

KARNATAKA



GOVERNMENT

DEPARTMENT OF SCHOOL EDUCATION AND LITERACY

Learning outcomes Based Assessment (LBA) Question Bank

2026-2027

Mathematics

7th Standard

Department of State Education Research & Training centre

Banashankari 3rd Stage Bangalore -560085

And

District Institute of Education & Training, Davanagere

ಪರಿಕಲ್ಪನೆ ಮತ್ತು ಮಾರ್ಗದರ್ಶನ	
ಶ್ರೀಮತಿ ರಶ್ಮಿ ಮಹೇಶ್.ವಿ, ಭಾ.ಆ.ಸೇ ಅಪರ ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿಗಳು, ಶಾಲಾ ಶಿಕ್ಷಣ ಮತ್ತು ಸಾಕ್ಷರತಾ ಇಲಾಖೆ	
ಶ್ರೀಮತಿ. ಡಾ. ಕೆ. ವಿದ್ಯಾಕುಮಾರಿ, ಭಾ.ಆ.ಸೇ ರಾಜ್ಯ ಯೋಜನಾ ನಿರ್ದೇಶಕರು, ಸಮಗ್ರ ಶಿಕ್ಷಣ ಇಲಾಖೆ, ಬೆಂಗಳೂರು	ಶ್ರೀಮತಿ ಅನಿತಾ ವಿ ನಾಜ್ವರೆ ನಿರ್ದೇಶಕರು, ಡಿ ಎಸ್ ಇ ಆರ್ ಟಿ, ಬೆಂಗಳೂರು
ಡಯಟ್ ಸಹಕಾರ	
ಪ್ರಾಂಶುಪಾಲರು ಶ್ರೀಮತಿ ಗೀತಾ. ಎಸ್. ಪ್ರಾಂಶುಪಾಲರು, ಡಯಟ್ ದಾವಣಗೆರೆ	ನೋಡಲ್ ಅಧಿಕಾರಿ ಶ್ರೀಮತಿ ಮಂಜಮ್ಮ ಲೋಕೇಶ್. ಎಸ್. ಹಿರಿಯ ಉಪನ್ಯಾಸಕರು, ಡಯಟ್ ದಾವಣಗೆರೆ
ಸಂಯೋಜನೆ	
ಶ್ರೀಮತಿ ರಾಧಾ ಪಿ ಹಿರಿಯ ಸಹಾಯಕ ನಿರ್ದೇಶಕರು, ಡಿ ಎಸ್ ಇ ಆರ್ ಟಿ, ಬೆಂಗಳೂರು	
ಸಂಪನ್ಮೂಲ ರಚನಾ ತಂಡ	
• ಶ್ರೀಮತಿ ನೇಮಾವತಿ. ಸಿ. ಎಂ. ಸ.ಶಿ. ಸ. ಹಿ. ಪ್ರಾ. ಶಾಲೆ. ಆವರಗೊಳ್ಳ ದಾವಣಗೆರೆ (ಉ.ವ) • ಶ್ರೀಮತಿ ಸಾವಿತ್ರಿ. ಕೆ. ಸ.ಶಿ. ಸ. ಹಿ. ಪ್ರಾ. ಶಾಲೆ. ಲೋಕಿಕೆರೆ. ದಾವಣಗೆರೆ (ದ.ವ) • ಶ್ರೀಮತಿ ಕಲ್ಪನಾ. ಸಿ. ಎನ್. ಸ.ಶಿ. ಸ. ಹಿ. ಪ್ರಾ. ಶಾಲೆ. ಕುಂಟಪಾಲನಹಳ್ಳಿ. ದಾವಣಗೆರೆ (ದ.ವ) • ಶ್ರೀಮತಿ ರೀನಾ .ಎನ್.ಎಂ. ಸ.ಶಿ. ಸ. ಪ್ರಾ. ಶಾಲೆ. ಗುತ್ತೂರು. ಹರಿಹರ (ತಾ) • ಶ್ರೀಮತಿ ಮುಸರ್ಫತ್ ಫಾತಿಮ. ಎಸ್. ಸ.ಶಿ. ಪಿ.ಎಂ.ಶ್ರೀ ಕೆ.ಪಿ.ಎಸ್. ಚನ್ನಗಿರಿ. (ತಾ)	• ಶ್ರೀಮತಿ ಸೈಯಿದಾ ಕೌಸರ್ ತಸ್ನೀಮ್. ಸ. ಶಿ. ಸ..ಉರ್ದು.ಪೌಢ ಶಾಲೆ. ಮಲೇಬೆನ್ನೂರು. ಹರಿಹರ (ತಾ) • ಶ್ರೀಮತಿ ಉಷಾ ಎಲ್. ಪಾಟೀಲ್. ಸ.ಶಿ. ಜಿ. ಜಿ. ಸಿ. ಕೊಡಗನೂರು. ದಾವಣಗೆರೆ (ದ.ವ) • ಶ್ರೀಮತಿ ಅರುಣಕುಮಾರಿ. ಸ. ಶಿ. ರಾ.ಸಿ.ಬಾ.ಪೌಢ ಶಾಲೆ ಪಿ.ಜೆ.ಬಡಾವಣೆ.ದಾವಣಗೆರೆ (ದ.ವ) • ಶ್ರೀಮತಿ ರಾಜೇಶ್ವರಿ ಅಂಗಡಿ. ಸ. ಶಿ. ಸ. ಪ್ರಾ.ಶಾ. ಮೆಳ್ಳೇಕಟ್ಟೆ. ದಾವಣಗೆರೆ (ಉ.ವ)
ಮಾರ್ಗದರ್ಶಕರು	ಪರಿಶೀಲಕರು
ಶ್ರೀಮತಿ ಶೋಭಾ. ಜಿ. ಸ.ಶಿ ಸ. ಹಿ. ಪ್ರಾ. ಶಾಲೆ. ಕರಿತಿಮ್ಮನಹಳ್ಳಿ ಬೆಂಗಳೂರು ದಕ್ಷಿಣ ವಲಯ-2	ಶ್ರೀಮತಿ ಮಂಗಳ. ವಿ. ಮು.ಶಿ ಸ. ಪ್ರಾ. ಶಾಲೆ. ದಿದ್ದಿಗಿ. ಜಗಲೂರು (ತಾ) ದಾವಣಗೆರೆ

ಮುನ್ನುಡಿ

ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ತರಗತಿ ನಿರ್ದಿಷ್ಟ ಕಲಿಕಾಫಲ ಆಧಾರಿತ ಕಲಿಕೆಯನ್ನು ಉಂಟುಮಾಡಲು ಹಾಗೂ ರಾಷ್ಟ್ರ ಮತ್ತು ರಾಜ್ಯ ಮಟ್ಟದ ಸಾಧನಾ ಸಮೀಕ್ಷೆಗಳಲ್ಲಿ ವಿದ್ಯಾರ್ಥಿಗಳ ಕಲಿಕಾ ಸಾಧನೆಯನ್ನು ಉತ್ತಮಪಡಿಸುವ ಮೂಲಕ ಶಾಲಾ ಶೈಕ್ಷಣಿಕ ವ್ಯವಸ್ಥೆಯನ್ನು ಬಲಪಡಿಸಲು ಹಾಗೂ ಕಲಿಕಾಫಲ ಆಧಾರಿತ ತರಗತಿ ಪ್ರಕ್ರಿಯೆಗಳನ್ನು ಪರಿಣಾಮಕಾರಿಗೊಳಿಸಲು ರಾಜ್ಯಮಟ್ಟದಲ್ಲಿ ಹಲವಾರು ಉಪಕ್ರಮಗಳನ್ನು ರೂಪಿಸಲಾಗಿದೆ. ತರಗತಿ ಪ್ರಕ್ರಿಯೆ, ಮೌಲ್ಯಾಂಕನ ಮತ್ತು ಮೌಲ್ಯಮಾಪನ ಪ್ರಕ್ರಿಯೆಗಳನ್ನು ಸಾಮರ್ಥ್ಯಧಾರಿತ, ಕಲಿಕಾ ಫಲ ಆಧಾರಿತವಾಗಿ ನಿರ್ವಹಿಸಲು ಹಾಗೂ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ನಿರೀಕ್ಷಿತ ಕಲಿಕಾ ಸಾಮರ್ಥ್ಯಗಳನ್ನು ಬೆಳೆಸಲು ರಾಜ್ಯ ಶೈಕ್ಷಣಿಕ ಸಂಶೋಧನೆ ಮತ್ತು ತರಬೇತಿ ಇಲಾಖೆ (DSERT) ಯಿಂದ ಕ್ರಮಗಳನ್ನು ಕೈಗೊಳ್ಳಲಾಗುತ್ತಿದೆ. ಈ ಹಿನ್ನೆಲೆಯಲ್ಲಿ 2026-27ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿಗೆ ಒಂದನೇ ತರಗತಿಯಿಂದ ಹತ್ತನೇ ತರಗತಿಯವರೆಗೆ 'ಗಣಿತ' ವಿಷಯದಲ್ಲಿ ಕಲಿಕಾಫಲ ಆಧಾರಿತ ಮೌಲ್ಯಾಂಕನ ಪ್ರಶ್ನಕೋರಿಯನ್ನು (LBA) ರೂಪಿಸಲಾಗಿದೆ.

ಪ್ರತಿ ತರಗತಿಗೆ ಸಂಬಂಧಿಸಿದ ಕಲಿಕಾ ವಿಷಯಗಳಲ್ಲಿ, ಕಲಿಕಾ ಸಾಮರ್ಥ್ಯಗಳು ಹಾಗೂ ಕಲಿಕಾ ಫಲಗಳ ಆಧಾರದಲ್ಲಿ ಪ್ರಶ್ನೆಗಳನ್ನು ರೂಪಿಸಲಾಗಿದೆ. ಗಣಿತ ವಿಷಯದಲ್ಲಿ ಪರಿಕಲ್ಪನಾತ್ಮಕ ಜ್ಞಾನ, ತಿಳಿವಳಿಕೆ, ಕೌಶಲ, ಅನ್ವಯ, ಸಮಸ್ಯಾ ಪರಿಹಾರ ಕೌಶಲಗಳು, ಗಣಿತೀಯ ಅನ್ವಯನ, ಸೃಜನೆ ಹಾಗೂ ಉನ್ನತ ಮಟ್ಟದಲ್ಲಿ ವಿದ್ಯಾರ್ಥಿಗಳ ಕಲಿಕೆಯನ್ನು ಮೌಲ್ಯಾಂಕನ ಮಾಡುವ ಉದ್ದೇಶದಿಂದ ವಸ್ತುನಿಷ್ಠ, ಸಂಕ್ಷಿಪ್ತ, ವಿವರಣಾತ್ಮಕ, ಅನ್ವಯಿಕ, ಕೌಶಲಾಧಾರಿತದಂತಹ ವಿವಿಧ ಸ್ವರೂಪದ ಪ್ರಶ್ನೆಗಳನ್ನು ರಚಿಸಲಾಗಿದೆ. ಇವು ಕಲಿಕಾರ್ಥಿಗಳಲ್ಲಿ ಉನ್ನತ ಮಟ್ಟದ ಚಿಂತನಾ ಕೌಶಲಗಳನ್ನು ಮೂಡಿಸಲು ಉಪಯುಕ್ತವಾಗಿವೆ.

ಕಲಿಕಾ ಫಲ / ಸಾಮರ್ಥ್ಯ ಆಧಾರಿತ ಮೌಲ್ಯಾಂಕನವು ಕೇವಲ ವಿದ್ಯಾರ್ಥಿಗಳ ಶೈಕ್ಷಣಿಕ ಸಾಧನೆಯನ್ನು ಅಳೆಯುವ ಸಾಧನವಲ್ಲ; ಬದಲಾಗಿ ಕಲಿಕೆಯ ಗುಣಮಟ್ಟವನ್ನು ವೃದ್ಧಿಸುವ, ಬೋಧನಾ ಪ್ರಕ್ರಿಯೆಯನ್ನು ಪರಿಣಾಮಕಾರಿಯಾಗಿಸುವ ಹಾಗೂ ಪ್ರತಿ ವಿದ್ಯಾರ್ಥಿಯ ಕಲಿಕಾ ಪ್ರಗತಿಯನ್ನು ನಿರಂತರವಾಗಿ ಗುರುತಿಸಿ, ಅಗತ್ಯ ಶೈಕ್ಷಣಿಕ ಬೆಂಬಲ ಒದಗಿಸುವ ಪ್ರಮುಖ ಶೈಕ್ಷಣಿಕ ಸಾಧನವಾಗಿದೆ. ಈ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಸದರಿ ಪ್ರಶ್ನಕೋರಿಯನ್ನು ತರಗತಿಪ್ರಕ್ರಿಯೆ, ಮೌಲ್ಯಾಂಕನ ಮತ್ತು ಮೌಲ್ಯಮಾಪನ ಪ್ರಕ್ರಿಯೆಗಳಲ್ಲಿ ನಿರಂತರವಾಗಿ (CCE) ಬಳಸುವುದು ಅತ್ಯವಶ್ಯಕವಾಗಿದೆ.

ರಾಜ್ಯದ ಎಲ್ಲಾ ಶಾಲೆಗಳಲ್ಲಿ ಗಣಿತ ಬೋಧನಾ-ಕಲಿಕಾ ಪ್ರಕ್ರಿಯೆಯನ್ನು ಮತ್ತಷ್ಟು ಉತ್ತಮಗೊಳಿಸುವಲ್ಲಿ ಹಾಗೂ ವಿದ್ಯಾರ್ಥಿಗಳ ಕಲಿಕಾಫಲ ಆಧಾರಿತ ಕಲಿಕೆಯನ್ನು ಉನ್ನತೀಕರಿಸುವಲ್ಲಿ ಈ **ಕಲಿಕಾಫಲ ಆಧಾರಿತ ಮೌಲ್ಯಾಂಕನ ಪ್ರಶ್ನಕೋರಿಯು** ಉಪಯುಕ್ತವಾಗಿದೆ. ಸದರಿ ಕಾರ್ಯದಲ್ಲಿ ಭಾಗವಹಿಸಿದ ವಿಷಯ ಪರಿಣಿತರು, ಸಂಪನ್ಮೂಲ ವ್ಯಕ್ತಿಗಳು, ಶಿಕ್ಷಣ ತಜ್ಞರಿಗೆ ಇಲಾಖೆಯು ಕೃತಜ್ಞತೆಗಳನ್ನು ಸಲ್ಲಿಸುತ್ತದೆ.

ನಿರ್ದೇಶಕರು
ಡಿ.ಎಸ್.ಇ.ಆರ್.ಟಿ, ಬೆಂಗಳೂರು

ಶಿಕ್ಷಕರಿಗೆ ಮಾರ್ಗಸೂಚಿ

1. ಶಿಕ್ಷಕರು, ಸಂಪನ್ಮೂಲ ವ್ಯಕ್ತಿಗಳು, ಇಲಾಖೆಯ ಎಲ್ಲಾ ಹಂತದ ಅನುಷ್ಠಾನಾಧಿಕಾರಿಗಳು ಮೊದಲಿಗೆ ಪಠ್ಯಕ್ರಮದ ಗುರಿಗಳು, ಸಾಮರ್ಥ್ಯಗಳು ಮತ್ತು ಕಲಿಕಾಫಲಗಳ ಬಗ್ಗೆ ಸ್ಪಷ್ಟವಾಗಿ ಅರಿತುಕೊಳ್ಳಬೇಕು.
2. ಮಕ್ಕಳು ಆಯಾ ತರಗತಿ ಹಾಗೂ ವಿಷಯವಾರು ಸಾಧಿಸಬೇಕಾದ ಕಲಿಕಾಫಲಗಳಿಗೆ ಪೂರಕವಾಗಿ ಇಲ್ಲಿ ಚಟುವಟಿಕೆಗಳು ಹಾಗೂ ಪ್ರಶ್ನೆಗಳನ್ನು ನೀಡಲಾಗಿದೆ. ಶಿಕ್ಷಕರು ತಮ್ಮ ತರಗತಿ ಪ್ರಕ್ರಿಯೆಯಲ್ಲಿ ಮಕ್ಕಳು ಕಲಿಕಾಫಲಗಳನ್ನು ಸಾಧಿಸಲು ಪೂರಕವಾಗಿ ಇವುಗಳನ್ನು ಸಂದರ್ಭೋಚಿತವಾಗಿ ಬಳಸುವುದು.
3. ತರಗತಿ ಪ್ರಕ್ರಿಯೆಯಲ್ಲಿ ಹಂತ ಹಂತವಾಗಿ ಕಲಿಕಾಫಲ ಆಧಾರಿತ ಚಟುವಟಿಕೆಗಳನ್ನು ಬಳಸುವ ಮೂಲಕ ಮಕ್ಕಳನ್ನು ತೊಡಗಿಸಿಕೊಳ್ಳುವುದು ಹಾಗೂ ಮೌಲ್ಯಮಾಪನ ಪ್ರಕ್ರಿಯೆಯಲ್ಲಿ ಕಲಿಕಾಫಲ ಆಧಾರಿತ ಪ್ರಶ್ನಾಕೋಶದಲ್ಲಿ ನೀಡಿರುವ ಪ್ರಶ್ನೆಗಳನ್ನು ಅವಶ್ಯಕತೆಗಳಿಗನುಗುಣವಾಗಿ ಅಭ್ಯಾಸ ಮಾಡಿಸುವುದು.
4. ವಿದ್ಯಾರ್ಥಿಗಳ ಕಲಿಕಾ ಅಂತರವನ್ನು ಗುರುತಿಸಿ ಸೂಕ್ತ ಚಟುವಟಿಕೆಗಳನ್ನು ಕೈಗೊಳ್ಳುವ ಮೂಲಕ ತರಗತಿ ನಿರ್ದಿಷ್ಟ ಕಲಿಕೆಗೆ ಅಗತ್ಯ ಕ್ರಮವಹಿಸುವುದು.
5. ಪ್ರಶ್ನೆಕೋಶಿಯು ಜ್ಞಾನ, ಗ್ರಹಿಕೆ, ಅನ್ವಯ, ಅಭಿವ್ಯಕ್ತಿ, ಪ್ರಶಂಸೆ, ವಿಮರ್ಶಾತ್ಮಕತೆ ಹಾಗೂ ಹೈಯರ್ ಆರ್ಡರ್ ಪ್ರಶ್ನೆಗಳನ್ನು ಒಳಗೊಂಡಿದೆ. ಹೈಯರ್ ಆರ್ಡರ್ ಪ್ರಶ್ನೆಗಳು ಹೋಲಿಕೆ, ಸಾಮ್ಯತೆ ಮತ್ತು ವ್ಯತ್ಯಾಸ, ವಿಶ್ಲೇಷಣಾ ಸಾಮರ್ಥ್ಯ, ಮೌಲ್ಯಮಾಪನ ಮತ್ತು ಸೃಜನಶೀಲತೆಯಂತಹ ಆಯಾಮಗಳನ್ನು ಒಳಗೊಂಡಿರುತ್ತದೆ.
6. ಕೇವಲ ಅಂಕಗಳನ್ನು ನಮೂದಿಸುವುದಕ್ಕಾಗಿ, ಅಥವಾ ಪಠ್ಯವಸ್ತುವನ್ನು ಪೂರ್ಣಗೊಳಿಸುವುದಕ್ಕಾಗಿ ಕಲಿಕಾ ಫಲಾಧಾರಿತ ಮೌಲ್ಯಾಂಕನವನ್ನು ಜಾರಿಗೊಳಿಸದೇ, ವಿದ್ಯಾರ್ಥಿಗಳ ಸಾಮರ್ಥ್ಯ ವೃದ್ಧಿಗಾಗಿ ಹಾಗೂ ಕೌಶಲಗಳ ಪ್ರಾಪ್ತಿಗಾಗಿ ಕಲಿಕಾಫಲ ಆಧಾರಿತ ಮೌಲ್ಯಾಂಕನ ಪ್ರಶ್ನಾಕೋಶಿಯನ್ನು ಪರಿಣಾಮಕಾರಿಯಾಗಿ ಬಳಕೆ ಮಾಡುವುದು.
7. ಶಿಕ್ಷಕರು ಎಲ್ಲಾ ವಿಷಯಗಳಲ್ಲೂ ನಿಗದಿತ ಸಾಮರ್ಥ್ಯಗಳಿಸುವುದಕ್ಕಾಗಿ ಕಲಿಕಾನುಭವಗಳನ್ನು ನೀಡುವ ಹಾಗೂ ಮಕ್ಕಳ ಬೌದ್ಧಿಕ ಬೆಳವಣಿಗೆಗೆ ಸಹಕರಿಸುವ ನಿಟ್ಟಿನಲ್ಲಿ ಚಿಂತಿಸಿ ಈ ಶೈಕ್ಷಣಿಕ ಉಪಕ್ರಮವನ್ನು ಕಾರ್ಯಗತಗೊಳಿಸಬೇಕಿದೆ.
8. ಆಯಾಯ ತರಗತಿಯಲ್ಲಿ ಕಲಿಕೆಯನ್ನು ಅನುಕೂಲಿಸುತ್ತಿರುವ ವಿಷಯವಾರು ಶಿಕ್ಷಕರು ತಮ್ಮ ತಮ್ಮ ವಿಷಯಗಳ ಪ್ರಶ್ನಾಕೋಶಿಯನ್ನು ಅರ್ಥಪೂರ್ಣವಾಗಿ ಬಳಸಿಕೊಂಡು ಮಕ್ಕಳಲ್ಲಿ ಅಪೇಕ್ಷಿತ ಕಲಿಕಾಫಲಗಳ ಸಾಧನೆಗಾಗಿ ಶ್ರಮಿಸುವುದು.
9. ಇಲಾಖೆಯ Website ನಲ್ಲಿ ಲಭ್ಯವಿರುವ ಕಲಿಕಾಫಲ ಆಧಾರಿತ ಮೌಲ್ಯಾಂಕನ ಪ್ರಶ್ನೆಕೋಶಿಯನ್ನು ಕೂಲಂಕಷವಾಗಿ ಅವಲೋಕಿಸುವುದು ಹಾಗೂ ಅವುಗಳನ್ನು ಕಲಿಕೆಯಲ್ಲಿ ಪರಿಣಾಮಕಾರಿಯಾಗಿ ಬಳಸುವುದು.
10. ಪ್ರಶ್ನೆಕೋಶಿಯನ್ನು ತರಗತಿ ಪ್ರಕ್ರಿಯೆ, ಮೌಲ್ಯಾಂಕನ, ಮೌಲ್ಯಮಾಪನ ಪ್ರಕ್ರಿಯೆಗಳಲ್ಲಿ ನಿರಂತರವಾಗಿ ಬಳಸುವುದು ಹಾಗೂ ಮಾಹಿತಿಯನ್ನು SATSನಲ್ಲಿ ಕಾಲಕಾಲಕ್ಕೆ ಇಂದೀಕರಿಸುವುದು.
11. LBA, ರೂಪಣಾತ್ಮಕ ಮೌಲ್ಯಾಂಕನ, ಸಂಕಲನಾತ್ಮಕ ಮೌಲ್ಯಮಾಪನ ಹಾಗೂ ಇತರೆ ಪರೀಕ್ಷೆಗಳಲ್ಲಿ, LBA ಯಲ್ಲಿರುವಂತೆ ಎಲ್ಲಾ ಸ್ವರೂಪದ ಪ್ರಶ್ನೆಗಳನ್ನು ಒಳಗೊಂಡ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಸಿದ್ಧಪಡಿಸುವುದು ಹಾಗೂ ವಿಶ್ಲೇಷಣಾ ವರದಿಯನ್ನು ಆಧರಿಸಿ ಪರಿಹಾರಾತ್ಮಕ ಕ್ರಮಗಳನ್ನು ಕೈಗೊಳ್ಳುವುದು.
12. ಪ್ರಶ್ನೆಕೋಶಿಯಲ್ಲಿರುವ ಉತ್ತರ ಕೀಲಿಯನ್ನು ವಿಷಯ ಶಿಕ್ಷಕರು ಒಮ್ಮೆ ಅವಲೋಕಿಸಿ, ಖಚಿತಪಡಿಸಿಕೊಂಡು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವಂತೆ ಅಪೇಕ್ಷಿತ ಉತ್ತರಗಳನ್ನು ಒದಗಿಸುವುದು.

LIST OF LEARNING OUTCOMES

Curricular Goals	Competencies	Learning outcomes	Chapter name
CG-1- Understands numbers and sets of numbers (whole numbers, fractions, integers, rational numbers, and real numbers), looks for patterns, and appreciates relationships between numbers.	C-1.1: Develops the ability to read, write, compare, estimate, and perform operations with large whole numbers up to 20 digits, and expresses them in scientific notation using exponents and powers.	1. Read and write large numbers. Compare Indian and American number systems. Create large numbers using different techniques. 2. Identify number patterns and solve problems related to large numbers also solve guess estimation problems. 3. Estimate the numbers to the nearest place values. Also estimate the number of digits in the product of two numbers.	1. Large Numbers Around Us
	C-1.2: Discovers, identifies, and explores number patterns (e.g., multiples of 7, powers of 3, prime numbers) and explains relationships between different patterns.	4. Identify numerical properties, patterns, place value, and properties of addition and multiplication, and generalize two-digit and three-digit numbers into arithmetic expressions. 5. Solve mathematical grids and magic-square-based problems. 6. Develop logical thinking through Virahanka and Fibonacci sequences and number-based puzzles.	6. Number Play
		7. Find prime factors and multiples of numbers. 8. Explain the difference between HCF and LCM of given numbers and find HCF and LCM of given numbers. 9. Solve related word problems and apply them in daily life. Find different number patterns and solve puzzles	11. Finding Common Ground
	C-1.3: Learns about zero and negative numbers and performs arithmetic operations on them as described by Brahmagupta.	10. Perform addition and subtraction of integers 11. Determine the results of multiplication and division involving positive and negative integers and apply them in daily life.	10. Operation with Integers

	C-1.4: Explores sets of numbers such as whole numbers, fractions, integers, rational numbers, and real numbers, and visualizes them on the number line.		
	C-1.6: Explores and applies fractions, both as ratios and decimals, in everyday situations.	12. Identify the need for decimal numbers, compare them with whole numbers, and represent them on the number line. 13. Arrange decimals in ascending and descending order. 14. Convert decimals into fractions and fractions into decimals. 15. Explain basic operations on decimals and apply them in daily life (money, weight, length, etc.).	3. A peek beyond the points
		16. Perform multiplication and division of fractions using standard procedures and solve related word problems. 17. Explain the rationale behind multiplication and division of fractions	8. Working with Fractions
CG-2- Understands the concepts of variable, constant, coefficient, expression, and (one-variable) equation, and uses these concepts to solve meaningful daily-life problems with procedural fluency.	C-2.1: Understands equality between numerical expressions and checks arithmetic equations.	18. Express the given situations as arithmetic expressions, Read and evaluate complex expressions including brackets. 19. Compare the different arithmetic expressions. Explain commutative and associative properties of addition. 20. Explain the use of arithmetic expressions in everyday transactions and situations.	2. Arithmetic Expressions
	C-2.2: Extends number representation using variables and algebraic expressions.	21. Use appropriate symbols to express mathematical relationships and patterns and write algebraic expressions using letters and numbers. 22. Convert verbal statements into expressions; identify like and unlike terms, and simplify algebraic	4. Expressions using letter numbers

		expressions.	
	C-2.3: Forms and manipulates algebraic expressions using variables, coefficients, and constants.	23. Simplify algebraic expressions and solve puzzles	4. Expressions using letter numbers
	C-2.4: Forms and solves linear equations to find unknown values, including in puzzles and word problems.	24. Convert word problems into algebraic equations and solve one-step and two-step equations using balancing or transposition methods. 25. Develop logical reasoning, analytical skills, and algebraic thinking required to solve real-world problems.	15. Finding the Unknown
	C-2.5: Develops personal methods for solving puzzles and problems using algebraic thinking.	26. Generate equations and solve real life problems. Express patterns as algebraic expression.	15. Finding the Unknown
CG-3- Understands, formulates, and applies properties and theorems regarding simple geometric shapes (2D and 3D).	C-3.1: Describes, classifies, and understands relationships among different 2D and 3D shapes using their properties.		
	C-3.2: Explains the properties of lines, angles, triangles, quadrilaterals, and polygons and applies them in problem-solving.	27. Identify opposite angles, linear pairs, perpendicular and parallel lines, corresponding angles in the surroundings. Obtain parallel and perpendicular lines through paper folding. 28. Identify corresponding and alternate angles. Find the unknown angles when a transversal cut parallel lines. 29. Recognize applications of geometry in art, engineering, and architecture. 30. Investigate and explain triangle inequality and angle properties through practical and logical reasoning 31. Solve problems based on triangle	5. Parallel and Intersecting Lines

		inequality and angle sum property.	
	C-3.3: Identifies attributes of 3D shapes, constructs them using materials, and uses 2D representations to visualize and solve problems.	32. Classify triangles based on their sides and angles	7. A tale of three intersecting lines
	C-3.4: Draws and constructs geometric shapes such as lines, parallel and perpendicular lines, angles, and simple triangles using a compass and straightedge.	33. Construct the different types of triangles 34. Construct and measure heights (altitudes) using geometric tools. Construct parallel lines, perpendicular bisectors.	7. A tale of three intersecting lines
	C-3.5: Understands congruence and similarity and identifies similar and congruent triangles.	35. Explain the meaning of congruency. Identify corresponding equal sides and angles and apply congruence criteria (SSS, SAS, ASA, AAS, RHS) to solve problems. 36. Appreciate the importance of congruence in everyday life (e.g., paired windows, identical designs). 37. Explain why the triangles are congruent.	9. Geometric twins
CG-4- Develops understanding of perimeter and area for 2D shapes and uses them to solve day-to-day life problems.	C-4.1: Discovers and uses formulas for the area of squares, triangles, parallelograms, and trapeziums, and finds areas of composite shapes.		
	C-4.2: Learns the Baudhayana–Pythagoras theorem, explores geometric proofs, and studies related constructions from the Sulba-Sutras.		
	C-4.3: Creates tiling designs using 2D shapes and appreciates their use in Indian and world art.	38. Use congruence properties to construct angles and perpendicular bisectors using only a ruler and compass also construct various art patterns. 39. Create tiling techniques in square grid/rectangular grid	14. Constructions and Tilings

	C-4.4: Develops familiarity with fractals and recognizes their appearance in nature and art.		
CG-5- Collects, organizes, represents (graphically and in tables), and interprets data/information from daily-life experiences.	C-5.1: Collects, organizes, and interprets data using mean, median, and mode.	40. Identify, collect, and interpret statistical data from daily-life situations and distinguish statistical questions from statements. 41. Calculate mean for the given data and solve problems 42. Calculate median for the given data and solve problems. 43. Represent data using dot plots, bar graphs, and double bar graphs, and correctly interpret scales, patterns, and variations.	13. Connecting the Dots
	C-5.2: Selects, creates, and uses graphs such as pictographs, bar graphs, histograms, line graphs, and pie charts to interpret data.		
CG-6- Develops mathematical thinking and the ability to communicate mathematical ideas logically and precisely.	C-6.1: Uses inductive and deductive reasoning to formulate definitions, make conjectures, and develop proofs in algebra, number theory, and geometry.		
CG-7- Engages with puzzles and mathematical problems and develops own creative methods and strategies to solve them.	C-7.1: Demonstrates creativity in discovering solutions to puzzles and appreciates different approaches by others.	44. Solve simple cryptarithm puzzles based on addition.	6. Number Play
	C-7.2: Engages in and appreciates the creativity and aesthetics of puzzle-making and puzzle-solving.	45. Pose puzzles and solve them	6. Number Play
CG-8- Develops basic skills and capacities of computational thinking, namely, decomposition, pattern recognition, data	C-8.1: Applies programmatic thinking, including iteration, symbolic representation, logical operations, and algorithmic problem-solving.		
	C-8.2: Learns systematic counting, listing, reasoning, pattern recognition, data representation, and algorithm design, while understanding		

representation , generalisation , abstraction, and algorithms in order to solve problems where such techniques of computational thinking are effective.	correctness and efficiency.		
CG-9- Knows and appreciates the development of mathematical ideas over a period of time and the contributions of past and modern mathematicians from India and across the world.	C-9.1: Recognizes the historical development of mathematical concepts across different civilizations.		
	C-9.2: Knows and appreciates the contributions of Indian mathematicians such as Aryabhata, Brahmagupta, Bhaskara, Ramanujan, and others.	46. Appreciate the usage of notion of decimal quantities in historical times 47. Appreciate the Virahanka-Fibonacci numbers 48. Appreciate the rules given by Brahmagupta for fraction multiplication and division 49. Appreciate the rules given by Brahmagupta for integer multiplication and division 50. Appreciate the knowledge of linear equations in historical times	3. A peek beyond the point. 6. Number Play 10. Operation with Integers 8. Working with fractions
CG-10- Knows about and appreciates the interaction of Mathematics with each of their other school subjects.	C-10.1: Recognizes connections between Mathematics and subjects such as Science, Social Science, Visual Arts, Music, Vocational Education, and Sports.	51. Appreciate the connections and integration of mathematics with other subjects.	

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PART - 1
Chapter – 01- Large Number around us

Lo.No	Learning Outcomes	Question numbers
1	Read and write large numbers. Compare Indian and American number systems. Create large numbers using different techniques.	1, 2, 3, 4, 6, 7, 8, 11, 13, 14, 16 to 25, 31 to 35, 41 to 50, 66, 67, 73
2	Identify number patterns and solve problems related to large numbers also solve guess estimation problems.	5, 9, 15, 26 to 30, 68, 69, 74, 75
3	Estimate the numbers to the nearest place values. Also estimate the number of digits in the product of two numbers.	10, 12, 36 to 40, 51 to 65, 70, 71, 72

Weightage to Objectives

Sl. No.	Objectives	Number of Questions	Marks	Percentage
1	Knowledge	24	29	20%
2	Understanding	22	44	30%
3	Application	21	43	30%
4	Skill	08	29	20%
Total		75	145	100%

Weightage to Difficulty Level

Sl. No.	Difficulty	Number of Questions	Marks	Percentage
1	Easy	26	44	30%
2	Average	27	72	50%
3	Difficult	12	29	20%
Total	Grand Total	75	145	100%

I. Choose the correct answer:

10×1 = 10

1. Largest 1-digit number (Knowledge- Easy)
a. 9 B. 5 C. 10 D. 8
2. Hundreds in one thousand. (Knowledge- Easy)
a. 5 b.9 c. 10 d.0
- 3.Number in the tens place of 500 (Knowledge - Easy)
a. 5 b.0 c.50 d.0.5
- 4.If we subtract 1 from the largest 2-digit number (Knowledge -Easy)
a. 46 b.22 c.98 d.99
5.

127

 $\longrightarrow$

128

 $\longrightarrow$

--

 The next number (Knowledge- Easy)
. a.125 b.126 c.128 d.129
6. The root words for Lakh and Crore come from the language (Understanding-Easy)
a. Kannada b. Sanskrit c. Persian d. English
- 7.In the American system, Commas are placed to group the digits. (Knowledge - Easy)
a. 5 b.4 c.6 d. 3
8. Zeros in one Lakh. (Knowledge- Easy)
a. 5 b.4 c.6 d. 3
9. Nearest ten of 146 is . (Knowledge - Easy)
a. 140 b.150 c.200 d. 100
- 10."4 groups of 5 objects" written in multiplication is (Knowledge-Easy)
a. 5×4 b. $5 - 4$ c. $5 + 4$ d. $5 \div 4$

II. Fill in the blanks:

5×1 = 5

11. "Ten thousand" written in number..... (Knowledge- Easy)
12. Round off 3587 to nearest thousand is (Knowledge - Easy)
13. Largest 3-digit number is..... (Knowledge- Easy)
14. 1 kilometre = ---- meters. (Knowledge- Easy)
15. Number after 1000 is (Knowledge- Easy)

III. Put commas and write the numbers in words. $5 \times 1 = 5$ (Understanding- Easy)

16. 700596

17. 251388

18. 401010

19. 650111

20. 946440

IV. Write in number $5 \times 1 = 5$

(Knowledge - Easy)

21. Five lakhs and ten

22 . Nine lakhs ninety nine thousand nine hundred and ninety nine.

23. One Lakh and one hundred ten.

24. Eight lakhs twenty six thousand nine hundred and ten.

25. Six lakhs and one.

V. There is only one +1000 button in the picture. How many times should it be pressed to indicate the next number? $5 \times 1 = 5$

(Application- Easy)

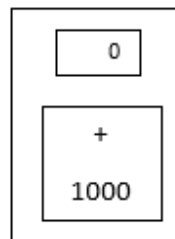
26. 26000

27. 5120

28. 17000

29. 44000

30. 12100



VI. Compare the below using($<$, $>$, $=$) $5 \times 1 = 5$

31. 30 Thousand =		3 Lakhs	(Application-Average)
32. 500 Lakhs =		5 Million	(Application-Easy)
33. 800 Lakhs =		5 Million	(Application-Easy)
34. 640 Lakhs =		60 Million	(Application-Easy)
35. 1 Crore =		10 Million	(Application- Average)

VII. Write the following numbers nearest to its Thousand's place. $5 \times 1 = 5$ (Understanding- Easy)

36. 45,601

37. 6,56,400

38. 1,05,700

39. 27,301

40. 44,999

VIII. Read the numbers and write in Indian and American system in words. $5 \times 2 = 10$

(Knowledge -Average)

41. 8490561

42. 6890010

43. 772456

44. 9116200

45. 692010

IX. Write the following numbers in Indian system with commas: $5 \times 2 = 10$

(Understanding- Average)

46. Fifty six Billion Four Hundred and Twenty six

47. Five Hundred and one Million and Twenty six

48. One Hundred Twenty Thousand and Hundred and Forty-five

49. Seven Million and One

50. Six Hundred and One billion and Fourteen Thousand and Seven

X. Give examples for the below statements: $5 \times 2 = 10$

(Application- Average)

51.	1 digit	×	1 digit
52.	2 digit	×	2 digit
53.	3 digit	×	3 digit
54.	4 digit	×	4 digit
55.	5 digit	×	5 digit

XI. Find products and estimate to nearest thousand. $5 \times 3 = 15$ (Understanding-Average)

56. 458×64

57. 226×39

58. 974×426

59. 895×34

60. 972×49

XII. Find quick methods to do the following multiplications.

$5 \times 3 = 15$

61. $5 \times 125 \times 50$

(Skill - Difficult)

62. 200×724

(Skill - Easy)

63. $25 \times 595 \times 50$

(Skill - Difficult)

64. $100 \times 24 \times 9$

(Skill - Easy)

65. $125 \times 43 \times 20$

(Skill - Difficult)

XIII. Solve the following:

$5 \times 4 = 20$

66. If you add the largest 3-digit number and the largest 2-digit number then subtract the largest 3-digit number, what number do you get? (Application - Average)

67. If you subtract the largest 3-digit number from the smallest 4-digit number and add the largest 2-digit number, what number do you get? (Application - Average)

68. Observe these numbers. (Application - Average)



- A) 8415 B) 6796 C) 2221 D) 1800

How many sticks are required to form the given numbers?

69. 4-digit numbers that can be written using 24 matchsticks (Skill - Average)

70. Find the actual sum and the estimated sum to the nearest thousand of 5254 and 3796.

(Understanding- Average)

XIV. Solve the Following:

71. Write the 5 nearest neighbour numbers to the following (Skill - Difficult)

A. 3, 87, 69, 957

72. Subtract 4, 90,020 from 14,63,128 and write the next 4 nearest neighbour numbers.

(Understanding-Easy)

73. Use numbers from 1 to 9 and write the five largest numbers without repetition. (Application- Difficult)

74. Complete the pattern

(Skill - Difficult)

12
123
1231
12312
123123

75. 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 Strike out 10 smallest numbers here and write the largest 5-digit numbers.

(Application- Difficult)

Chapter: 2 - Arithmetic Expression

Lo.No	Learning Outcomes	Question numbers
18	Express the given situations as arithmetic expressions, Read and evaluate complex expressions including brackets.	1, 2, 5, 6, 8, 9, 11, 13, 14, 16, 17, 20, 22, 23, 32, 34, 35, 39, 41
19	Compare the different arithmetic expressions. Explain commutative and associative properties of addition.	4, 7, 10, 12, 15, 19, 21, 24, 29, 30, 31, 33, 36
20	Explain the use of arithmetic expressions in everyday transactions and situations	3, 19, 25 to 28, 37, 38, 40, 42, 43, 45 to 47

Weightage to Objectives

Sl. No.	Objectives	Number of Questions	Marks	Percentage
1	Knowledge	18	22	20%
2	Understanding	11	31	30%
3	Application	11	31	30%
4	Skill	7	22	20%
Total		47	106	100%

Weightage Difficulty Level

Sl. No.	Difficulty	Number of Questions	Marks	Percentage
1	Easy	24	31	30%
2	Average	17	53	50%
3	Difficult	06	22	20%
Total	Grand Total	47	106	100%

I. Choose the correct answer from the four options given below. 10 X 1 = 10

1. Simple arithmetic expression is (Easy- knowledge)
- a) 12 b) $13+2$ c) 8 d) 5
2. "Add three to six." The arithmetic expression form of this statement (Easy- knowledge)
- a) $6 + 3$ b) $6 - 3$ c) 6×3 d) $6 \div 3$
3. 20 as the product of two numbers. (Easy-knowledge)
- a) $10 + 2$ b) 10×2 c) $10 - 2$ d) $10 \div 2$
4. The sign used to compare expressions is (Easy-knowledge)
- a) '+' b) '-' c) $\div$ d) =
5. The value of $10 + 2$ is (Easy-knowledge)
- a) 13 b) 12 c) 10 d) 5
6. The value of $7 + 4 - 2$ is (Easy-knowledge)
- a) 5 b) 6 c) 8 d) 9
7. The mathematical expression of $10 + 2$ is greater than $7 + 1$ (Easy-knowledge)
- a) $10 + 2 = 7 + 1$ b) $10 + 2 < 7 + 1$ c) $10 + 2 > 7 + 1$ d) None of these
8. In the expression $30 + (5 \times 4)$, the value of the sub-expression inside the brackets is. (Easy-understanding)
- a) 50 b) 30 c) 20 d) 10
9. The individual terms of the expression $83 - 14$ are. (Easy-knowledge)
- a) 83, 14 b) -83, 14 c) 83, -14 d) -83, -14
10. When $5 - (2 - 10)$ is rewritten without brackets, it becomes. (Easy-knowledge)
- a) $5 - 2 - 10$ b) $5 - 2 + 10$ c) $5 + 2 - 10$ d) $5 + 2 + 10$

II. Fill in the blank spaces with the most appropriate answers. 10 X1 = 10

11. The signs used to perform operations between two numbers are _____. (Easy-knowledge)
12. The signs used to compare two expressions are _____. (Easy- knowledge)
13. The sign used to show the relation between an arithmetic expression and its evaluated value is _____. (Easy-understanding)

14. The value of the expression $-10 + 25 + 3$ is _____ (Easy-knowledge)

15. If the terms of $6 + (-4)$ are interchanged, the expression becomes _____.
(Easy-knowledge)

16. An expression equivalent to $8 - (5 + 2)$ without brackets is _____ (Easy-knowledge)

17. Form an correct expression by using suitable brackets $100 - 15 + 56 = 29$ _____ (Easy-skill)

18. Fill with missing signs $27 - (8 + 3) = 27$ ____ 8 ____ 3 (Easy-knowledge)

19. 97×25 means 97 times _____. (Easy- knowledge)

20. $5 - 2 \times 7 = 5 \times 7 - 2 \times$ _____ (Easy-knowledge)

III. 21.Match the Following.

5 X 1 = 5 (Easy-knowledge)

Column A	Column B
a) $20 - (4 + 3)$	1. 48
b) $4 \times 9 + 2 \times 6$	2. $(100 - 2) \times 8$
c) $6 \times 5 + 3$	3. $(20 - 4) - 3$
d) 98×8	4. $(100 + 2) \times 8$
e) 0	5. 33
	6. $0 + 0, 1 - 1, 0 \times 1, 0 \div 1$

IV. Solve the following Question

10 X 2 = 20

22. Explain arithmetic expressions with a suitable example. (Easy-Understanding)

23. What are the primary mathematical operations used in arithmetic expressions?
(Easy-Understanding)

24. Write the signs used to compare arithmetic expressions. (Easy-Understanding)

25. A box contains 25 mangoes. There are 6 more boxes containing 5 mangoes each. How many total mangoes are there?
(Average-Application)

26. Satish bought a book for ₹15 and a pen for ₹10. He gave a ₹100 note to the shopkeeper. Write the arithmetic expression to find the amount he gets back.
(Average-Application)

27. Neeta had ₹150. She purchased a school bag for ₹40 and a water bottle for ₹25. How much money does

she have left?

(Average- Application)

28. Shyam is plying a drone from his terrace. It goes 8m up and then moves 4m down. Write an expression to show how high the final position of the drone is from the terrace?(Difficult- Application)

29. Write the commutative property of addition using the numbers 9 and 2.

(Average-Application)

30. Write the associative property of addition to the numbers 2, 3, and 4.

(Average-Application)

31. Write the distributive property using the numbers 2, 5, and 3.

(Average-Application)

V. Solve the following.

$$5 \times 3 = 15$$

32. Calculate the values of the following expressions and arrange them in ascending order

a) $35 + 15$ b) $67 - 20$ c) 25×5 d) $60 + 40$ e) $57 - 14$ f) $105 \div 3$

(Average- Understanding)

33. Compare the following pairs, determine which is greater, and fill in with the correct sign

($>$, $<$, or $=$)

(Average-skill)

a) $1023 + 125$ OR $1022 + 128$

b) $364 + 587$ OR $363 + 589$

c) $129 + 245$ OR $124 + 245$

34. Write each expression as a sum of its terms, and then find its final value:

(Average- skill)

expression	Sum of the terms	Value
a) $15 - 2 + 6$		
b) $8 + 5 \times 3$		
c) $24 - 3 \times 4 + 16$		

35. Solve the following expressions by removing the brackets.

(Average- skill)

a) $(5 + 10) - 3$

b) $16 - (8 - 3)$

c) $32 - (15 + 4)$

36. Fill in the missing boxes and blanks with appropriate operations/numbers to make both sides equal.

(Average-Understanding)

a) $35 + (6 - 4) = 35 + 6$ _____

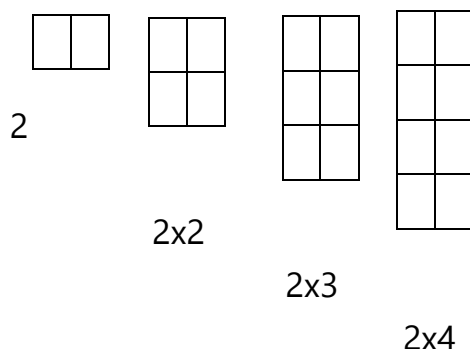
b) $20 - 6 - 4 = 24 - 6$ _____

c) $37 - (8 \square \text{ ——— }) = 37 - 8 + 3$

VI. Solve the following.

9 X 4 = 36

37. Write a repression and find the value for the following situation. Entry ticket rate at an exhibition is ₹40 for adults and ₹20 for children. Find the total cost for 4 adults and 3 children. (Average-Application)
38. Four friends go to a restaurant and order 4 dosas. Each dosa costs ₹25. They also give a combined tip of ₹10 to the waiter. Write an expression for the total expense. (Average-Application)
39. Find the values of the following pairs of expressions. Predict whether their values will turn out identical before solving, when the expressions are equal. (Difficult- Understanding)
- a) $(5 + 8) - 2$ and $5 + (8 - 2)$
- b) $25 - (10 + 6)$ and $25 + (-10 - 6)$
40. Asha and Deepa visited a restaurant. Each ordered one pizza costing ₹63 and one jamun costing ₹14. Frame a single expression using brackets to represent their total bill, compute the amount, and name the mathematical property utilized. (Average-Application)
41. Find the product by using distributive property. (Average-Understanding)
- a) 42×12 b) 104×5 c) 96×10 d) 49×8
42. Observe the relation pattern and solve. (Average -Understanding)
- a) If $43 \times 16 = 688$, then find the value of 53×16
- b) If $58 \times 15 = 870$, then find the value of 68×15
43. Count the total number of small square units in the given grid boxes by writing an expression using brackets along with addition operations. (Average- skill)



44. Find the grand sum of all numbers given in the patterns below using at least two different methods.

(Difficult -Skill)

Figure : 01

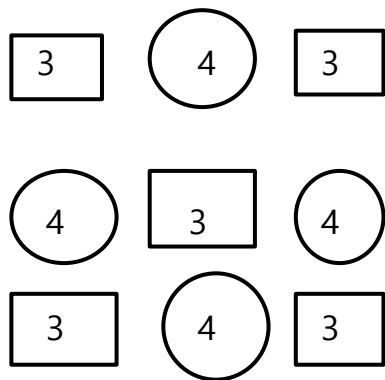
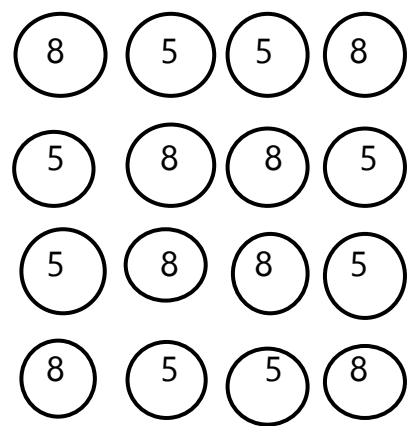


figure : 02



45. Complete the following table structure.

(Average -skill)

Expression	Expression as the sum of its Terms	Terms
$4 + 15 - 9$	+ +	_____
$5 + 6 \times 3$	+	_____
$21 - 2 \times 4 + 13$	+ +	_____
$32 - 15 + 17$	+ +	_____

VII. Solve the following.

$$2 \times 5 = 10$$

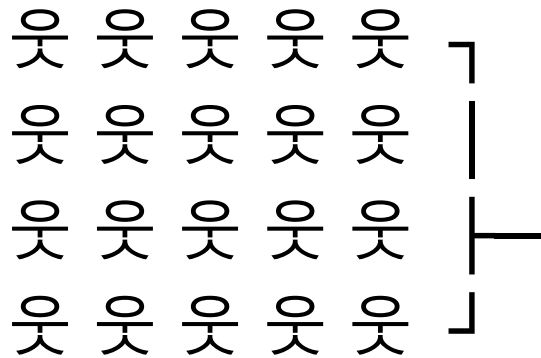
46. Using the numbers 5, 6, and 7, the operations (+) and (-) and grouping brackets wherever necessary, construct 5 completely distinct expressions that give 5 different final values based on arithmetic properties.

(Average-Difficult)

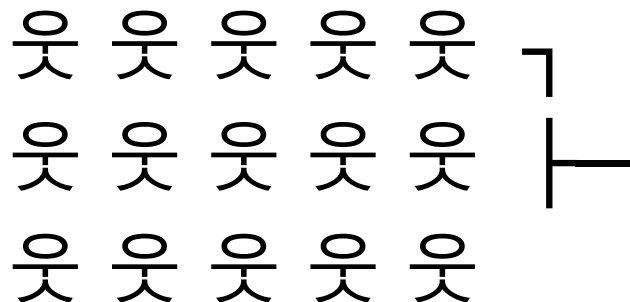
47. In a classroom, students are seated in rows. In each of the first 4 rows containing 5 students each, 4 students receive award certificates. In each of the remaining 3 rows containing 5 students each, 3 students receive roses. Write an expression to calculate the total number of certificates and roses awarded, and find the solutions.

(Difficult-Application)

Top Section (Award Winners):



Bottom Section (Rose Receivers):



Chapter – 03 - A peek beyond the point

Lo.No	Learning Outcomes	Question numbers
12	Identify the need for decimal numbers, compare them with whole numbers, and represent them on the number line.	3, 6, 9, 10, 13, 17, 19, 21, 32, 35, 36, 37, 40, 41, 55, 56, 57, 62, 66, 67, 72, 75, 76, 77, 80, 83
13	Arrange decimals in ascending and descending order.	24, 26, 27, 42, 43, 44, 48, 60, 65, 71
14	Convert decimals into fractions and fractions into decimals.	1, 2, , 22, 28, 30, 47, 50, 68, 69, 70
15	Explain basic operations on decimals and apply them in daily life (money, weight, length, etc.)	4, 5, 8, 11, 12, 14, 15, 16, 18, 20, 23, 25, 29, 31, 33, 34, 38, 39, 45, 46, 49, 51 to 54, 58, 59, 61, 63, 64, 73, 74, 78, 79, 81, 82, 84

WEIGHTAGE TO OBJECTIVES

Objective	No of Questions	Marks	Percentage
Knowledge	17	27	20%
Understanding	25	40	30%
Application	25	41	30%
Skill	17	27	20%
Total	84	135	100%

WEIGHTAGE TO DIFFICULTY LEVEL

Difficulty Level	Marks	Questions	Percentage
Easy	25	41	30%
Average	42	67	50%
Difficult	17	27	20%
Total	84	135	100%

I. Choose the correct answer from the following options.**(10x1=10)**

1. This decimal represents five by ten. (Knowledge- Easy)
a) 0.05 b) 0.5 c) 5.0 d) 0.005
2. Decimal form of $45/100$. (Understanding-Easy)
a) 4.5 b) 0.45 c) 45.0 d) 0.045
3. Greater decimal among the following. (Understanding- Average)
a) 4.05 b) 4.5 c) Equal d) Cannot say
4. 1 cm is equal to. (Understanding -Difficult)
a) 1 mm b) 10 mm c) 100 mm d) 1000 mm
5. 250 g is equal to. (Application- Average)
a) 2.5 kg b) 25 kg c) 0.25 kg d) 0.025 kg
6. The smallest decimal among the following. (Skill-Average)
a) 0.2 b) 0.02 c) 0.22 d) 0.202
7. 0.75 rupee means. (Application- Average)
a) 75 paisa b) 7 paisa c) 750 paisa d) 705 paisa
8. The value of $5.6 + 2.3$. (Skill-Difficult)
a) 7.9 b) 8.9 c) 6.9 d) 7.8
9. Decimal between 2 and 3. (Understanding- Easy)
a) 1.9 b) 2.5 c) 3.1 d) 4.2
10. 7.50 And 7.5 are. (Understanding- Average)
a) Different b) Equal c) Cannot compare d) Opposite

II. Fill in the blanks –**(10x1=10)**

11. $1/10 =$ _____ (Knowledge- Easy)
12. 1 kg = _____ g. (Knowledge- Easy)
13. 0.09 has _____ hundredths. (Understanding- Easy)
14. 56 mm = _____ cm. (Application- Average)
15. $0.5 + 0.5 =$ _____ (Skill- Easy)
16. 1 rupee = _____ paisa. (Application -Average)
17. 4.05 written in words _____. (Skill-Easy)
18. $2.7 - 1.2 =$ _____ (Skill- Easy)
19. The value of 0.2, 0.20 and 0.200 decimal is _____ (Skill-Difficult)
20. 325 cm = _____ m (Knowledge-Average)

III. 21. Match the following. (5x1=5)

(Understanding- Average)

A	B
1. 0.1	a) One hundredth
2. 0.75	b) One thousandth
3. 0.01	c) One tenth
4. 0.001	d) One rupee twenty five paise
5. 1.25	e) 75 paise

IV. Write whether the following statements are true or false.**(10x1=10)**

22. $0.5 = 5/10$	(Understanding- Easy)
23. $1 \text{ m} = 100 \text{ cm}$	(Knowledge- Easy)
24. 0.09 is greater than 0.9	(Understanding- Average)
25. 250 paise = 2.50 rupees	(Skill- Average)
26. 0.20 and 0.2 are equal	(Understanding- Easy)
27. 5.4 is less than 5.04	(Knowledge-Easy)
28. Decimal point separates whole and fraction	(Knowledge- Easy)
29. $1000 \text{ g} = 1 \text{ kg}$	(Knowledge- Easy)
30. 7.05 is greater than 7.5	(Understanding- Difficult)
31. $3.45 + 1.55 = 5.00$	(Skill- Easy)

V. In following question, there is a relationship between first 2 words; write the appropriate**Answer for the second pair.****(10x1=10)**

32. 0.1 : One tenth :: 0.01 : ____	(Understanding- Easy)
33. 1 cm : 10 mm :: 5 cm : _____ mm	(Skill -Difficult)
34. 100 paise : 1 rupee :: 800 paise : _	(Application- Easy)
35. 0.5 : Five tenths :: 0.25 : _____	(Understanding- Average)
36. 7.50 : 7.5 :: 0.20 : ____	(Understanding- Average)
37. 0.001 : Thousandth :: 0.01 : _____	(Knowledge- Easy)
38. 1 kg : 1000 g :: 10 kg : _____ g	(Application- Average)
39. 0.9 : Nine tenths :: 0.09 : _____	(Understanding-Difficult)
40. 10 mm : 1 cm :: 100 mm : _____	(Understanding-Difficult)
41. 5.6 : five point six :: 5.06 : _____	(Skill -Easy)

VI. Define the following –**(5x1=5)**

42. Decimal point.	(Knowledge- Easy)
43. Tenths.	(Knowledge- Easy)
44. Hundredths.	(Skill -Easy)
45. Thousandths.	(Application -Average)
46. Decimal notation.	(Understanding- Average)

VII. Convert the following.**(8x1=8)**

- | | |
|---------------------------------|--------------------------|
| 47. 7/10 into decimal form. | (Understanding-Average) |
| 48. 90 paise into rupees. | (Understanding-Average) |
| 49. 68 g into kg. | (Knowledge - Average) |
| 50. 254/1000 into decimal form. | (Understanding- Average) |
| 51. 1560 g into kg. | (Application-Difficult) |
| 52. 2036 mm into cm. | (Application- Average) |
| 53. 250 paise into rupees. | (Application- Easy) |
| 54. 704 g into kg. | (Application- Average) |

VIII. Solve the following.**(7x1=7)**

- | | |
|---|--------------------------|
| 55. Write 0.45 in words. | (Understanding- Easy) |
| 56. Compare 3.5 and 3.05. | (Understanding- Average) |
| 57. Write the place value of 5 in 4.56. | (Understanding- Average) |
| 58. Find the sum of 2.5 and 1.4 | (Skill- Easy) |
| 59. Find difference of 8.7 and 2.5 | (Skill- Easy) |
| 60. Arrange 0.2, 0.02, and 0.22 in ascending order. | (Understanding- Average) |
| 61. Convert 125 cm in meters | (Application- Average) |

IX. Solve the following.**(8x2=16)**

- | | |
|--|--------------------------|
| 62. Write the place value of 5.08 | (Understanding- Average) |
| 63. Add 12.45 and 5.25 | (understanding- Easy) |
| 64. Subtract 18.5 and 9.25 | (Skill- Average) |
| 65. Arrange the following lengths in increasing order. | (Skill -Easy) |

$$4\frac{1}{10}, \frac{4}{10}, \frac{41}{10}, 41\frac{1}{10}$$

- | | |
|---|-------------------|
| 66. Write the next three terms:
4.4, 4.8, 5.2, _____ | (Skill-Difficult) |
| 67. Represent 1.4 on number line. | (Knowledge-Easy) |
| 68. Write the following fractions in words. | (Knowledge-Easy) |

(a) $\frac{9}{10}$ (b) $1\frac{7}{10}$

69. Observe the given sequences of numbers and extend the pattern. (Skill-Difficult)

(a) $4, 4\frac{3}{10}, 4\frac{6}{10},$ _____, _____, _____, _____

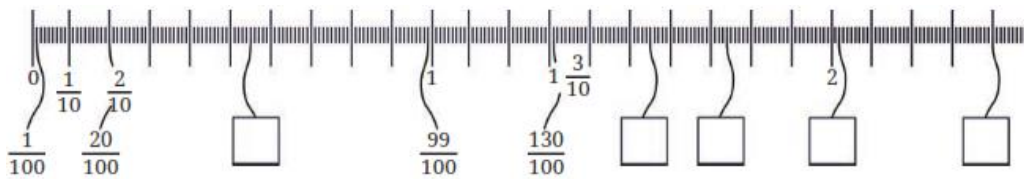
(b) $8\frac{2}{10}, 8\frac{7}{10}, 9\frac{2}{10},$ _____, _____, _____, _____

X. Solve the following.

(7x3=21)

70. Fill the lengths in the empty boxes.

(Application-Difficult)



71. Arrange 4.5, 4.05, 4.50 and 4.005 in ascending order.

(Understanding, Average)

72. Mark each length on the scale.

(Skill- average)

$$3\frac{1}{10}, \frac{30}{10}, 1\frac{3}{10}$$



73. What will be the sum of

(Skill- Average)

$$15\frac{3}{10}\frac{4}{100} \text{ and } 2\frac{6}{10}\frac{8}{100} ?$$

74. Find the difference.

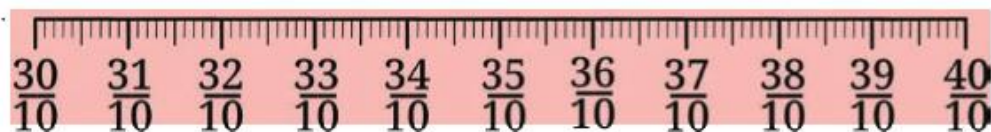
(skill-Difficult)

$$7\frac{7}{100} - 4\frac{4}{100}$$

75. Mark each length on the scale.

(Skill- Average)

$$3\frac{6}{10}, 3\frac{6}{100}, 3\frac{6}{10}\frac{6}{100}$$



76. Fill the decimal notation in the following table.

(Application -Average)

Quantity	Decimal Notation
7 hundreds and 5 ones (700 + 0 + 5)	
7 tens and 5 tenths $(70 + 0 + \frac{5}{10})$	
7 units and 5 hundredths $(7 + 0 + \frac{5}{100})$	

XI. Solve the following.**(7x4=28)**

77. Explain decimal place of 45.678.

(Understanding- Difficult)

78. Fill the following charts with correct place values.

(Understanding-Average)

Decimal number	Hundreds	Tens	Units	• Tenths	Hundredths
705				•	
70.5				•	
7.05				•	

79. Convert the following:

(Application- Average)

- a) 36 cm into m
- b) 465 g into kg
- c) 99 paise into rupees
- d) 134 mm into cm

80. Draw a number line and locate 2.35

(Skill- Difficult)

81. Fill in the blanks below.

(Skill- Average)

12 mm = 1.2 cm	56 mm = 5.6 cm	70 mm = _____
_____ = 0.9 cm	134 mm = _____	_____ = 203.6 cm

82. A shopkeeper sold 2.5 kg rice, 1.75 kg sugar and 0.5 kg wheat. Find total weight.

(Application- Average)

83. Answer the following.

(Skill- Average)

- A) Which of the following is nearest to 1?
0.9, 1.1, 1.01, 1.11
- B) Which of the following is nearest to 4?
3.56, 3.65, 3.099

XII. Solve the following.**(1x5=5)**

84. Pinto supplied 3.79 L, 4.2 L and 4.25 L milk for the three days. He supplied 25 L for 6 days. Find the milk supplied since last three days.

(Application- Difficult)

Chapter - 4 - Expression using letter - Numbers

Lo.No	Learning Outcomes	Question numbers
21	Use appropriate symbols to express mathematical relationships and patterns and write algebraic expressions using letters and numbers.	1 to 5, 11,16, 19, 21, 22, 27, 29, 35 to 45, 46
22	Convert verbal statements into expressions; identify like and unlike terms, and simplify algebraic expressions	6 to 10, 12 to 15, 18, 20, 23, 24, 26, 30 to 32, 34, 43 to 45, 47 to 52, 55, 59, 60, 62 to 73, 76, 78, 80
23	Simplify algebraic expressions and solve puzzles	15, 25, 28, 33, 53, 54, 56 to 58, 61, 69, 74, 75, 79

WEIGHTAGE TO OBJECTIVES

Objective	No. of Questions	Marks	Percentage
Knowledge	16	32	20%
Understanding	24	48	30%
Application	24	49	30%
Skill	16	32	20%
Total	80	161	100%

WEIGHTAGE TO DIFFICULTY LEVEL

Difficulty Level	No. of Questions	Marks	Percentage
Easy	28	34	30%
Average	44	108	50%
Difficult	8	19	20%
Total	80	161	100%

I. Choose the correct answer from the following options. (10×1=10)

1. Letters used to represent numbers in algebraic expressions are called (Knowledge- Easy)
- a) Letter-numbers b) Constants c) Fixed number d) Equations
2. If a represents Arun's age, Nidhi is 3 years older than him. This expression represents Nidhi's age.
- (Knowledge- Easy)
- a) $a - 3$ b) $a + 3$ c) $3a$ d) $a \div 3$
3. A matchstick pattern of the letter 'L' requires 2 matchsticks. The expression for the number of matchsticks required to make n number of 'L' is.
- (Understanding-Easy)
- a) $2 + n$ b) $n - 2$ c) $2n$ d) $2 \times n$
4. The formula of regular pentagon with the side 's' (Knowledge- Average)
- a) $4s$ b) $5s$ c) $6s$ d) $3s$
5. Shortening the expression $4 \times n$ according to standard mathematical practice gives. (Knowledge- Easy)
- a) $4+n$ b) $n4$ c) $4n$ d) 4^n
6. Simplify the expression: $5c + 3c + 10c$.
- (Understanding, Average)
- a) $18c$ b) $15c$ c) $18c^3$ d) $8c + 10$
7. The expression $18c + 11d$ can be simplified as.
- (Understanding- Average)
- a) It becomes $29cd$ b) It becomes $29(c + d)$
- c) Cannot be simplified, because they are unlike terms d) it becomes $7c$
8. The value of the expression $5m + 3$ when $m = 2$.
- (Application - Average)
- a) 10 b) 13 c) 25 d) 16
9. When the brackets are removed in the expression $-(18 + 13)$, it becomes.(Understanding- Difficult)
- a) $-18 + 13$ b) $18 - 13$ c) $-18 - 13$ d) $18 + 13$
10. In a calendar month, a design appears at positions that are multiples of 3. This is the position of its n th occurrence.
- (Application- Average)
- a) $3 + n$ b) $3n$ c) $n - 3$ d) $n/3$

II. Fill in the Blanks

(8×1=8)

11. The perimeter of a square with side length q is _____. (Knowledge- Easy)
12. In algebra, swapping and grouping terms does not change the _____ of the expression.
(Understanding- Average)
13. The value of the expression $7k$ when $k = 4$ is _____. (Understanding- Easy)
14. The short form of $10 \times (y - 3)$ is _____. (Knowledge, Easy)
15. Terms that have the same letter-numbers are called _____ terms. (Knowledge-Easy)
16. The expression for "13 less than 2 times a number x " is _____. (Understanding-Average)
17. The n th term of the sequence 4, 8, 12, 16, 20,... is _____. (Understanding- Average)
18. According to the distributive property, $4(x + y) =$ _____. (Understanding- Average)

III. Write whether the following statements are True or False (8×1=8)

19. The expressions $5u$ and $5 + u$ are equal for all values of u . (Understanding- Average)
20. The expression $3a + 2b$ can be simplified to $5ab$. (Understanding- Average)
21. Changing the order of terms while adding does not alter the final result. (Understanding- Easy)
22. The expression $-(a - b)$ is equal to $-a + b$. (Understanding- Difficult)
23. The expressions $10y - 3$ and $10(y - 3)$ give the same value when $y = 5$. (Application -Easy)
24. The simplified form of $3b - 2b - b$ is b . (Understanding- Average)
25. The expression $2y + 1$ represents the number of matchsticks in y consecutive triangles. (Application-Average)
26. Unlike terms can be added together into a single simplified term. (Knowledge- Easy)

IV. There is a relationship between first pair, write the appropriate answer for the second pair. (8×1=8)

27. Perimeter of a square : $4s$:: Perimeter of equilateral triangle : _____ (Application -Difficult)
28. $2 \times n$: $2n$:: $c \times 35$: _____ (Knowledge- Easy)
29. $a + 3$: 3 more than a :: $a - 3$: _____ (Understanding- Easy)
30. Like terms: $5c + 3c$:: Unlike terms : _____ (Knowledge- Average)
31. $m = 2$ in $5m$: 10 :: $k = 4$ in $7k$: _____ (Understanding- Easy)

32. $-(18+13) : -18-13 :: -(6x+10y) :$ _____ (Understanding- Difficult)
33. Multiples of 4 sequence : $4n ::$ Multiples of 3 sequence : _____ (Understanding- Average)
34. $4(x+y) : 4x+4y :: 6(p+2) :$ _____ (Understanding- Average)

V. Define the Following (7x1=7)

35. Letter-numbers (Application -Average)
36. Algebraic Expression (Knowledge-Easy)
37. Constant (Knowledge-Average)
38. Like Terms (Knowledge-Easy)
39. Unlike Terms (Knowledge-Easy)
40. Distributive Property (Understanding-Average)
41. Regular Polygon (Knowledge-Easy)

VI. Solve the Following Questions. (5x1=5)

42. Write an algebraic expression for: "5 more than a number z". (Understanding-Difficult)
43. Find the value of the arithmetic expression: $23a - 10a \times 2a$. (Understanding- Easy)
44. Simplify the expression: $p + p - (p + p)$. (Knowledge -Average)
45. Find the value of $7k$ when $k = 5$. (Understanding- Easy)
46. Write an algebraic expression for: "4 less than a number y" . (Skill- Easy)

VII. Solve the following questions (5x2=10)

47. Find the value of the $3(2a - 10b) + 2a$. (Understanding- Easy)
48. Simplify the expression $(34m - 14n) - (20m + 15n)$. (Understanding- Easy)
49. Identify the like terms from the following : $8x, 3y, 1xy, 6y, -xy, 14x, 20$ (Understanding- Easy)
50. Solve: $(40x + 75y) - (6x + 10y)$. (Understanding- Easy)
51. If a square has a side length of 7 cm, write its perimeter expression using a formula.
(Application- Average)

VIII. Solve the following questions (15x3=45)

52. If $m=4$ then find the value of $5m + 3$.

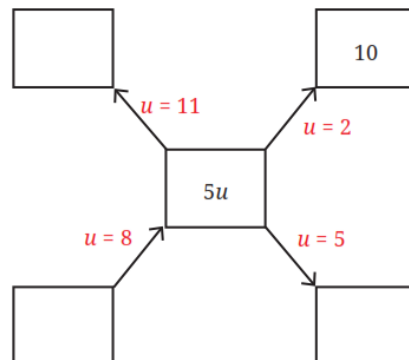
(Understanding- Average)

53. Fill in the blanks with correct letter numbers by numbers.

(Understanding- Average)

54. A school stationery shop sells pencils on Day 1, $3c$ pencils on Day 2, and $10c$ pencils on Day 3, write and simplify the

(Application- Average)



sells pencils at ₹5 each. If a student buys pencils on Day 2, and $10c$ pencils on Day 3, write and simplify the

55. Write algebraic

(Understanding- Average)

expressions for

A) 2 less than 13 times a number n .

B) 13 less than 2 times a number n .

56. What is the total amount Krithika has, if she has the notes of ₹100, ₹20, and ₹5? Complete the following table.

(Understanding-Easy)

No. of ₹100 notes	No. of ₹20 notes	No. of ₹5 notes	Expression and total amount
3	5	6	
			$6 \times 100 + 4 \times 20 + 3 \times 5 = 695$
8	4	z	
x	y	z	

57. In a calendar month, if any 2×3 grid full of dates is chosen as shown in the picture, write expressions for the dates in the blank cells if the bottom middle cell has date 'w'. (Understanding-Difficult)

November 2024

Mon	Tue	Wed	Thu	Fri	Sat	Sun
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

$W - 1$	W	

58. Munirathna has a 20 m long pipe. He joins another pipe of length k meters to it. Write the expression for the combined length and calculate it if $k = 15$ m. (Application-Easy)

59. Simplify the expression: $4(\times + y) - y - 4(\times - y)$. (Understanding- Average)

60. Prove whether the expressions $5u$ and $5 + u$ are equal or not by using $u = 2$.

(Understanding- Average)

61. Draw a rough matchstick pattern representing 3 connected 'L' and write the formula for n number of 'L'. (Knowledge -Average)

62. Ketaki prepares laddus. The price of a coconut is ₹35 and 1 kg of jaggery is ₹60. (Knowledge -Average)

A) Write an algebraic expression for the total amount paid for c coconuts and j kg of jaggery.

B) Find the total amount if she buys 7 coconuts and 4 kg of jaggery.

63. Simplify the following expressions. (Understanding- Average)

A) $3a + 9b - 6 + 8a - 4b - 7a + 16$

B) $2(2x - 3) + 8x + 12$

64. Add the following algebraic expressions: (Understanding- Average)

A) $4d - 7c + 9$ and $8c - 11 + 9d$

B) $6f - 20 + 8s$ and $23 - 13f - 12s$ (Understanding- Average)

65. Subtract the expression $(9a - 6b + 14)$ from $(6a + 9b - 18)$ by grouping

(Understanding- Average)

66. Write statements to the following algebraic expressions: (Understanding-Easy)

A) $8x + 3y$

B) $15x - 2x$

IX. Solve the Following Questions (10x4=40)

67. Venkatalakshmi owns a flour mill. It takes 10 seconds for the mill to start. Once running, each kg of grain takes 8 seconds to grind. (Application- Average)

A) Write the expression for the total time taken to grind y kg of grain from an initial off state.

B) Find the time taken to grind 5 kg of grain.

68. A bus travels from Shahapur to Surapur. Its speed is such that it covers a certain distance in t minutes. The total travel time is described as 6 minutes more than 4 times t . (Application- Average)

A) Write the algebraic expression for the journey time.

B) If $t = 4$ minutes, find the total travel time.

69. Draw the geometric representations of matchstick patterns for: (Skill- Average)

A) Step 1: 1 triangle (3 sticks)

B) Step 2: 2 connected triangles (5 sticks)

C) Step 3: 3 connected triangles (7 sticks)

Derive the general expression for Step y .

70. Krithika has currency notes of ₹100, ₹20, and ₹5. (Application- Average)

A) Complete the algebraic expression for the total amount if she has x notes of ₹100, y notes of ₹20, and z notes of ₹5.

B) Calculate the total amount if she has 6 notes of ₹100, 4 notes of ₹20, and 3 notes of ₹5.

C) Calculate the amount if $x=8$, $y=4$, $z=2$.

71. Solve the following. (Understanding- Average)

A) Add: $-6f + 19 - 8s$ and $-23 + 13f + 12s$

B) Subtract: $17g + 9 - 7h$ from $11 - 10g + 3h$

72. Solve and simplify the following large expressions by removing brackets and grouping like terms:

A) $23 + 4(6m - 3n) - 8n - 3m - 18$ (Knowledge- Average)

B) $5(2w + 3x + 4w) - 10w$

73. A furniture rental shop charges ₹40 as a deposit for a chair and ₹75 for a table. When returned, they refund ₹6 per chair and ₹10 per table. (Knowledge- Average)

A) Write the expression for the net amount spent if a person rents x chairs and y tables.

B) Simplify the expression by combining terms.

74. In a calendar month, a cross shape (+) containing 5 numbers is chosen. The numbers are 8, 14, 15, 16, 22 (with 15 at the center). (Knowledge-Easy)

A) Find the sum of these 5 numbers and compare it with the center number.

B) If the center number is 'a' then, express the other four surrounding numbers in terms of a.

C) Algebraically prove that the total sum is always 5 times the center number.

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

75. Draw a detailed visualization diagram representing: (Skill- Average)

A) A big rectangle split into two smaller rectangles of width v and lengths 4 and 3 respectively.

B) Write individual area expressions and apply the distributive property to find the total area expression.

76. Are the expressions $10y - 3$ and $10(y - 3)$ equal? Prove by evaluating them for $y = 2$ and $y = 10$. Show the comparative process. (Understanding- Average)

X. Solve the following questions. (4x5=20)

77. Charu participates in three rounds of a quiz. Her scores are represented by the expressions:

Round 1: $7p - 3q$

(Application- Difficult)

Round 2: $8p - 4q$

Round 3: $6p - 2q$

Where p is the score for a correct answer and q is the penalty for an incorrect answer.

A) Find her score in the first round if $p = 4$ and $q = 1$.

B) Find her total final score after all three rounds as a simplified algebraic expression.

C) Her friend Krishita's final score is $23p - 7q$. Subtract Charu's total score from Krishita's score to find out how much more Krishita scored.

78. Simplify:

(Skill - Average)

A) $p - q + p - q$

B) $2d - d - d - d$

C) $2d - d - (d - c)$

D) $2d - (d - d) - c$

(e) $2d - d - c - c$

79. Investigate the matchstick triangle pattern where consecutive steps form a chain of triangles.

(Understanding- Average)

A) Construct a table showing Step Number ($y = 1, 2, 3, 4, 5$) and the corresponding Number of Matchsticks.

B) Two students came up with different expressions: Student A says $3 + 2(y - 1)$, Student B says $2y + 1$. Show algebraically that both expressions are identical.

C) Calculate the exact number of matchsticks required for Step 33, Step 84, and Step 108 using the simplified formula.

80. Formulate a comprehensive review chart by solving these fundamental system sets:

(Understanding- Average)

A) Add: $8d - 14c + 9$ and $16c - (11 + 9d)$

B) Subtract: $9a - 6b + 14$ from $6a - (9b + 18)$

Chapter – 5 - Parallel & Intersecting Lines

Lo.No	Learning Outcomes	Question numbers
27	Identify opposite angles, linear pairs, perpendicular and parallel lines, corresponding angles in the surroundings. Obtain parallel and perpendicular lines through paper folding.	1, 2, 3, 6, 7, 9, 11, 12, 13, 18, 19, 20, 23, 24, 25, 28 to 32, 45, 46, 47, 49 to 56, 62, 63, 65, 66, 70
28	Identify corresponding and alternate angles. Find the unknown angles when a transversal cut parallel lines.	4, 5, 8, 15, 16, 17, 21, 22, 26, 27, 33 to 44, 48, 57 to 61, 64, 67, 68, 69
29	27. Recognize applications of geometry in art, engineering, and architecture.	10, 14

Weightage to objectives.

Sl.No	Objectives	No. of questions	Marks	Percentage
1	Knowledge	22	22	20%
2	Understanding	25	34	30%
3	Application	14	33	30%
4	Skill	09	22	20%
5	Total	70	111	100%

Weightage to difficulty level

Sl.No	Difficulty	No.of Questions	Marks	Percentage
1	Easy	28	33	30%
2	Average	31	56	50%
3	Difficult	11	22	20%
	Total	70	111	100%

I. Choose the correct answer from the given four alternatives. 10X1=10

1. The following statements is true about parallel lines. (Knowledge-Average)

- a) They never meet, however far extended. b) They meet at one point.
c) They meet at two points d) they cross each other.

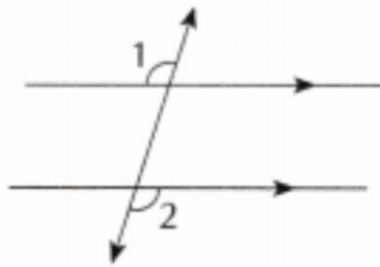
2. The measure of each angle formed when two lines are perpendicular. (Knowledge-Easy)

- a) 60° b) 90° c) 120° d) 45°

3. Vertically opposite angles formed by two intersecting lines are. (Knowledge-Easy)

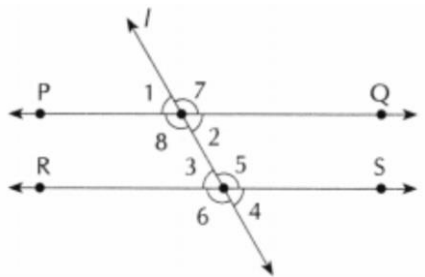
- a) Always unequal b) Sometimes equal c) Always equal d) Never form angles

4. In the given figure, the angles marked are. (Knowledge-Easy)



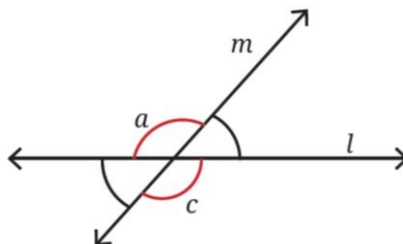
- a) Corresponding angles b) line pair
c) Adjacent angles d) Alternate exterior angles.

5. In the given figure line l intersects two parallel lines PQ and RS then which one of the following is not true. (Understanding-Average)



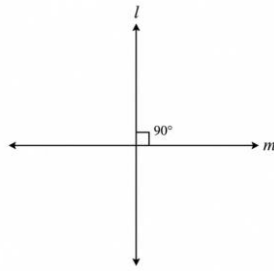
- a) $\angle 1 = \angle 3$ b) $\angle 2 = \angle 4$ c) $\angle 4 = \angle 7$ d) $\angle 6 = \angle 8$

6. In the below figure $\angle a = 110^\circ$ then $\angle c = ?$ (Application-Easy)



- a) 70° b) 110° c) 180° d) 90°

7. In the given figure $\angle a = 90^\circ$, the term best describes lines l and m ? (Knowledge-Easy)



- a) Parallel b) Intersecting c) Perpendicular d) Vertical lines

8. Two adjacent angles form a linear pair. If one angle is 45° the other is.

(Understanding-Average)

- a) 135° b) 145° c) 90° d) 180°

9. A transversal intercepts to Parallel Lines, then the sum of all four interior angles.

(Understanding- Average)

- a) 360° b) 180° c) 720° d) 540°

10. Railway Bridge has vertical pillars and the ground, the kind of angle is formed between pillar and ground?

- a) Acute b) Right c) Obtuse d) Reflex (Application-Average)

II. Fill up the blanks with suitable answers.

(8X1=8)

11. Two lines on the plane that never meet are called _____ lines. (Knowledge-Easy)

12. When two lines intersect the pairs of angles opposite to each other are called _____ angles. (Knowledge-Easy)

13. When a line intersects two lines at different points, it is called a _____ (Knowledge-Easy)

14. If two lines intersect at right angles, they are called _____ lines. (Knowledge-Easy)

15. A common vertex, a common arm and non-common opposite sides is called _____ (Knowledge- Easy)

16. The sum of the interior angles on the same side of a transversal is _____ (Understanding-average)

17. If two lines intersect at a point then the vertically opposite angles are always _____ (knowledge-easy)

18. The opposite sides of a rectangle are example for _____ (understanding-easy)

III. State true or false

(6X1=6)

19. All the straight lines on a plane are parallel to each other. (Understanding-average)
20. Two lines that intersect at right angles are called perpendicular lines. (knowledge-easy)
21. The sum of linear pairs of angles are always equal to 180° . (Understanding-average)
22. Vertically opposite angles formed by two intersecting lines are not always equal
(Understanding-average)
23. In vertically opposite angles if one pair of angle is acute then other pair is obtuse.
(Understanding-average)
24. Corresponding angles are always equal. (Knowledge-Easy)

IV. Define the following.

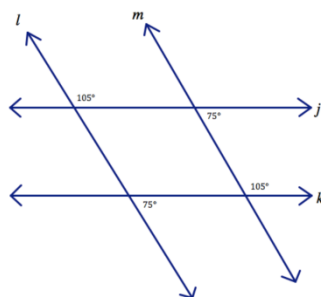
(5X1=5)

25. Parallel Lines (Knowledge-Easy)
26. Corresponding angles (Knowledge-Easy)
27. Transversal (Knowledge-Easy)
28. Perpendicular lines (Knowledge-Easy)
29. Intersecting lines (Knowledge-Easy)

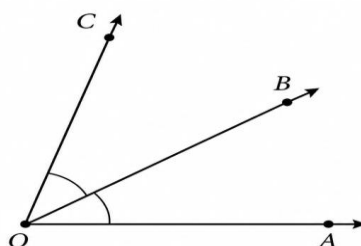
V. Solve the following

(5X1=5)

30. Two angles form a straight line. If one angle measures 110° . What is the measure of another angle?
(Application -easy)
31. Name the Parallel lines? (Understand-average)

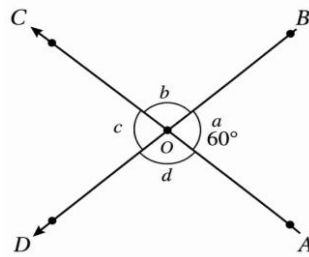


32. Write each pair of adjacent angles in the following figure. (knowledge-easy)

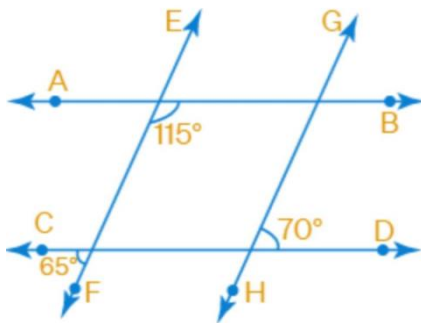


33. In the given figure, If $\angle a = 60$ then find the $\angle c$

(Knowledge-Easy)



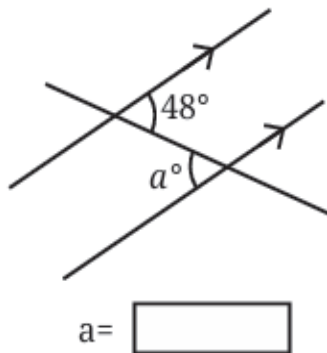
34. State whether the lines AB and CD are parallel to each other or not. (Application -Average)



VI. Find the angles marked below.

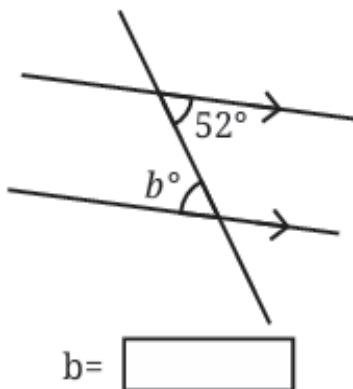
(10X1=10)

35.



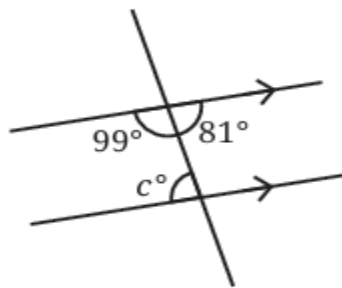
(Understanding-Average)

36.



(Understanding-Average)

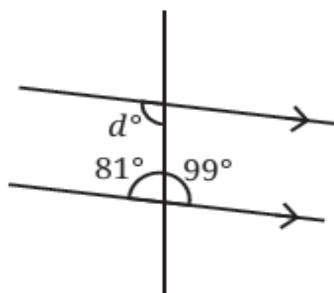
37.



(Understanding-Average)

$c =$

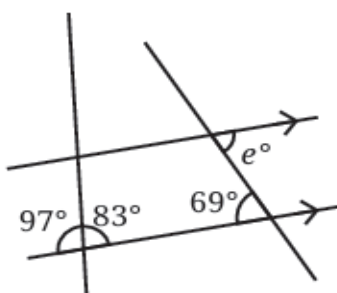
38.



(Understanding-Average)

$d =$

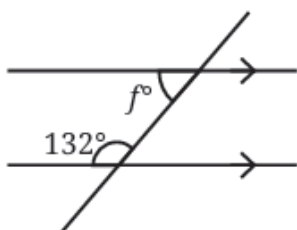
39.



(Understanding-Difficult)

$e =$

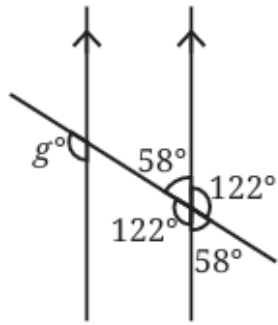
40.



(Knowledge-Easy)

$f =$

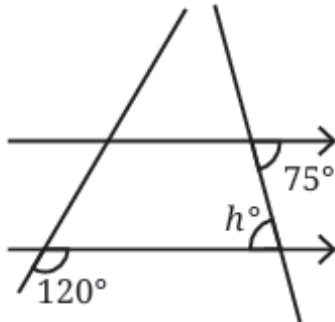
41.



(Understanding-Difficult)

$g =$

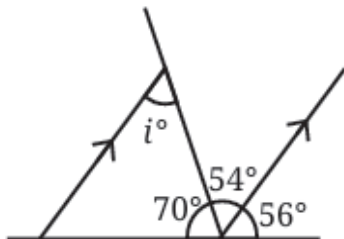
42.



(Understanding-Difficult)

$h =$

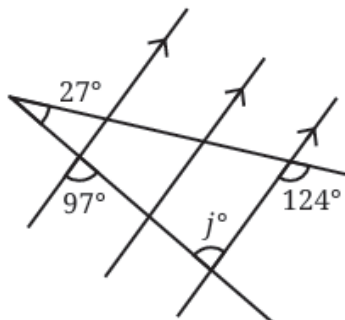
43.



(Understanding-Difficult)

$i =$

44.



(Understanding-Difficult)

$j =$

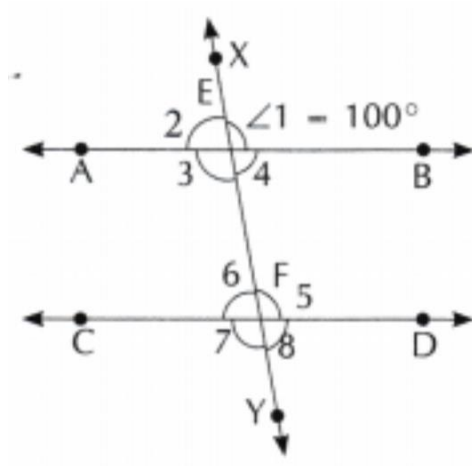
VII. Solve the following problems.

(13X2=26)

45. In the following figure, XY cuts two parallel lines AB and CD at two points E and F respectively.

If $\angle 1 = 100^\circ$, find all other angles.

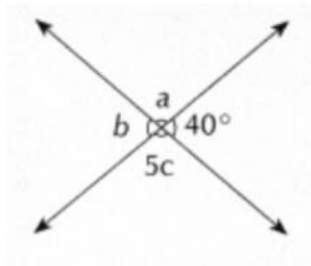
(Understanding-Easy)



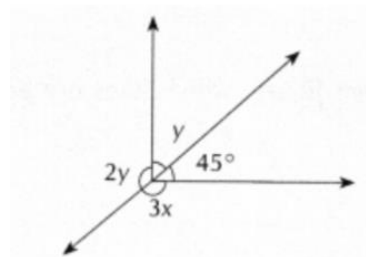
46. Find the value of unknowns in the following figures.

(Understanding-Average)

a)

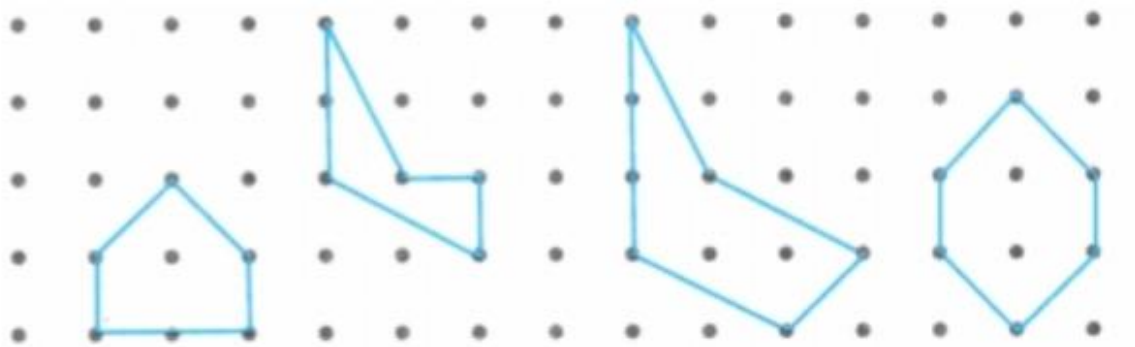


b)



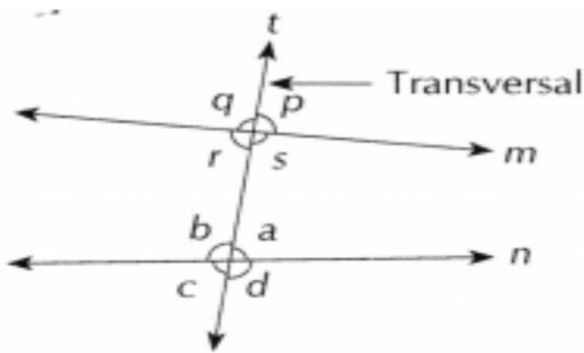
47. Look at the shapes shown given below. Use the given notations like single arrows, double arrows etc. to mark the parallel lines in the shapes.

(Application-average)



48. In the given figure, line t is a transversal of two lines m and n . Identify the given pairs of angles.

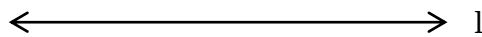
- a) Adjacent angle b) Vertically opposite angles c) Corresponding angles



(Understanding-average)

49. Draw a line parallel to l that goes through point 'P'.

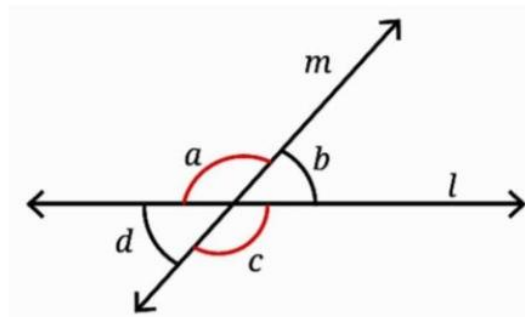
(Skill-Average)



P

50. In the given figure, If $\angle a = 115^\circ$, find $\angle b$, $\angle c$ and $\angle d$

(Understanding-Average)



51. Two complementary angles are such that one angle is 30° less than twice the other. Find the measure of the larger angle.

(Application-Average)

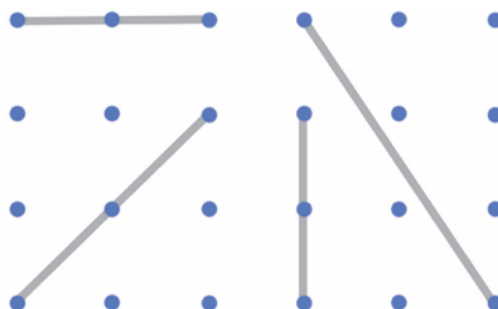
52. Identify the types of angles formed when two lines intersect:

- a) Angles opposite to each other
b) Adjacent angles forming a straight line.

(Understanding-Average)

53. Draw some lines perpendicular to the lines given on the dot paper.

(Skill-Easy)



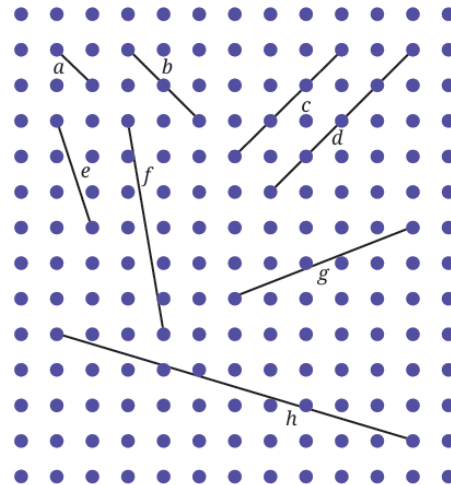
54. In the dot paper , draw different sets of parallel lines. The line segments can be of different lines but should have dots as endpoints.
(Skill – Average)

55. Using your sense of how parallel lines look try to draw lines parallel to the line segments on this dot paper.
(Skill-Average)

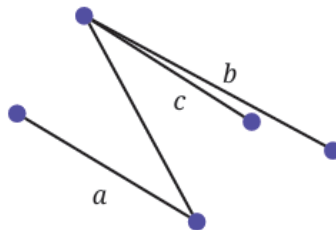
a) Did you find it challenging to draw some of them?

b) Which ones?

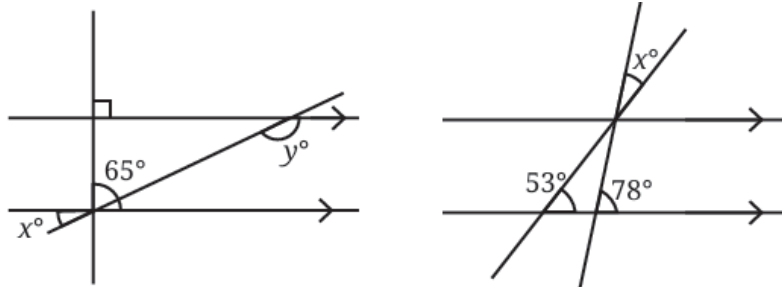
c) How did you do it?



56. In the given figure which line is parallel to line a, line b or line c? How do you decide this?
(Application -Average)



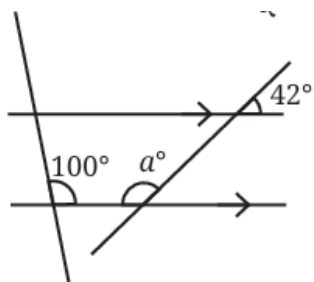
57. In the figure below, what angles do x and y stand for?
(Application-Difficult)



VIII. Find the angle represented by a.

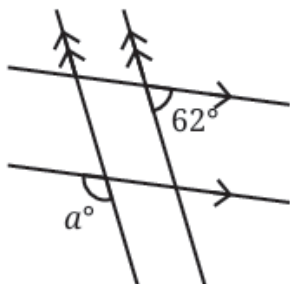
(4X2=8)

58.



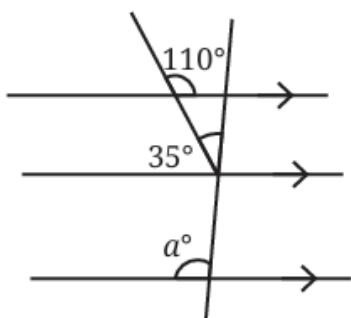
(Application-Difficult)

59.



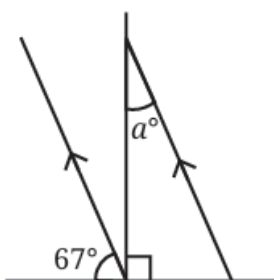
(Application-Difficult)

60.



(Application -Difficult)

61.



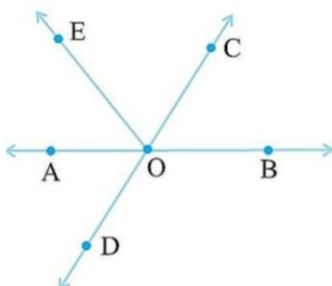
(Understanding-Difficult)

IX. Solve the following problems.

(3X5=15)

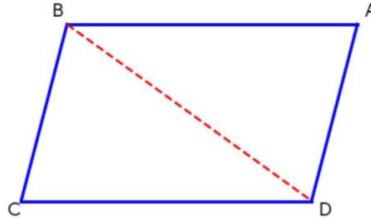
62. Look at the figure given and answer the following.

(Skill-Average)



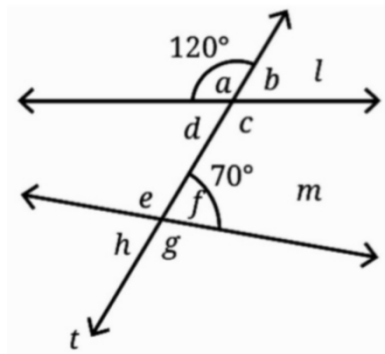
- Name five pairs of adjacent angles.
- Name three linear pairs of angles.
- Name two pairs of vertically opposite angles.

63. In the given figure line segment AB is parallel to CD and AD is parallel to BC. $\angle CBD = 70^\circ$ and $\angle BCD = 75^\circ$. What are the measures of $\angle ABD$, $\angle BAD$ and $\angle ADC$? (Application-Difficult)



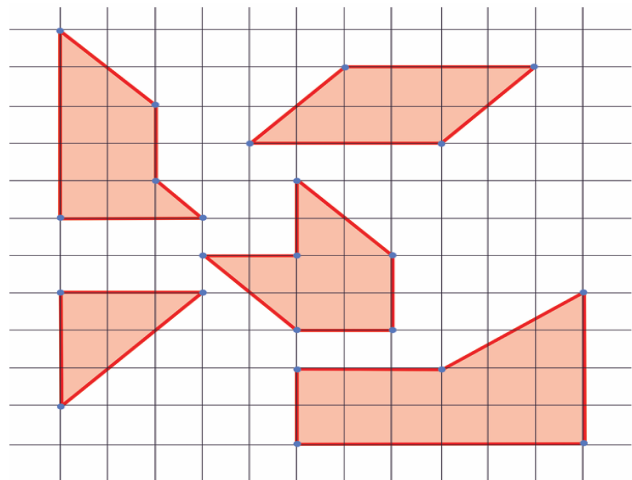
64. Draw two lines intersecting at a point such that one angle is 35° find the remaining 3 angles. (Skill-Average)

65. In the given figure $\angle a = 120^\circ$ and $\angle f = 70^\circ$. Are l and m parallel? Give reason. (Skill-Difficult)



66. In the given figure mark the Parallel Lines using the notation given above (single Arrow, double Arrow etc.). Mark the angle between perpendicular lines with a square symbol. (Skill-Average)

- How did you spot the perpendicular lines?
- How did you spot the parallel lines?

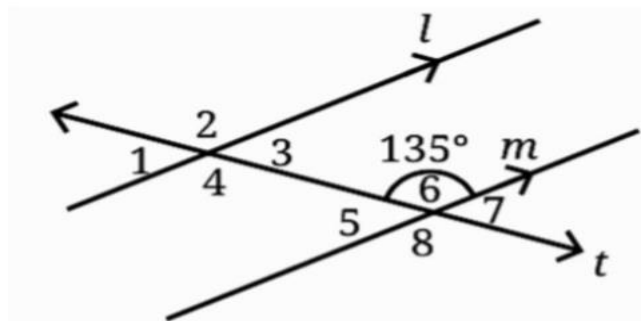


X. Solve the following problems.

(2X4=8)

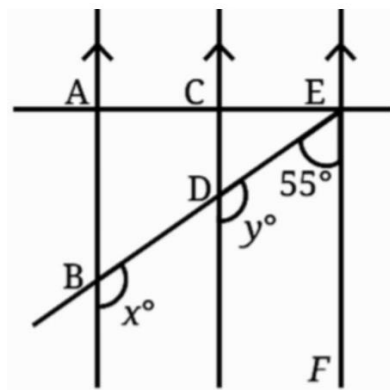
67. In the given figure $\angle 6 = 135^\circ$. Find the measures $\angle 1, \angle 2, \angle 3, \angle 4, \angle 5, \angle 7, \angle 8$

(Understanding-Average)



68. In the below figure, $AB \parallel CD \parallel EF$ and $EA \perp AB$. If $\angle BEF = 55^\circ$, find x and y .

(Application-Easy)

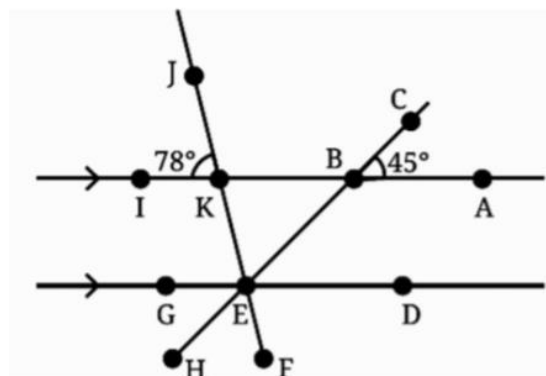


XI. Solve the following problems.

(2X5=10)

69. In the given figure, $\angle ABC = 45^\circ$ and $\angle IKJ = 78^\circ$. Find angles $\angle GEH$, $\angle HEF$ and $\angle FED$ with reasoning.

(Application-Difficult)



70. Classify the following pairs of lines as parallel, perpendicular or intersecting.

(Application -Average)

- a) Opposite edges of a book
- b) Hands of a clock at 9:00
- c) Letter "T"
- d) Railway tracks
- e) Corner of a window frame.

Chapter – 06 - Number Play

Lo.No	Learning Outcomes	Question numbers
4	Identify numerical properties, patterns, place value, and properties of addition and multiplication, and generalize two-digit and three-digit numbers into arithmetic expressions.	3, 4, 5, 6 , 11, 13 to 21, 24, 25, 26, 28 to 35, 38, 42, 45, 4, 50, 54, 61
5	Solve mathematical grids and magic-square-based problems.	9, 10, 22, 36, 44, 51, 56, 60
6	Develop logical thinking through Virahanka and Fibonacci sequences and number-based puzzles	1, 7, 8, 12, 37, 40, 43, 52
44	Solve simple cryptarithm puzzles based on addition.	23, 39, 46, 48, 55, 58
45	Pose puzzles and solve them	2, 41, 53, 57, 59
47	Appreciate the Virahanka-Fibonacci numbers	27, 49

Weightage to objectives.

Sl.No	Objectives	No. of questions	Marks	Percentage
1	Knowledge	20	20	20%
2	Understanding	25	30	30%
3	Application	14	30	30%
4	Skill	12	20	20%
5	Total	61	100	100%

Weightage to difficulty level

Sl.No	Difficulty	No.of Questions	Marks	Percentage
1	Easy	24	30	30%
2	Average	30	50	50%
3	Difficult	07	20	20%
	Total	61	100	100%

1. Choose the correct answer from given four alternatives.

15X1=15

1. The next term of the Virhanka-Fibonacci series 1, 2, 3, 4, 5, 8, 13, 21, 34 (Understanding-Easy)

- a) 52 b) 53 c) 54 d) 55

2. If you create a 3X3 magic square using the set of numbers 3 to 11, the number in the centre of the magic square (Knowledge - Average)

- a) 6 b) 7 c) 8 d) 9

3. The n^{th} even number is given by (Knowledge-Easy)

- a) $n + 2$ b) $2n - 1$ c) $2n + 1$ d) $2n$

4. The parity of the expression $3n + 2$ when $n = 2$ is (Skill-Average)

- a) Even b) odd c) sometimes even sometimes odd d) neither even not odd

5. For a grid with dimensions 17X20 the parity of the number of small squares is (Understanding-Average)

- a) Even b) odd c) both d) none of these

6. The parity of number 5053 is (Skill -Easy)

- a) Odd b) Even c) Sometimes odd sometimes even d) neither even not odd

7. 7th term of the Virahanka-Fibonacci sequence is (Knowledge-Easy)

- a) 34 b) 21 c) 55 d) 13

8. The number of all rhythms of short and long syllabus having 9 beats is.(Understanding-Average)

- a) 34 b) 21 c) 55 d) 13

9. In the magic square grade 3X3 from 1to 9 the centre number will be (Skill -Difficult)

- a) 1 b) 9 c)5 d)3

10. In a standard 3X3 magic square using numbers 1 to 9, the sum of each row, column and diagonals will be (Understanding-Easy)

- a) 9 b) 15 c) 20 d) 45

11. The palindromic number is. (Reads the same forwards and backwards)

(Knowledge-Easy)

- a) 12321 b) 12345 c) 54321 d) 11234

12. The sum of five odd numbers will always be (Knowledge-Easy)

- a) Even b) odd c) sometimes even sometimes odd d) always zero

III. State True or False

10X1=10

28. The parity of the sum of $1 + 2 + 3 + \dots + 100$ is even. (Understanding - Average)
29. An even number multiplied by any whole number always result in an even product.
(Skill - Average)
30. The n^{th} even number can be found using the formula $3n$. (Application - Average)
31. The general term for the n th odd number is $(2n - 1)$ (Application - Average)
32. The sum of two odd numbers is always an odd number. (Knowledge - Easy)
33. The expression $5n + 1$ always gives an even number for any value of n .
(Application - Average)
34. If two odd numbers are multiplied together the result is always divisible by 2.
(Knowledge - Easy)
35. If the parity of a number is even it means number is even. (Knowledge - Average)
36. In a 3×3 magic square using the number 1 to 9, the centre number must be 5.
(Understanding - Easy)
37. The 5^{th} term in the Virahanka sequence is 8. (Skill -Average)

IV. 38. Match the following

1X8=8

- | | | |
|------------------------------------|--------------------|---------------------------|
| a) The n^{th} even number | 1) $2n - 1$ | (Understanding - Average) |
| b) The n^{th} odd number | 2) $4n$ | |
| c) Virahanka-Febonacci sum rule | 3) $2n$ | |
| d) Multiples of 4 | 4) $a_n = a_{n-1}$ | |
| e) Even + even | 5) odd | |
| f) Odd + odd | 6) odd | |
| g) Even + odd | 7) even | |
| h) Odd - even | 8) even | |

V. Solve the following problems.

8X1=8

39. In the cryptarithm $T+T+T=UT$, where U and T are distinct digits, what is the value of T ?
(Application-Difficult)
40. What are the next two numbers in the Virahank- Fibanachi sequence of the 987 and 1597?
(Understading-Avarege)

41. What are palindromic numbers? (Knowledge-Easy)
42. What is the parity of the sum of three odd numbers? (Knowledge-Easy)
43. Write the Virahanka-Fibonacci sequence up to the 5th term. (Understanding-Average)
44. What is the parity of the number of small squares in a 7 X 9 grid? (Application-Average)
45. What is parity in mathematics. (knowledge-Average)
46. What is a Cryptarithm? (Understanding-Average)

VI. Solve the following.

5X2=10

47. Find the 20th odd number in the sequence 1, 3, 5, 7..... (Understanding-Average)
48. Solve the Cryptarithm (Application Difficult)

$$\begin{array}{r}
 \text{U T} \\
 \text{T A} \\
 \hline
 \text{T A T} \\
 \hline
 \end{array}$$

49. Write the next three numbers in sequence 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, _____, _____, _____ (Skill -Average)
50. Prove the parity of the sum of 2 even numbers and 3 odd numbers. (Knowledge-easy)
51. Make a 3X3 magic square with zero as the magic sum. All numbers cannot be zero use negative numbers as needed. (Understanding-easy)

VII. Solve the following problems.

5X3=15

52. In the Virahanka-Fibonacci sequence, two consecutive numbers are 987 and 1597. What are the next two numbers in the sequence? (Skill -Average)
53. Create a magic sequence whose magic sum is 60. (Application-Difficult)
54. Ashwini has a large old encyclopaedia. When she open it several loose pages fell out of it. She counted 50 sheets in total each printed on both sides. Can the sum of the page numbers of the loose sheets be 6000 why or why not? (Application-Average)
55. Find out (Understanding-average)

$$\begin{array}{r}
 \text{A B} \\
 + 71 \\
 \hline
 180 \\
 \hline
 \end{array}$$

56. Create a 3 X 3 magic square whose sum is 51. (Application-Difficult)

IX. Solve the following problems.**3X4=12**

57. Is it possible to get a magic square by filling 9 non-consecutive numbers? Give an example or explain with an example? (Skill -Average)

58. In the cryptarithm $P + P + P = QP$ where P and Q are digits and QP is a two digit number, find P and Q. (Understanding-Difficult)

59. Choose any magic square that you have made so far using consecutive numbers. If m is the letter number of the number in the centre. Express how other numbers are related to m, how much more or less than m. (Application-Average) MC7.2-45

	m	

X. Solve the following problems.**2X5=10**

60. Using given magic square and

(Application-Average)

a) Increase each number by 1

b) Double each number

8	1	6
3	5	7
4	9	2

61. Ramu says he has an odd number of 1 Rs coins, an add number of 5 Rs coin and an even number of 10 Rs coins. He calculated his total to be 205 Rs. Did he make a mistake? (Understanding-Difficult)

Chapter – 07- A Tale of three intersecting Lines

Lo.No	Learning Outcomes	Question numbers
33	Construct the different types of triangles	1 to 68

Weightage to objectives

SL. NO.	OBJECTIVES	NO. OF QUESTIONS	MARKS	PERCENTAGE
1	Knowledge	18	25	20%
2	Understanding	28	38	30%
3	Application	13	38	30%
4	Skill	09	24	20%
Total		68	125	100%

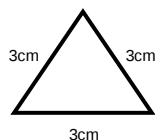
Weightage to difficulty level

SL. NO.	DIFFICULTY LEVEL	NO. OF QUESTIONS	MARKS	PERCENTAGE
1	Esay	31	38	30%
2	Average	31	62	50%
3	Difficulty	06	25	20%
Total		68	125	100%

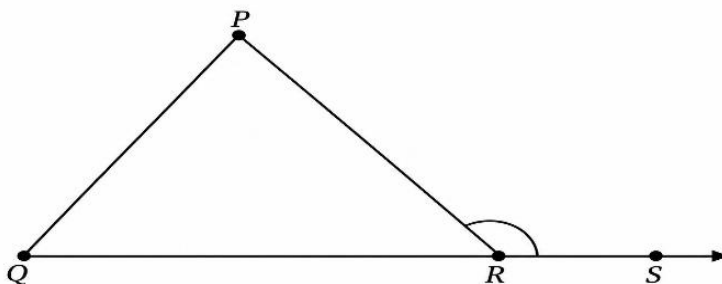
Choose the correct answer from the four alternatives given. 14X1=14

I.

1. The most basic closed figure is. (Knowledge- Easy)
a) Straight line b) Line segment c) Angle d) Triangle
2. Number of equal sides in an isosceles triangle is (Knowledge- Easy)
a) 1 b) 2 c) 3 d) 4
3. Sum of the interior angles of a triangle is (Understanding- Easy)
a) 90° b) 180° c) 270° d) 360°
4. Elements are required to construct a triangle (Understanding- Easy)
a) 1 b) 2 c) 3 d) 4
5. The type of triangle given in the figure is (Understanding- Easy)
a) Equilateral triangle b) Scalene triangle
c) Obtuse angled triangle d) Isosceles triangle

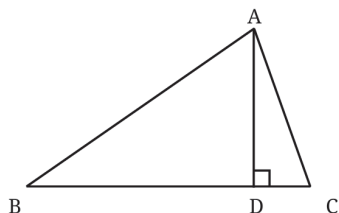


6. If the sum of any two sides of a triangle is equal to the third side, then. Understanding- Easy)
a) A triangle is formed b) An equilateral triangle is formed
c) A triangle cannot be formed d) A right triangle is formed
7. If two sides of triangle measure 4 cm and 5 cm, then the third side measures
a) 10 b) 9 c) 7 d) 8.5 (Understanding- Easy)
8. If a right-angled triangle is an isosceles triangle, then the three interior angles are
a) $90^\circ, 90^\circ, 45^\circ$ b) $90^\circ, 30^\circ, 30^\circ$ c) $90^\circ, 45^\circ, 45^\circ$ d) $80^\circ, 35^\circ, 45^\circ$
(Understanding- Easy)
9. In the given figure, exterior angle is (Understanding - Easy)
a) $\angle PQR$ b) $\angle QRS$ c) $\angle PRQ$ d) $\angle PRS$



10. In the given figure height of the triangle is (Understanding - Easy)

- a) AB b) AD c) BD d) AC



11. The exterior angle of a triangle is equal to (Understanding –Easy)

- a) sum of interior opposite angles b) adjacent angle
c) interior angle d) equal to sum of interior angles.

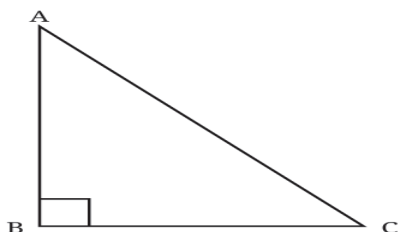
12. To construct a triangle, the sum of two angles (Skill-Easy)

- a) should be less than 180° b) should be equal than 180°
c) should be more than 180° d) should be equal to 360°

13. If two angles of a triangle are 50° and 60° , then the other angle will be. (Understanding -Easy)

- a) 70° b) 80° c) 90° d) 100°

14. In the given figure the right angle is (Knowledge – Easy)



- a) $\angle A$ b) $\angle B$ c) $\angle C$ d) None of these

II. Fill in the blanks: 1X9=9

15. A closed figure formed by joining three non collinear points is ____ (Knowledge- Easy)

16. The number of sides in a triangle is _____. (Knowledge- Easy)

17. In a right angled triangle, the longest side is called _____. (Knowledge- Easy)

18. In an equiangular triangle, each angle measures _____. (Understanding- Average)

19. In a scalene triangle, all sides are _____. (Knowledge- Easy)

20. In $\triangle ABC$, if $\angle A = 60^\circ$ and $\angle B = 70^\circ$, then $\angle C =$ _____. (Understanding- Average)

21. In a triangle , number of obtuse angles is ____ (Understanding - Easy)

22. When one side of a triangle is extended, the angle formed between the extended side and the adjacent side is _____ (Understanding- Easy)

23. The shortest distance drawn from a vertex of a triangle to its opposite side is _____ (Understanding- Easy)

III. 24. Match the following. 8X1=8

(Knowledge- Easy)

A

B

- | | |
|---------------------------|---|
| a. Equilateral triangle | 1. 90° |
| b. Isosceles triangle | 2. 3 unequal sides |
| c. Scalene triangle | 3. 3 equal angles |
| d. Acute angled triangle | 4. One angle between 90° and 180° |
| e. Right angled triangle | 5. Sum of interior opposite angles |
| f. Obtuse angled triangle | 6. 3 equal sides |
| g. Equiangular triangle | 7. each angle less than 90° |
| h. Exterior Angle | 8. Two sides are equal |

IV. Define the following : 9X1=9

(Knowledge- Easy)

25. Equilateral Triangle
26. Isosceles Triangle
27. Scalene Triangle
28. Equiangular Triangle
29. Right-angled Triangle
30. Acute-angled Triangle
31. Obtuse-angled Triangle
32. Altitude (Height) of a Triangle
33. Exterior Angle of a Triangle

V. Solve the following questions. (6X1=6)

34. How many vertices, sides, and angles are there in a triangle? (Knowledge- Easy)

35. Write the rule for constructing a triangle with respect to its sides. (Understanding- average)

36. How many circles with equal radii are used to construct an equilateral triangle?
(Understanding - average)

37. How many exterior angles can be formed in a triangle?
(Understanding - average)

38. Write the relationship between an exterior angle of a triangle and its interior opposite angles.
(Understanding- average)

39. How many altitudes can be drawn in a triangle?

(Understanding- average)

VI. Solve the following questions. (12X2=24)

40. When the lengths of three sides are given, what should be the relation among the side lengths to construct a triangle,? (Understanding- average)

41. Is it possible to construct a triangle in which all the angles are equal to 70° ? Give a reason.

(Application- Average)

42. Name the types of triangles.in the given figure. (Application - Average)



43. Is it possible to construct triangles for the given measurements? Give reason.

a) 3cm, 5cm, 4cm b)2cm, 1cm, 10cm (Application- Average)

44. Is it possible to construct triangles for the given measurements? Give reason.

a) 3cm, 30° , 4cm b) 100° , 84° , 6cm (Application-Average)

45. Construct an equilateral triangle with each side 5 cm. (Skill- average)

46. Construct a $\triangle ABC$ where $AB=5\text{cm}$, $BC=7\text{cm}$, and $AC=5\text{cm}$. (Skill- average)

47. Write any two properties of a triangle. (Understanding- average)

48. Construct a triangle whose sides are 3 cm, 4 cm and 8 cm. Are you able to construct the triangle? (Application - average)

49. The measure of two interior opposite angles of a triangle are 50° and 70° . Find the measure of the exterior angle. (Understanding- average)

50. In a triangle the measure of an exterior angle is 100° . Find the measures the interior opposite angles which are equal. (Understanding- average)

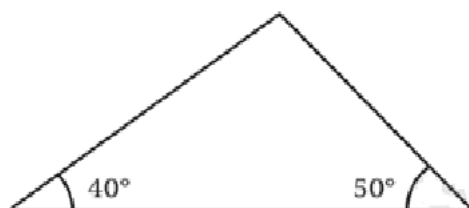
51. Kavitha starts from a point and walks 3 m towards the south, then 4 m towards the east, and finally walks 5 m to return to her starting point. What type of triangle is formed by her path? Construct the triangle using appropriate measurements. (Application- difficult)

VII. In the following figures of triangles, find the measure of the third angle.

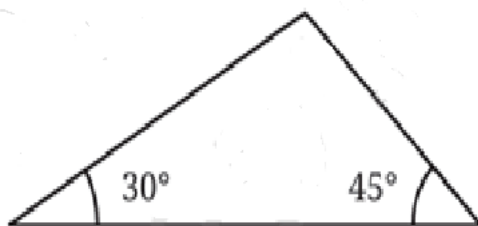
$3 \times 2 = 6$

(Understanding- average)

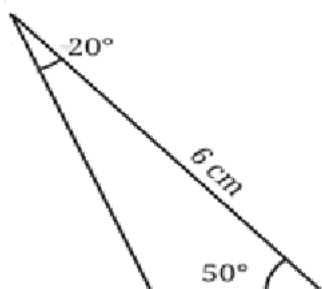
52.



53.



54.



VIII. Solve the following : 8X3=24

55. Without constructing, verify whether a triangle can be formed with side lengths 10 cm, 15 cm, and 25 cm. (Application-Average)

56. For each of the following, give at least 5 possible values for the third length so that there exists a triangle having these as sides length. (Application - average)

a)1,100 b)5,5 c)3,7

57. Which of the following lengths can be the side lengths of a triangle? Explain your answers. (Application - average)

a)2,4,8 b)5,5,8 c)10,20,35

58. Construct a $\triangle ABC$ given $AB=3\text{cm}$, $\angle B = 75^\circ$ and $AC=7\text{cm}$. (Skill-average)

59. Construct triangles for the following measurements: 25° , 3cm, 60° . (Skill – Average)

60. If $\hat{B}=\hat{C}$, and $\hat{A} = 80^\circ$, then find $\hat{B}$ and $\hat{C}$. (Skill – Average)

61. Construct a $\triangle PQR$ given $QR=5\text{cm}$, $PQ=6\text{cm}$ $RP=5\text{cm}$. Also draw altitude from P to QR. (Skill- average)

62. Construct a triangle TRY with $RY = 4\text{ cm}$, $TR = 7\text{ cm}$, $\angle R = 140^\circ$. Construct an altitude from T to RY. (Skill- average)

IX. Solve the following: 5X4=20

63. For each of the following angles, 30° , 70° , 54° , 144° . Find another angle for which a Triangle is (Skill- difficult)

(a) Possible, (b) not possible. (c) Find at least two different angles for each category

64. Determine which of the following pairs can be the angles of a triangle and which cannot:
(Application -difficult)

(a) 35° , 150° (b) 70° , 30° (c) 90° , 85° (d) 50° , 150°

65. Find the third angle of a triangle (using a parallel line) when two of the angles are,
(Understanding- difficult)

(a) 36° , 72° (b) 150° , 15° (c) 90° , 30° (d) 75° , 45°

66. Can we say anything about the existence of a triangle having sides length 3 cm, 3 cm and 7 cm?
Verify your answer by construction. (Skill- difficult)

67. Sunil travels 1000km by car to his friend Kumar's town. From there, he travels 750 km to reach another friend Dev's town. He then returns directly to his starting point by the shortest route.

a) Does his journey form a triangle? (Application- Difficult)

b) If yes, find the shortest distance from Dev's town back to Sunil's original location.

c) Construct the triangle using an appropriate scale.

VIII. Answer the following. 1X5=5

68. A tent is supported in the shape of a triangle having sides 6 m, 8 m and 10 m.

a) Identify the type of triangle. (Application- Difficult)

b) Give reason for your answer.

c) Write one advantage of triangular shapes in construction work.

d) Construct the triangular tent using a suitable scale

Chapter – 08 - Working with Fraction

Lo.No	Learning Outcomes	Question numbers
16	Perform multiplication and division of fractions using standard procedures and solve related word problems.	1, 3, 4, 5, 18 to 33, 39 to 43, 47, 48
17	Explain the rationale behind multiplication and division of fractions	2, 6 to 10, 11 to 17, 34 to 38, 49, 50
48	Appreciate the rules given by Brahmagupta for fraction multiplication and division	44, 45, 46

Weightage to Objectives

Sl.NO	Objectives	No. of questions	Marks	Percentage
1	Knowledge	12	21	20%
2	Understanding	18	32	30%
3	Application	14	32	30%
4	Skill	06	21	20%
Total		50	106	100%

Weightage to difficulty level

Sl.NO	Difficulty level	No. of questions	Marks	Percentage
1	Easy	17	32	30%
2	Average	28	58	50%
3	Difficult	05	21	20%
Total		50	106	100%

I Choose the correct answer from the given options:**5×1= 5**

1. An easy form of multiplication is (Knowledge- Easy)
 a) Subtraction b) Addition c) Factors d) Divison
2. When multiplicand and multiplier are multiplied . (Application - Easy)
 a) Product b) Quotient c) Sum d) Difference
3. The mixed fraction form of $\frac{8}{5}$ (Application - Average)
 a) $3\frac{1}{5}$ b) $1\frac{3}{5}$ c) $5\frac{1}{3}$ d) $1\frac{5}{3}$
4.  The shaded part in this figure is written in fraction form.
 (Knowledge- Understanding)
 a) $\frac{3}{4}$ b) $\frac{1}{3}$ c) $\frac{1}{4}$ d) $\frac{4}{3}$
5. The area of the rectangle (Application -Difficult)
 a) Length×Height b) Height × Breadth c) Length×Breadth d) Length× Breadth× Height

II. Fill in the blanks:**5×1= 5**

6. When a number is multiplied by 1, its -----does not change. (Knowledge-Difficult)
7. When a fraction is multiplied by its reciprocal ----- is obtained. (Knowledge-Easy)
8. The division operation in fractions can be converted into a ---- operation. (Application -Easy)
9. In multiplication, if one number is 0 and the other is 1, then the product is ---- (Application - Easy)

10. The area are measured in _____ units.

(Easy- Knowledge)

III. 11. Match the following: 4×1= 4

(Knowledge - Average)

- a. $4 + 4 + 4 + 4$ i. product
- b. $3 + 3 + 3 + 3 + 3$ ii. Quotient
- c. Multiplicand× Multiplier iii. 5×3
- d. Divisor÷ Dividend iv. 4×4

IV. Multiply the following and convert into mixed fraction. 6×2= 12 (Knowledge - Easy)

12. $6 \times \frac{2}{5}$

13. $5 \times \frac{12}{9}$

14. $\frac{7}{8} \times 4$

15. $\frac{13}{5} \times 2$

16. $11 \times \frac{2}{9}$

17. $14 \times \frac{5}{13}$

V. Find the products of the following: $6 \times 2 = 12$

(Understanding- Average)

18. $\frac{5}{6} \times \frac{2}{3}$

19. $\frac{3}{4} \times \frac{2}{5}$

20. $\frac{7}{8} \times \frac{1}{5}$

21. $\frac{4}{9} \times \frac{2}{3}$

22. $\frac{1}{6} \times \frac{1}{4}$

23. $\frac{12}{15} \times 3$

VI. Solve the following:

($5 \times 2 = 10$)

24. $4 \div \frac{1}{8}$

(Application – Average)

25. $15 \div \frac{2}{5}$

(Application- Average)

26. $21 \div \frac{7}{3}$

(Skill- Average)

27. $12 \div \frac{3}{60}$

(understanding- Average)

28. $65 \div \frac{2}{13}$

(understanding- Average)

VII. Find the quotients for the following: $5 \times 2 = 10$

(understanding – Average)

29. $\frac{6}{15} \div \frac{5}{12}$

30. $\frac{5}{25} \div \frac{25}{5}$

31. $\frac{3}{9} \div \frac{3}{9}$

32. $\frac{25}{20} \div \frac{5}{4}$

33. $\frac{22}{66} \div \frac{22}{11}$

VIII. Find the products of the following fractions and reduce to simplest form. $5 \times 3 = 15$

(Understanding- Average)

34. $\frac{2}{15} \times \frac{10}{3}$

35. $\frac{5}{6} \times \frac{4}{10}$

36. $\frac{3}{4} \times \frac{9}{9}$

37. $\frac{12}{25} \times \frac{5}{2}$

38. $\frac{7}{9} \times \frac{8}{4}$

IX. Solve the following word problems:**5×3=15**

39. Megha paid Rs.20 to play a game for 1 hour at the game centre. How much money should she pay to play for $1\frac{1}{2}$ hours? (Application-Difficult)

40. If the length of a rectangular plot is $\frac{12}{5}$ m and the breadth is $\frac{25}{24}$ m, then find the area of the rectangle.

(Application- Average)

41. Janya distributed $\frac{1}{2}$ litre water equally among her 4 friends. Find the amount of water did each friend received? (Application- Average)

42. In a school, $\frac{4}{5}$ of the students are boys and 200 are girls. Find the total number of students in the school?

(Application- Average)

43. Neha has read $\frac{2}{5}$ of a 50 page book. How many pages does she still have to read? (Application- Average)

X. Find Values: (3×3=9)**(Skill-Difficult)**

44. $(1 \div \frac{1}{2}) \times (1 \div \frac{1}{3}) \times (1 \div \frac{1}{2})$

45. $(2 \div \frac{1}{3}) \times (2 \div \frac{1}{4}) \times (2 \div \frac{1}{5})$

46. $(3 \div \frac{1}{3}) \times (3 \div \frac{1}{4}) \times (3 \div \frac{1}{5})$

XI. Solve the following:**(4×4=16)**

47. At a petrol bunk, $\frac{3}{10}$ of petrol can be filled in 1 hour. Find how much petrol can be filled in

a) $\frac{2}{5}$ hour b) $\frac{3}{4}$ hour c) $\frac{1}{3}$ hour d) $\frac{2}{3}$ hour

(Application- Difficult)

48. Ramesh's monthly income is Rs.30,000. He spends $\frac{1}{10}$ for household expenses $\frac{2}{10}$ for vegetables, milk and medicine, $\frac{3}{10}$ for children's school fees, and keeps $\frac{4}{10}$ for his savings. Find how much money is left with him? (Application- Difficult)

XII. Solve the following. (2X5=10)

49. The book "Pariganitha". Written by Sridharacharya in the 9th century mentions this problem. 'Friend' tell me the sum of $1 \div \frac{1}{6}$, $1 \div \frac{1}{10}$, $1 \div \frac{1}{13}$, $1 \div \frac{1}{9}$ and $1 \div \frac{1}{2}$ What should the friend say" ?

(Application- Difficult)

50. In this square diamond figure, express the shaded part in the form of fraction. (Skill- Difficult)



PART – 2

Chapter – 1- Geometric Twins

Lo.No	Learning Outcomes	Question numbers
35	Explain the meaning of congruency. Identify corresponding equal sides and angles and apply congruence criteria (SSS, SAS, ASA, AAS, RHS) to solve problems.	1 to 9, 11, 12, 13, 15 to 31, 33 to 50, 52, 53, 56, 57, 61, 65, 66, 71, 72
36	Appreciate the importance of congruence in everyday life (e.g., paired windows, identical designs)	10, 62, 68, 69, 70
37	Explain why the triangles are congruent.	14, 32, 51, 54, 55, 58, 59, 60, 63, 64, 67

Weightage to objectives

SL.No	Objectives	No. of question	Marks	percentage
1	Knowledge	26	27	20%
2	Understanding	21	41	30%
3	Application	15	41	30%
4	Skill	10	26	20%
	Total	72	135	100%

Weightage to Difficulty level

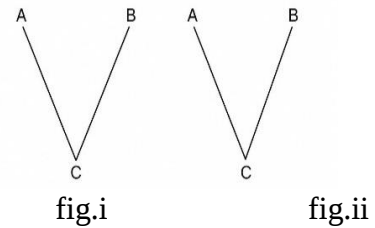
SL.No	Difficulty level	No. of question	Marks	percentage
1	Easy	25	40	30%
2	Average	26	67	50%
3	Difficult	11	28	20%
	Total	72	135	100%

I. Choose the correct answer from given four alternatives.

15 × 1 = 15

1. To know whether fig.(i) and fig.(ii) are geometric twins, we need. (knowledge-easy)

- a) Length of arms only
- b) Angle between the arms only
- c) Both length of the arms and angle between them
- d) Shape of the figures



2. Identify the geometric twins a

(knowledge-easy)

- a)  b) 
- c)  d) 

3. Congruent figures (Geometric twins) have equal

(knowledge-average)

- a) Shape only b) Size only c) Shape and size d) Area only

4. **The** true statement among these.

- a) All squares are congruent b) If two squares have equal sides, they are congruent
- c) If two rectangles have equal area, they are always congruent
- d) If two triangles have equal area, they are congruent (understanding-difficult)

5. In an equilateral triangle each angle measures

(knowledge-easy)

- a) 45° b) 60° c) 90° d) 120°

6. The symbol used to represent congruence is

- a) = b) $\approx$ c) Δ d) $\cong$

(knowledge-easy)

7. Which of the following is not a valid congruence criterion for triangles?

- a) SSS b) SAS c) RHS d) AAA (Knowledge -average)

8. In an isosceles triangle, the angles opposite to the equal sides are. (Knowledge -average)

- a) Equal b) Complimentary c) Supplementary d) Perpendicular

9. In $\triangle ABC$ and $\triangle PQR$, $AB = PQ$, $BC = QR$ and $\angle B = \angle Q$. Then which criterion proves the two triangles are congruent?

- a) SSS b) SAS c) ASA d) RHS (understanding-easy)

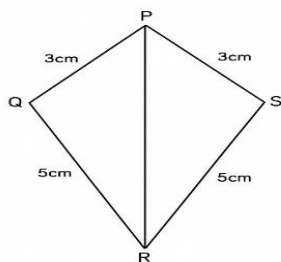
10. Sita traced a triangle and placed it exactly over another triangle without any gap. What can we conclude?

- a) Triangles are similar only b) Triangles are geometric twins (skill-easy)
- c) One triangle is bigger d) They are parallel

11. By which congruency criterion can we prove $\triangle PQR$ and $\triangle PSR$ are congruent?

- a) SSS
- b) SAS
- c) RHS
- d) AAA

(understanding-average)



12. The following statement is sufficient to prove two triangles are congruent (Knowledge -average)

- a) Two sides and non-included angle
- b) Three angles
- c) Two angles and included side
- d) None of these

13. If $\triangle ABC \cong \triangle PQR$, then corresponding part of AC is (skill-average)

- a) PQ
- b) QR
- c) PR
- d) None of these

14. A teacher cuts two circles from cardboard using the same compass width. The circles are congruent because they have same

- a) Colour
 - b) Shape
 - c) Radius
 - d) Centre
- (skill-average)

15. In two congruent triangles $\triangle ABC$ and $\triangle DEF$, If $AB = 5$ cm, then the measure of corresponding side of $\triangle DEF$ will be

- a) 10 cm
 - b) 5 cm
 - c) 2.5 cm
 - d) Cannot say
- (application-average)

II. There is a relationship between first pair, find appropriate answer for second pair.

$$4 \times 1 = 4$$

16. Triangle: 3 sides :: Square : _____ (Knowledge -easy)

17. Congruent figures: Same shape and size :: Similar figures : _____ (understanding-average)

18. Congruent squares: Equal sides :: Congruent circles : _____ (understanding-difficult)

19. Equal sides: Congruent squares :: Equal length and equal breadth : (skill-average)

III. Fill in the Blanks

$$9 \times 1 = 9$$

20. Two triangles are congruent if all their _____ are equal. (knowledge-Easy)

21. Figures that have same shape and size are called _____ (knowledge-easy)

22. In a right-angled triangle, the side opposite to the right angle is called _____

(knowledge-Easy)

23. Two figures are said to be congruent if they have the exact shape and _____

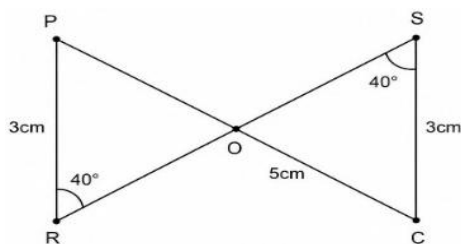
(Knowledge -easy)

24. In two triangles, If $AB = DE$, $BC = EF$ and $AC = DF$, then $\triangle ABC$ is congruent to $\triangle$ _____

(Skill-Average)

25. If $\triangle LMN \cong \triangle STU$, then side MN is equal in length to side _____. (understanding-average)

26. In the figure, $\triangle PQR \cong \triangle QOS$. Then side $PO =$ _____ cm. (application- Average)



27. If $\triangle ABC \cong \triangle XYZ$, then $\angle A =$ _____. (Knowledge -average)

28. If two angles of a triangle are 50° and 60° , then the measure of the third angle is _____.
(knowledge-easy)

IV. True or False

$5 \times 1 = 5$

29. All squares having equal areas are congruent. (understanding-average)
30. Every pair of triangles with equal angles are always congruent. (understanding-average)
31. Triangles having two equal angles and one equal side are congruent.(understanding-average)
32. If two triangles have equal areas, then they are always congruent. (Application-difficult)
33. In two triangles, if their corresponding angles are equal, then the triangles are automatically congruent. (understanding-average)

V. 34. Match the Following

$5 \times 1 = 5$

(understanding-easy)

A

B

- | | |
|------------------------|--------------------------------------|
| a. Congruent triangles | 1. Two sides of a triangle are equal |
| b. Isosceles triangle | 2. All three sides are equal |
| c. Similar figures | 3. Same radius |
| d. Congruent circles | 4. Same shape and Same size |
| e. Geometric twins | 5. Same shape only |

VI. Define

$$6 \times 1 = 6$$

- | | |
|-----------------------|-----------------------|
| 35. Congruent figures | (knowledge-average) |
| 36. SSS Criteria | (knowledge-easy) |
| 37. RHS Criteria | (knowledge-difficult) |
| 38. SAS Criteria | (knowledge-difficult) |
| 39. ASA Criteria | (knowledge-average) |
| 40. Congruent circles | (knowledge-easy) |

VII. Answer the Following.

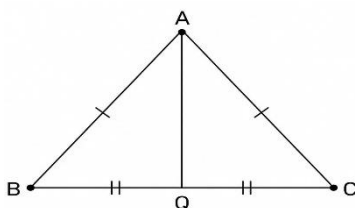
$$6 \times 1 = 6$$

- | | |
|---|----------------------|
| 41. What is an isosceles triangle ? | (knowledge-average) |
| 42. What is an obtuse angled triangle ? | (knowledge-average) |
| 43. If $\triangle ABC \cong \triangle PQR$, write the corresponding vertices. | (knowledge-easy) |
| 44. Give any one example for congruent figures. | (understanding-easy) |
| 45. In a right-angled triangle, what is the hypotenuse? | (knowledge-easy) |
| 46. If two triangles have equal corresponding sides and equal corresponding angles, what can we conclude? | (understanding-easy) |

VIII. Solve the Following.

$$9 \times 2 = 18$$

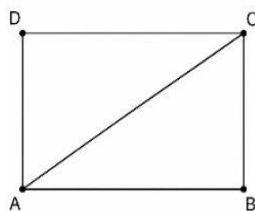
- | | |
|---|--------------------------|
| 47. If $\triangle ABC \cong \triangle DEF$, write the corresponding sides. | (understanding-easy) |
| 48. State any two properties of congruent figures. | (knowledge-easy) |
| 49. Are two figures having the same shape always congruent? Give reason. | (understanding- Average) |
| 50. If $\triangle ABC \cong \triangle PQR$ and $AB = 6$ cm, $BC = 8$ cm and $AC = 10$ cm, write the measures of PQ, QR and PR. | (application-easy) |
| 51. In the given figure, state the three pairs of equal parts that make $\triangle ABQ \cong \triangle ACQ$ and name the congruence criterion used. | (understanding-average) |



- | | |
|---|-------------------------|
| 52. In $\triangle PQR$ and $\triangle XYZ$, $PQ = XY = 5$ cm, $PR = XZ = 8$ cm and $QR = YZ = 7$ cm. Are the triangles congruent? Name the criterion used. | (application-average) |
| 53. A student says "All equilateral triangles are congruent." Is the statement correct? Give reason. | (Application -average) |
| 54. In two right-angled triangles, the hypotenuse is 13 cm and one corresponding side is 5 cm each. Are they congruent? Justify. | (application-difficult) |

55. ABCD is a rectangle. AC is a diagonal. Are $\triangle ACB$ and $\triangle ACD$ congruent? Why?

(application-average)



IX. Solve the Following.

$$6 \times 3 = 18$$

56. $\triangle ABC$ and $\triangle PQR$ are congruent triangles. $\triangle ABC \cong \triangle PQR$. Write the parts of $\triangle ABC$ corresponding to:

(understanding-average)

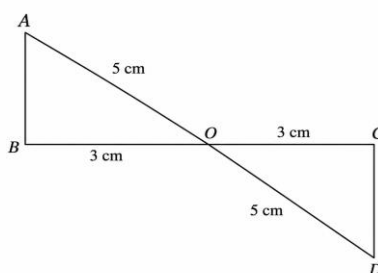
a. PQ

b. PR

c. $\angle Q$

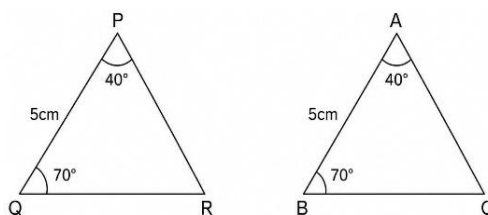
57. In the given figure $AO = DO = 5$ cm and $BO = OC = 3$ cm. Are $\triangle ABO$ and $\triangle DCO$ congruent? If yes, mention the criterion and symbolic form.

(understanding-average)



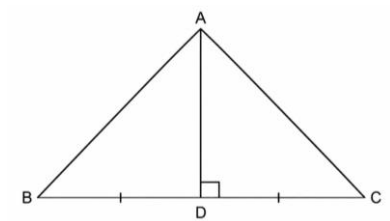
58. Prove that $\triangle ABC$ and $\triangle PQR$ are congruent and write them in symbolic form.

(application- Average)



59. In triangle ABC, AD is perpendicular to BC and bisects it. Show that $\triangle ABD \cong \triangle ACD$.

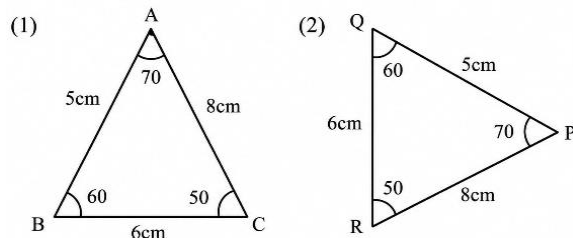
(skill-average)



60. In $\triangle ABC$ and $\triangle PQR$, $AB = PQ$, $AC = PR$ and $\angle B = \angle Q = 90^\circ$. Prove that the triangles are congruent.
(application-difficult)

61. Identify the corresponding sides and corresponding angles in the given figures (1) and (2).

(understanding-easy)



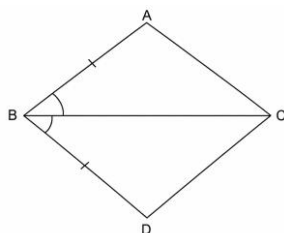
X. Solve the Following.

$$7 \times 4 = 28$$

62. Construct an equilateral triangle of side 5 cm and construct another triangle congruent to it.
(skill-easy)

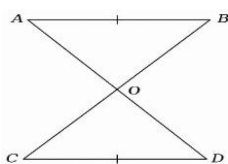
63. In the adjoining figure $AB = BD$ and $\angle ABC = \angle DBC$. Prove that $\triangle ABC \cong \triangle BCD$.

(application-average)



64. In the figure $AB = CD$ and O is the midpoint of AD and BC. Is $\triangle AOB \cong \triangle COD$? Justify.

(application-difficult)



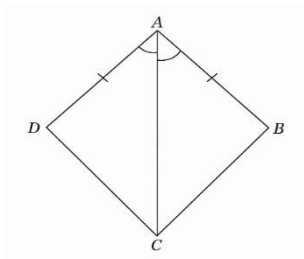
65. In the figure $AB = AD$ and $\angle BAC = \angle DAC$. Find:

(understanding-easy)

- $BC = \underline{\hspace{2cm}}$
- $\angle BCA = \underline{\hspace{2cm}}$
- $\angle ABD = \underline{\hspace{2cm}}$

Also state:

- AC bisects $\underline{\hspace{2cm}}$ and $\underline{\hspace{2cm}}$.

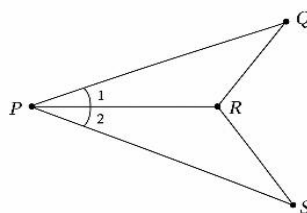


66. In the adjoining figure $PQ = PS$ and $\angle 1 = \angle 2$.

(Application -difficult)

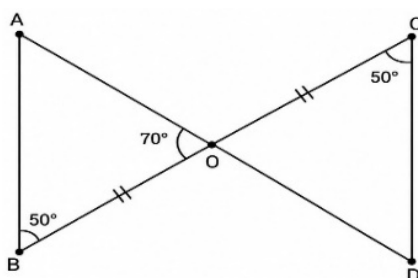
a. Is $\triangle PQR \cong \triangle PSR$?

b. Is $QR = SR$? Give reason.



67. Construct an isosceles triangle $\triangle ABC$ such that $AB=AC=5\text{cm}$, $BC=6\text{cm}$ and construct another triangle congruent to it. (skill-average)

68. In the figure $\triangle AOB \cong \triangle DOC$. Find $\angle COD$ and $\angle ODC$ with reasons. Also write the measures of all angles of $\triangle COD$. (application/difficult)



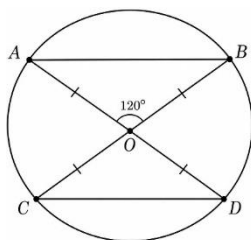
XI. Solve the Following.

$4 \times 5 = 20$

69. Construct a right-angled triangle whose hypotenuse is 6 cm and one side is 4 cm. Draw another triangle congruent to it and name them. (skill-average)

70. In the figure O is the center of the circle. Prove that $\triangle AOB \cong \triangle COD$. Also find $\angle A$ and $\angle B$.

(application-difficult)



71. In $\triangle ABC$ and $\triangle DEF$:

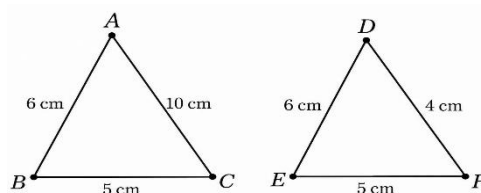
(Understanding-average)

a) Compare the corresponding sides.

b) Triangles $\triangle ABC$ and $\triangle DEF$ congruent.

c) Name the congruence criterion used.

d) Explain why such figures are called geometric twins.



72. construct a triangle ABC such that $BC=6\text{cm}$, $\angle B=60^\circ$ and $\angle C=70^\circ$. Draw another triangle congruent to it using SSS criteria and write corresponding angles. (Skill-Average)

Chapter – 02 - Operation with Integers

Lo.No	Learning Outcomes	Question numbers
10	Perform addition and subtraction of integers	1 to 4, 7, 14 to 18, 22, 23, 24, 28, 33 to 37, 44, 49, 50, 64, 67, 69, 70
11	Determine the results of multiplication and division involving positive and negative integers and apply them in daily life.	5, 6, 8 to 13, 19, 20, 21, 25 to 27, 29 to 32, 38, 39 to 43, 45 to 48, 51 to 63, 65, 66, 68, 71 to 74

Weightage to objectives

SL.No	Objectives	No. of question	Marks	percentage
1	Knowledge	26	32	20%
2	Understanding	22	47	30%
3	Application	17	47	30%
4	Skill	9	33	20%
	Total	74	159	100%

Weightage to Difficulty level

SL.No	Difficulty level	No. of question	Marks	percentage
1	Easy	29	48	30%
2	Average	35	79	50%
3	Difficult	10	32	20%
	Total	74	159	100%

I. Choose the correct answer form the given four alternatives. 14x 1= 14

1. The group of numbers that includes positive numbers, negative numbers and zero is called
 a) Natural numbers b) Whole numbers
 c) Integers d) Negative number (knowledge - easy)
2. A pair of numbers that their sum is -25 and their difference is -9 are
 a) 8, 17 b) $-17, -8$ c) 17, -8 d) $-17, 8$ (knowledge - average)
3. The additive inverse of -46 is
 a) 0 b) $+46$ c) -46 d) -1 (knowledge - easy)
4.  The expression represented by the given tokens is (understand-easy)

 a) $-2 \times 3 = 6$ b) $-2 \times (-3) = 6$ c) $-3 \times 2 = -6$ d) $2 \times 3 = 6$
5. The product of -12 and -8 is
 a) -96 b) $+96$ c) -72 d) $+72$ (knowledge - easy)
6.  The number represents the token interpretation is

 a) -6 b) $+3$ c) -3 d) $+9$ (knowledge - easy)
7. The value of $(+3) \times (-20)$ is
 a) -23 b) -120 c) $+60$ d) -60 (understand-easy)
8. The integer neither positive nor negative is
 a) 1 b) -1 c) 0 d) 10 (knowledge - easy)
9. Identify the correct statement. (knowledge-Easy)
 a) Negative $\times$ Negative = Negative b) Positive $\times$ Negative = Positive
 c) Negative $\times$ Negative = Positive d) Negative $\times$ Positive = Positive
10. $(8 \times (-5)) \times 4 = 8 \times ((-5) \times 4)$ (knowledge-average)
 The property used in the equation is
 a) Closure b) Commutative c) Associative d) Distributive
11. The true statement among these (Knowledge-Average)
 a) $5 \div 0 = 5$ b) $0 \div 5 = 0$ c) $0 \div 5 = 5 \div 0$ d) $0 \div 5 = 5$
12. The odd one out (Understand-average)
 a) -8×2 b) $-15 + (-1)$ c) $-7 \times (-2)$ d) $-17 + 1$
13. The value of $-5 \times 18 + (-20)$ is
 a) -70 b) $+70$ c) -110 d) $+110$ (Understanding-average)

14. $7 \underline{\quad} -5 \underline{\quad} 8 = 20$ The correct way of using sign here is (Understand-difficult)
 a) +, - b) -, + c) -, × d) ÷, -

II. There is a relationship between first pair, write the appropriate answer for second pair **$5 \times 1 = 5$**

15. Profit : Positive :: Loss : _____ (knowledge-easy)
 16. Above sea level : Positive :: Below sea level : _____ (knowledge-easy)
 17. Additive inverse of +9 : -9 :: Additive inverse of -15 : _____ (understanding-easy)
 18. Left of the zero : Negative integer :: Right of the zero : _____ (knowledge-average)
 19. $-4 \times (+3) : -12 :: (-4) \times (-3) : \underline{\hspace{2cm}}$ (knowledge-easy)

III. Fill up the blanks with suitable answer **$7 \times 1 = 7$**

20. $-6 \times (+8) = +8 \times (-6)$
 The property expressed here is _____ (knowledge-Easy)
 21. When the multiplicand is positive and the multiplier is negative, then the product is _____
 (Knowledge- Easy)
 22. The numbers on the left side of zero on the number line are called _____(knowledge- Easy)
 23. The difference of -12 and +5 is _____ (understanding-difficult)
 24. The product of additive identity and multiplicative identity is _____(understanding-average)
 25. $(-8) \times \underline{\hspace{1cm}} = 56$ (understanding-average)
 26. $-72 \div \underline{\hspace{1cm}} = 8$ (understanding-average)

IV. Match the Following **$1 \times 4 = 4$** (knowledge-average)

- | | |
|---|--------------------------|
| 27. A | B |
| a) $-8 \times 6 = -48$ | 1) Commutative Property |
| b) $7 \times (-4) = -4 \times 7$ | 2) Distributive Property |
| c) $6 \times (-3 \times 2) = (6 \times -3) \times 2$ | 3) Closure Property |
| d) $5 \times (-4 + 3) = 5 \times (-4) + 5 \times (3)$ | 4) Associative Property |

V. True or False

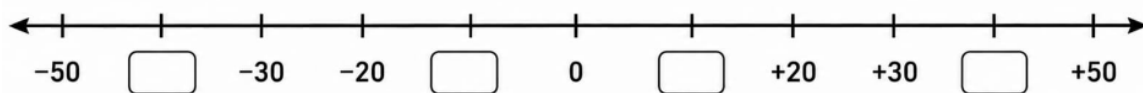
6 x 1 = 6

28. Zero is the smallest integer. (knowledge-average)
29. The product of any two negative integers is always negative. (knowledge-easy)
30. The product of $-8 \times (-5)$ and $+8 \times (+5)$ are equal. (understanding-easy)
31. Multiplication of integers follows the associative property. (knowledge-easy)
32. ₹50 loss is represented by +50. (knowledge-easy)
33. The additive inverse of an integer always has the opposite sign and the same numerical value. (knowledge- Easy)

VI. Solve the following

17 x 2 = 34

34. Arrange the following integers in ascending order: (understanding-average)
5, -20, 80, -5, 30
35. Fill the correct integers in the blanks on the number line. (understanding-easy)



36. Add $-3 + (-5)$ on number line and write the result. (skill-average)
37. Evaluate: (understanding- Easy)
a) $-15 + (+19)$
b) $-8 - (-10)$
38. Find the product: (knowledge-easy)
a) $(-5) \times (-1)$
b) $(-7) \times 15$
39. A submarine is at the depth of -120 m below the sea level. If it rises by 45 m, find its present position. (application-average)
40. A thermometer shows a temperature 5°C . If the temperature drops by 11°C , find the new temperature. (application-average)
41. Find the value of: (understanding-Average)
 $42 \times (-18) \times (-6)$
42. $3 \times (-3)$ represent it on number line and hence write the product. (skill-average)
43. A place is 65 m above the sea level and another place is 28 m below sea level. Find the difference in height between the two places. (application-difficult)

44. Write any two integers less than 4 whose difference is -4 . Verify your answer by subtraction.

(application-difficult)

45. The temperature in a city was 5°C . It decreased by 7°C each day for 3 days. Find the change in temperature.

(application-average)

46. A submarine goes down 12 m every minute. How far from sea level will it be after 5 minutes?

(application-average)

47. A shopkeeper loses ₹8 on each toy sold. What is the total loss on selling 6 toys?

(application-average)

48. Write an expression using multiplication of integers that gives -24 in two different ways.

(skill- Average)

49. Write a positive integer and a negative integer whose difference is negative.

(Application-average)

50. Is it possible to add two negative integers and get a positive integer? Give reason.

(understanding-average)

VII. solve the following problems.

$$11 \times 3 = 33$$

51. Show with an example that multiplication of integers follows the associative property.

(understanding-average)

52. A tank contains 700 l water. Because of a leak, 8 l of water leaks every hour. Find the amount of water remaining after 10 hours.

(application-average)

53. Find the value of:

(understanding-Easy)

$$(-5) \times (-2) \times (+5) \times (-8)$$

54. Find the integers whose product with -1 is:

(understanding-easy)

a) $+2$

b) -54

c) 0

55. Write any three properties of multiplication of integers with examples. (knowledge-average)

56. State any three rules for division of integers with examples. (Understanding-easy)

57. A science lab freezer begins at 40°C . The temperature drops by 6°C every hour. Find the temperature after 8 hours.

(application-average)

58. Write three different pairs of integers whose quotient is -4 . (understanding-Average)

59. On the first day, a company made a profit of ₹12,000. On the second day, it suffered a loss of ₹8,000. Calculate the net profit or loss.

(application-average)

60. Find the value of: (understanding-Easy)
 $54 \times (-14) \div 27$

61. Simplify using suitable property (understanding-difficult)
 $(25 \times -13) + (25 \times -27)$

VIII. Solve the following

$$7 \times 4 = 28$$

62. Verify the distributive property of multiplication over addition with an example. (understanding-Average)

63. In a quiz competition, +4 marks are awarded for every right answer and 2 marks are deducted for every wrong answer. A participant gives 14 correct answers and 9 incorrect answers. Find the total marks obtained. (application-difficult)

64. Using integers (+3), (+5), (-8) only once, form an expression whose value is 0. Using + & - at suitable places. (understanding-average)

65. A shopkeeper gains ₹25 per notebook sold and loses ₹10 per damaged notebook. If he sells 40 notebooks and damages 15 notebooks, find the net profit. (application-difficult)

66. A shopkeeper sells rice at ₹40 per kg. However, his weighing machine incorrectly shows 900 g as 1 kg. If he sells 3 kg of rice according to his faulty weighing machine, how much extra profit does he make? (skill-difficult)

67. Two integers have a product of 36 and their sum is -13. Find the integers. (Application-difficult)

68. Find the values without calculation (Application -easy)

a. If $90 - 35 + 16 - 11 + 4 = 64$, find
 $-90 + 35 - 16 + 11 - 4$

b. If $123 \times 546 = 67,158$, find

1) $(-123) \times 546$

2) $(-123) \times (-546)$

IX. Complete the 3×3 Magic Grids

$$2 \times 4 = 8$$

69. Sum = -9 (skill-average)

-4		-2
	0	
-7		4

70. Sum = -12 (skill-average)

-6		-9
	-9	-1
	-6	

X. Solve the following problems

$$4 \times 5 = 20$$

71. $\boxed{} + \boxed{} \times \boxed{} = -56$

(Skill-Easy)

Fill the boxes with suitable integers in four different ways and verify the answer.

72. Simplify the following expressions and write them in ascending order. (understanding-average)

a) $-14 + (+14) + 1$

b) $-81 \div 9$

c) $-5 + (-7) - 8$

d) -25×2

73. A tile company earns profit of ₹15 per box of designer tiles sold and incurs a loss of ₹7 per box of damaged tiles sold. If the number of damaged tile boxes sold is 540, how many boxes of designer tiles must the company sell to neither make profit nor loss? (skill-difficult)

74. Write the Collatz Conjecture sequence starting with -32 . If the rule of even take half and odd multiply by -3 and add 1 . Describe the pattern. (skill-difficult)

Chapter – 03 - Finding Common Ground

Lo.No	Learning Outcomes	Question numbers
7	Find prime factors and multiples of numbers.	1 to 5, 12, 16, 22, 28, 30, 38, 39, 40, 61, 66, 65
8	Explain the difference between HCF and LCM of given numbers and find HCF and LCM of given numbers. Solve related word problems and apply them in daily life.	6 to 11, 13, 14, 15, 17 to 21, 23 to 27, 29, 31 to 36, 41 to 46, 48, 50 to 58, 60 62, 63, 65, 68 to 72
9	Find different number patterns and solve puzzles	37, 47, 49, 57, 59, 64

Weightage given to Objectives

Sl. No.	Objectives	Number of Questions	Marks	Percentage
1	Knowledge	25	32	20%
2	Understanding	19	47	30%
3	Application	18	47	30%
4	Skill	10	31	20%
	Total	72	157	100%

Weightage to Difficulty Level

Sl. No.	Difficulty Level	Number of Questions	Marks	Percentage
1	Easy	35	47	30%
2	Average	28	80	50%
3	Difficult	9	30	20%
	Total	72	157	100%

I. Choose the correct answer from the four choices given below for each question: 20 x 1 = 20

1. The factors of the number 4. (Easy-knowledge)
A) 2 B) 1, 2 C) 1, 2, 4 D) 3, 4
2. The prime factorization of 90. (Easy-knowledge)
A) 3×10 B) $3 \times 5 \times 2$ C) $3 \times 2 \times 3$ D) $2 \times 3 \times 3 \times 5$
3. The prime numbers between 1 and 6. (Easy-knowledge)
A) 2 B) 3 C) 4 D) 5
4. The prime factorization of 121. (Easy-knowledge)
A) 11×10 B) 11×11 C) 11×12 D) 11×13
5. The common factors of 12 and 16. (Easy-knowledge)
A) 2, 3 B) 2, 3, 6 C) 2, 4 D) 1, 4
6. The HCF of 3 and 5. (Easy-knowledge)
A) 1 B) 2 C) 3 D) 4
7. The HCF of any two distinct prime numbers is always. (Easy-knowledge)
A) 0 B) 1 C) 2 D) -1
8. The HCF of 14 and 35. (Easy-knowledge)
A) 3 B) 2 C) 7 D) 5
9. If the common factors of 45 and 75 are 3 and 5, then their HCF. (Easy-knowledge)
A) 15 B) 20 C) 30 D) 45
10. The LCM of 2 and 3. (Easy-knowledge)
A) 3 B) 2 C) 6 D) 5
11. If 'a' and 'b' are two co-prime numbers, their LCM. (Easy-knowledge)
A) 1 B) $a \times b$ C) 0 D) $a + b$
12. The multiples of 10. (Easy-knowledge)
A) 2 and 5 B) 5, 6, 7... C) 2, 3, 4... D) 10, 20, 30, 40, 50...
13. The LCM of 15 and 20 (Easy -Application)

A) 60 B) 30 C) 20 D) 10

14. If p and q are two distinct prime numbers, the HCF of p^2 and q^2 . (Average:-skill)

A) pq B) 1 C) $p^2 q^2$ D) $p + q$

15. The correct relationship between the product of two numbers and their HCF and LCM

- A) $\text{HCF} \times \text{LCM}$ (Easy-knowledge)
B) $\text{HCF} \times \text{Product of two numbers} = \text{LCM}$
C) $\text{HCF} \times \text{LCM} = \text{Product of two numbers}$
D) $\text{LCM} \times \text{Product of two numbers} = \text{HCF}$

16. The multiples of 2 are 2, 4, 6, 8, 10... and the multiples of 3 are 3, 6, 9, 12, 15..., the common multiples of 2 and 3. (Average-knowledge)

A) 3 B) 4 C) 8 D) 6

17. The factors of 3 are 1, 3 and the factors of 6 are 1, 2, 3, 6. The HCF of 3 and 6

(Average-knowledge)

A) 1 B) 2 C) 3 D) 4

18. Identify the correct statement: The LCM of two different prime numbers (m , n) is always.

(Easy-Knowledge)

- A) Less than both numbers
B) Found between the two numbers
C) Greater than both numbers
D) Less than $m \times n$

19. The HCF of two numbers 72 and 120 is 24, their LCM (Easy -understanding)

A) 360 B) 120 C) 24 D) 72

20. The largest number that completely divides both 306 and 36 (Average-Application)

A) 36 B) 612 C) 18 D) 3

II. Fill in the blanks with appropriate answers: 6 x 1 = 6

21) The HCF of 45 and 75 is _____ (Easy - Knowledge)

22) The prime factors of 91 are _____ (Easy- Knowledge)

23) The LCM of 105 and 95 is _____ (Easy -understanding)

24) Between the LCM of two numbers and their product, the product is always _____
(Easy- Knowledge)

25) The product of the HCF and LCM of the numbers 15 and 20 is - _____

(Easy-understanding)

26) Two numbers have only '1' as their common factor; those numbers are called _____ numbers.

(Easy -skill)

III. 27. Match the following appropriately: (5 x 1 = 5) (Easy-knowledge)

Column 'A'	Column 'B'
a) Prime number	1) 6
b) Factors of 18	2) 2
c) HCF x LCM	3) 15
d) HCF of 12 and 18	4) 1 X 3 X6
e) LCM OF 5&15	5) Product of two numbers
	6) 18

IV. Define: (5 x 1 = 5)

28. Prime numbers. (Easy-knowledge)

29. Highest Common Factor (Easy-knowledge)

30. Examples for composite numbers. (Easy-knowledge)

31. Least Common Multiple (LCM). (Easy-knowledge)

32. What is the relationship between LCM, HCF, and the product of two numbers?

(Easy-knowledge)

V. Solve the following question: 18 x 2 = 36

33. 48 kg of rice and 72 kg of rice need to be packed in the bags of same size without mixing them.

What is the maximum capacity each bag holds? (Average-Application)

34. Two ropes of lengths 36 m and 48 m are to be cut into pieces of equal length. Find the maximum possible length of each piece. (Application-Average)

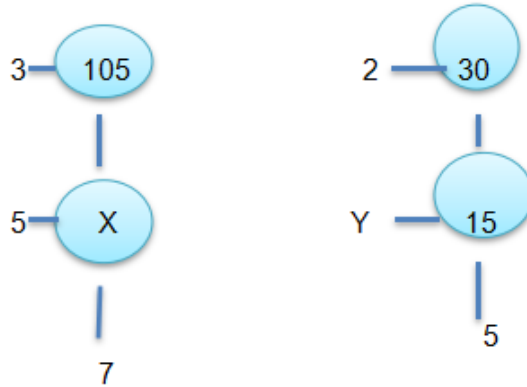
35. In a school, there are 72 boys and 96 girls. They need to be divided into groups containing an equal number of students, where each group has either only boys or only girls. What is the maximum?

number of students possible in each group?

(Average-understanding)

36. Find the HCF of 24 and 180 using the division method.(Easy-understanding)

37. Find the missing values of X and Y in the given factor tree diagrams. (Average-skill)



38. List all the factors of the number 90.

(Knowledge-Easy)

39. List the prime factors of the number 45.

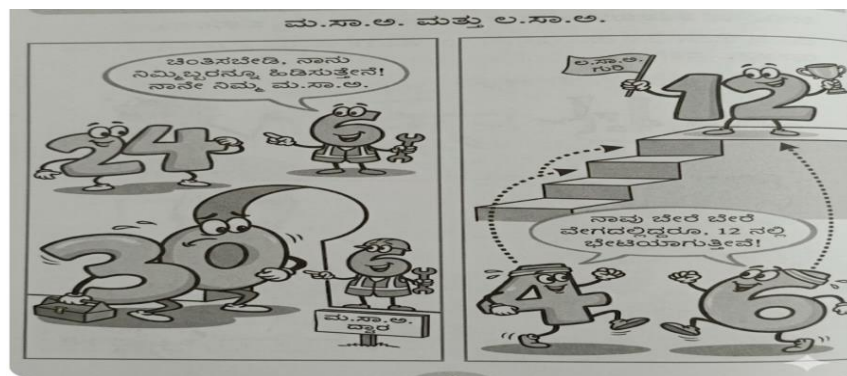
(Easy- Knowledge)

40. The number 360 has a total of 24 factors. Write all these factors in ascending order.

(Difficult-Application)

41. Find the common factors of 81 and 243, and determine their HCF.(Average-understanding)

42. Identify LCM and HCF in the given figure and write the factors.(Easy-skill)



43. Find the LCM of 21 and 35.

(Average-understanding)

44. Find the HCF of 12, 15, and 30.

(Average-understanding)

45. Find the LCM of 105, 95, and 65.

(Average-understanding)

46. Consider two multiples of 18: 18×10 and 18×15 . What is their HCF?

(Average-Application)

47. What is the largest number that can exactly divide both 300 and 150? (Average -Application)

48. If the HCF of 52 and 182 is 26, find their LCM.

(Average-understanding)

49. Find the total sum of $\frac{1}{2}$ and $\frac{2}{3}$. Write the method of solving. (Difficult-Application)

50. What is the LCM of the denominators of the fractions $\frac{1}{3}$ and $\frac{2}{3}$? (Average- Application)

V. Solve the following word problems: $5 \times 3 = 15$

51. A rectangular room is 18m72cm long and 13m20 cm wide. If square tiles of uniform size are to be fitted perfectly without cutting, find the minimum number of tiles required. (Difficult-Application)

52. The number of students in classes 8, 9, and 10 of a school are 48, 42, and 60 respectively. Find the minimum number of books required, that can be distributed equally among the students.
(Average -Application)

53. A local train blows its horn once every 30 minutes, and an express train blows its horn once every 45 minutes. If both trains blew their horns together just now, after how many minutes will they blow them together again?
(Average -Application)

54. A dog is chasing a rabbit that has ahead start of 150 feet. It jumps 9 feet every time. The rabbit jumps 7 feet in how many leaps does the dog catch up with the rabbit?
(Difficult-Application)

55. The bells of two temples toll at intervals of 9 minutes and 12 minutes respectively. If they toll together at a specific time, after how many minutes will they toll together again?
(Difficult-Understanding)

VI. Solve the following questions: $15 \times 4 = 60$

56. Find the smallest number which when divided by 35, 56, and 91 leaves a remainder of 7 in each case.
(Difficult-Application)

57. Find the largest number that divides 228 and 305 leaving remainders of 3 and 5 respectively.
(Difficult-Application)

58. Find the common factors and the HCF for. (Average-Understanding)

a) 18, 81, and 108

b) 15, 25, and 125

59. Consider the numbers 72 and 144. If $72 = 6 \times 12$ and $144 = 8 \times 18$ as composite factorizations, can we say that these two numbers have no common factors other than '1'? Why or why not? Explain your reasoning.
(Average-Application)

60. Find the HCF and LCM of the following pairs, and verify the formula $\text{LCM} \times \text{HCF} = \text{Product of the two numbers}$
(Average-Application)

a) 18 and 45

b) 16 and 80

61. Complete the table by listing the factors and the first 5 multiples for the given pairs:

(Easy-Understanding)

NUMBERS	FACTORS	MULTIPLES
10, 20		
12, 32		
15, 25		
18, 48		

62. Find the HCF and LCM for the following groups of numbers to complete the table.

(Average-Understanding)

NUMBERS	HCF	LCM
2, 3, 5		
6, 12, 18		
15, 30, 45		
4, 16, 80		

63. In a school, 144, 180, and 216 students need to be divided into groups of equal sizes. What is the maximum number of students that can be placed in each group? (Average-Skill)

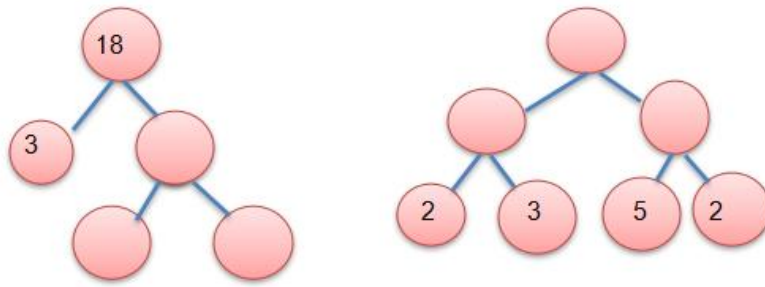
64. Find the largest number which divides 150, 187, and 203 leaving remainders of 6, 7, and 11 respectively. (Difficult-Application)

65. There is a circular running track. Deepa takes 36 minutes to complete one full lap, while Roopa takes 15 minutes. If they start from the same point at the same time and run in the same direction, after how many minutes will they meet again at the starting point? (Average -Skill)

66. Express the following numbers as the product of their prime factors using the division method: (Easy-Understanding)

- a) 64
- b) 104
- c) 320
- d) 125

67. Complete the missing values in the factor tree.



68. The HCF of 6 and 18 is 6, which is one of the two given numbers. Find more pairs of numbers where the HCF is equal to one of the numbers, and explain the rule to generate such pairs.(Average-Skill)

69. The LCM of 3 and 24 is 24, which is one of the given numbers. (Average-Skill)

a) Find more pairs of numbers where the LCM is equal to one of the numbers.

b) Provide a generalized algebraic statement for such pairs and explain it.

70. Write a general statement regarding the HCF of the following types of number pairs (verify with examples first):
(Average-Application)

a) Two consecutive even numbers

b) Two consecutive odd numbers

VII. Answer the following questions: $2 \times 5 = 10$

71. Find the HCF of 270 and 50. If both numbers are doubled, calculate the new HCF. Does the HCF also double? Explain why.
(Average-understanding)

72. A cowherd took his cows to graze in the field. The cows came to a crossing with 3 gates, An equal number of cows passing through each gate. Later at another crossing with 5 gates again an equal number of cows passed through each gate. The same happened at the third crossing with 7 gates. If the cow herde had less than 200 cows, , how many cows does he have? (Average-understanding)

Chapter – 04 - Another peek beyond the point

Lo.No	Learning Outcomes	Question numbers
15	Explain basic operations on decimals and apply them in daily life (money, weight, length, etc.)	1 to 74

Weightage to objectives

SL. NO.	OBJECTIVES	NO. OF QUESTIONS	MARKS	PERCENTAGE
1	Knowledge	29	29	20%
2	Understanding	17	44	30%
3	Application	18	44	30%
4	Skill	10	29	20%
Total		74	146	100%

Weightage to difficulty level

Sl. no.	difficulty level	no. of questions	marks	percentage
1	Essay	29	29	30%
2	Average	34	75	50%
3	Difficulty	11	42	20%
TOTAL		74	146	100%

I. Choose the correct answer from the four alternatives given. 14X1=14

1. The fraction form of 0.3 is (knowledge- easy)
A) $\frac{3}{100}$ B) $\frac{3}{10}$ C) $\frac{3}{1000}$ D) $\frac{30}{10}$
2. In the decimal number 27.53, the digit 5 represents: (knowledge- easy)
A) 5 Ones B) 5 Tens C) 5 Tenths D) 5 Hundredths
3. The decimal form of $\frac{43}{100}$ is (knowledge- easy)
A) 4.3 B) 0.43 C) 43.0 D) 0.043
4. Number of hundredths in 1 whole (knowledge- easy)
A) 100 B) 10 C) 1000 D) 1
5. $123 \div 10 =$ (understanding- easy)
A) 1.23 B) 1230 C) 12.3 D) 0.123
6. The digit in the hundredths place 7.538 (knowledge- easy)
A) 5 B) 3 C) 8 D) 7
7. 1 kg is equal to (knowledge- easy)
A) 0.1 g B) 0.01 g C) 1000 g D) 100 g
8. The smallest decimal among the following numbers. (Knowledge- easy)
A) 0.9 B) 0.909 C) 0.99 D) 0.09
9. The ascending order of the decimals 0.7, 0.07, 0.707 (Knowledge - easy)
A) 0.07, 0.7, 0.707 B) 0.07, 0.707, 0.7
C) 0.7, 0.707, 0.07 D) 0.707, 0.07, 0.7
10. The decimal greater than 0.56 but less than 0.58? (Knowledge -easy)
A) 0.57 B) 0.55 C) 0.59 D) 0.60
11. The product of 0.4×5 (understanding- easy)
A) 0.2 B) 2 C) 20 D) 0.02
12. $9.5 \times 5 =$ (Knowledge - easy)
A) 475 B) 4.75 C) 0.475 D) 47.5
13. The reciprocal of 10 (knowledge- easy)
A) $\frac{1}{10}$ B) $\frac{1}{100}$ C) 1 D) 10
14. The value of 23.02×10 (knowledge- easy)
23.02 B) 2.302 C) 230.2 D) 0.2302

II. Fill in the Blanks: 18X1=18

15. Dividing a number by 100 moves the decimal point to the left for _____ places. (knowledge- easy)
16. $123 \div 1000 =$ _____. (Knowledge - easy)
17. The cost of one pen is ₹6.2. The cost of 10 pens is ₹_____ (Application- average)
18. In decimal multiplication, the total number of decimal places in the product equals the _____ of decimal places in the factors. (Understanding- easy) MC 1.6-15
19. The two decimal numbers less than 1 are multiplied, the product is usually _____ than two numbers. (understanding- Average)
20. Multiplying a decimal by 10 moves the decimal point _____ place to the right. (understanding- easy)
21. $3.9 \div 10 =$ _____. (knowledge- easy)

22. When 0.0005 is multiplied by 100 number of zeros in the decimal place will be _____.
(knowledge- easy)
23. The quotient of $9.5 \div 4$ is _____. (Knowledge - easy)
24. To divide a decimal by 1000, move the decimal point to the _____. Place
(knowledge- easy)
25. The repeating block in the decimal expansion of $\frac{1}{7}$ is _____. (knowledge- easy)
26. One leap year contains _____ days. (knowledge- easy)
27. A year divisible by 100 is not a leap year unless it is also divisible by _____.
(Knowledge - easy)
28. The division method using place values is also called _____ division.
(knowledge- easy)
29. Number of digits after the decimal point in the Multiplicand of 12.5×7.5 _____.
(Knowledge - easy)
30. Earth completes one revolution around the Sun in exactly _____.
(knowledge- easy)
31. When we regroup Ones into Tenths, we place a decimal point in the _____.
(Knowledge - easy)
32. After 100 calendar years, number of more days needed by the Earth to complete its 100th revolution around the Sun is _____ days. (application- Average)

III. 33. Match the following: (10x1=10)

(knowledge- Average)

- | A | B |
|-------------------------|-----------------------|
| i) 2.5×4 | a) 0.4 |
| ii) 0.8×0.5 | b) 0.5 |
| iii) $7.2 \div 9$ | c) 5500m |
| iv) 2.456 | d) 0.8 |
| v) 0.1 | e) 142857 |
| vi) magic number | f) 10 |
| vii) $5.5 \text{ km} =$ | g) $2+0.4+0.05+0.006$ |
| viii) 3 hundredths | h) $\frac{1}{10}$ |
| ix) $\frac{1}{2}$ | i) 53.64 |
| x) 6 tenths | j) $\frac{3}{10}$ |

IV. Answer the following questions. (10X1=10)

34. What is the decimal form of $\frac{7}{10}$? (knowledge- Average)
35. Write 0.45 as a fraction with denominator 100. (understanding- Average)
36. What is the place value of 5 in 3.58? (Knowledge - Average)
37. How many hundredths are there in 0.35? (Knowledge - Average)
38. Find 1.5×6 . (Understanding- average)
39. Find $0.06 \div 5$. (Understanding - average)

40. What is the repeating block in the decimal expansion of $\frac{1}{3}$? (knowledge-Average)
41. What is the length of each piece if the ribbon is cut into 100 equal pieces?
(Application- average)
42. What is the number of days that the Earth needs to make 4 full revolutions around the Sun?
(Application- average)
43. How many years are divisible by 4 in 100 years? (Application- average)

V. Answer the following questions. 12X2=24

44. Write the following fractions as a sum of fractions and also as decimals:
a) $\frac{847}{10000}$ b) $\frac{123}{10}$ (understanding- average)
45. A car moves 12.5 km per litre of petrol. What is the distance covered with 7.5 litres of petrol?
(Application- average)
46. Can the product of 2.5 and 0.4 be a natural number? (understanding- average)
47. Find the products of the following: (understanding - average)
a) 27.34×6 b) 4.23×3.7
48. Given that $18 \times 12 = 216$, find the products: (skill - average)
a) 18×1.2 b) 0.18×0.12
49. In which of the following multiplications is the product less than 1?
(a) 7×0.6 (b) 0.07×0.06 (Application - average)
50. Express the following fractions in decimal form: (skill - average)
a) $\frac{2}{5}$ b) $\frac{5}{8}$
51. Evaluate the following using the information $156 \times 12 = 1872$
(a) 15.6×1.2 (b) 0.156×0.12 (skill- average)
52. Tejus needs 1.65 m of cloth for a shirt. How many metres of cloth are needed for 3 shirts?
(Application- average)
53. 13.5 kg of flour (aata) was distributed equally among 15 students. How much flour did each student receive?
(Application- average)
54. A 4 m long wooden block has to be cut into 5 pieces of equal length. What is the length of each piece?
(Application- average)
55. A family consumes 1.85 litres of milk daily. Estimate the milk required for 30 days
(Application- average)

VI. Answer the following questions. 7X3=21

56. Can the product of a decimal and a natural number be a natural number? Illustrate with example.
(understanding- difficult)
57. When is the product of two decimals greater than both the numbers? When is it less than both the numbers?
(understanding- difficult)
58. When the divisor is a decimal, is the quotient always greater than the dividend? Justify your answer with an example. (skill- average)
59. Find the quotient by converting the denominator into 1, 10, 100 or 1000 and verify the solution by the long division method (skill- average)
- a) $\frac{18}{5}$ b) $\frac{4827}{8}$ c) $\frac{1217}{2}$

60. The price of 1 kg of oranges is ₹56.50. What is the price of 2.250 kg of oranges? Can we write 56.50 as 56.5 and 2.250 as 2.25 and multiply? Will we get the same product? Why?
(Application- difficult)
61. Jonali goes to the market to buy spices. She purchases 50 g of Cinnamon, 100 g of Cumin seeds, 25 g of Cardamom and 250 g of Pepper. Express each of the quantities in kilograms by writing them in terms of fractions as well as decimals.
(skill- average)
62. Two shops sell the same notebook.
Shop A: ₹24.50 per notebook
Shop B: ₹245 for 10 notebooks
Which shop offers a better price?
(Application- difficult)

VII. Answer the following questions. 11X4=44

63. Multiply the following numbers by 10, 100 and 1000 to complete the table.
(Skill- average)

Decimal	$\times 10$	$\times 100$	$\times 1000$
5.7			
23.02			
0.306			
24.67			

64. Divide the following numbers by 10, 100 and 1000 to complete the table.
(Skill- average)

Decimal	$\div 10$	$\div 100$	$\div 1000$
18.7			
21.1			
		2.146	
			0.0058

65. What is the quotient of the following:
a) $132 \div 4$ b) $13.2 \div 4$ c) $0.0126 \div 8$ d) $0.126 \div 8$
(Understanding- average)
66. Find the quotients of the following:
(a) $24.86 \div 1.2$ (b) $5.728 \div 1.52$
(Understanding - average)
67. Find the following quotients given that $756 \div 36 = 21$:
(a) $75.6 \div 3.6$ (b) $7.56 \div 0.36$ (c) $756 \div 0.36$ (d) $75.6 \div 360$
(Understanding- difficult)
68. Using the digits 2, 4, 5, 8, and 0 fill the boxes.
(Understanding- difficult)

$$\boxed{} \boxed{} \boxed{} . \boxed{} \times \boxed{} . \boxed{}$$

to get the:

- (a) Maximum product
- (b) Minimum product
- (c) Product greater than 150
- (d) Product nearest to 100

69. A shopkeeper sells rice at ₹58.75 per kg. Ramesh buys 3.5 kg of rice and 2.25 kg of sugar at ₹46.80 per kg. Find: (Application- difficult)

- a) Cost of rice
- b) Cost of sugar
- c) Total amount paid

70. Dwarakanath purchases notebooks at a wholesale price of ₹23.6 per piece and sells each notebook at ₹30/-. How much profit does he make if he sells 50 books in a week?

(Application- difficult)

71. A car covers 234.45 km using 12.6 litres of petrol. What is the distance travelled per litre?

(Application- difficult)

72. Without multiplying, identify which product will be greatest.(understanding-Difficult)

- a) 4.5×0.9
- b) 4.5×1.1
- c) 4.5×0.75
- d) 4.5×0.5

73. The thickness of one book is 2.4 cm. A shelf is 150 cm long. (Application- difficult)

- a) How many books can be arranged?
- b) How much space remains?

VIII. Answer the following questions. 1X5=5

(Application-difficult)

74. A school collected ₹12,875.50 for Sports Day. The amount was contributed equally by 175 students. Later each student contributed an additional ₹12.50.

- a) How much did each student contribute initially?
- b) What is the new total fund collected?

Chapter – 05 - Connecting the Dots

Weightage to Objectives

Lo.No	Learning Outcomes	Question numbers
40	Identify, collect, and interpret statistical data from daily-life situations and distinguish statistical questions from statements.	1, 4, 5 to 11, 14, 18, 29
41	Calculate mean for the given data and solve problems	3, 12, 25, 29
42	Calculate median for the given data and solve problems.	2, 13, 19, 29
43	Represent data using dot plots, bar graphs, and double bar graphs, and correctly interpret scales, patterns, and variations	15, 16, 17, 20 to 24, 26 to 30

Sl.NO	Objectives	No. of questions	Marks	Percentage
1	Knowledge	09	16	20%
2	Understanding	11	24	30%
3	Application	05	23	30%
4	Skill	05	17	20%
Total		30	80	100%

Weightage to difficulty level

Sl.NO	Difficulty level	No. of questions	Marks	Percentage
1	Easy	16	24	30%
2	Average	10	40	50%
3	Difficult	04	16	20%
Total		30	80	100%

I. Choose the correct answer from the given options:**5×1= 5**

1. A dot plot can be called a group of (Knowledge- Easy)
A. Triangles B. Points C. Dots D. Rectangles
2. The median of 2, 8, 4, 6, 5 is (Knowledge - Easy)
A. 8 B. 2 C. 4 D. 6
3. The average value of 5, 6, 7, 4, 3 is . (Understanding- Easy)
A. 24 B. 25 C. 21 D. 5
4. Range is the difference between the following two values. (Knowledge- Easy)
A. Maximum - Minimum B. Minimum - Maximum
C. Maximum – Maximum D. Minimum – Minimum
5. The term that indicates the study of collection, organization, and interpretation of data is . (Knowledge - Easy)
A. Linguistics B. Statistics C. Physics D. Biology

II. Define: 5×1= 5

6. Mean (Understanding-Easy)
7. Median (Knowledge-Easy)
8. Deviation (Understanding-Easy)
9. Visualization of Data (Understanding-Easy)
10. Range (Knowledge -Easy)

III. Solve the following problems:**5×2=10**

11. Neha and Niharika's marks in the second semester exam are as follows. (Understanding- Easy)

Subject	Kannada	English	Hindi	Maths	Science	Social
Neha	58	69	84	76	80	94
Niharika	84	95	92	96	95	90

- a. Who scored more marks in Maths?
- b. In which subject did Neha score the least marks?

12. The heights of 7th-grade students are as follows: 145, 148, 136, 150, 154, 138, 140, 142. Find their mean.

(Understanding-Easy)

13.Dhanraj scored the following runs in 10 overs of cricket. Find the median of these runs.

5, 4, 3, 4, 6, 5, 2, 4, 6, 1

(Understanding- Medium)

14.Last year, Nethra brought groceries every month as follows.

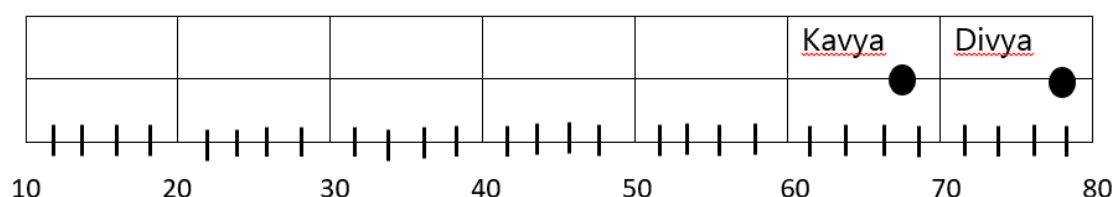
(Understanding- Easy)

January	February	March	April	May	June	July	August
2500	2050	3100	1400	2010	2750	3200	3000

a. In which month were the most groceries purchased?

b. In which month were groceries less than 2000 purchased?

15.In the following plot, the second semester results of Kavya and Divya are given (Skill- Easy)



a. Write Kavya's result from this plot.

b. Whose result is better?

IV. Answer the Following:

$$5 \times 3 = 15$$

16.Anitha and Saritha's marks out of 25 in 5 unit tests are given. Find the average of their marks and who has scored the higher average?

(Knowledge - Average)

Test	1	2	3	4	5
Anitha	20	22	18	25	24
Saritha	18	15	17	19	20

17. Rahul has written the number of pages he read in the library in one week. Show these in a dot plot.

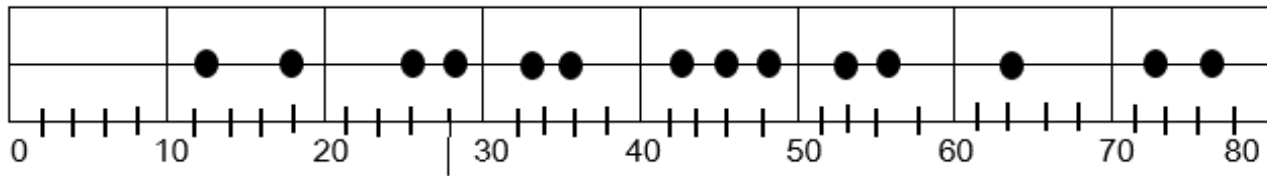
(Skill-Average)

Sunday	Monday	tuesday	Wednesday	Thursday	Friday	Saturday
80	60	75	50	70	68	65

18. Ravi and Shyam scored between 75-80 and 68-78 respectively in all subjects in two semesters. Then whose range of marks is greater?

(Knowledge - Easy)

19. From the figure given below, Write the mean and median. (Understanding- Average)



20. Explain the difference between bar graph and double bar graph with diagram. (Skill-Easy)

V. Answer the Following:

5×4=20

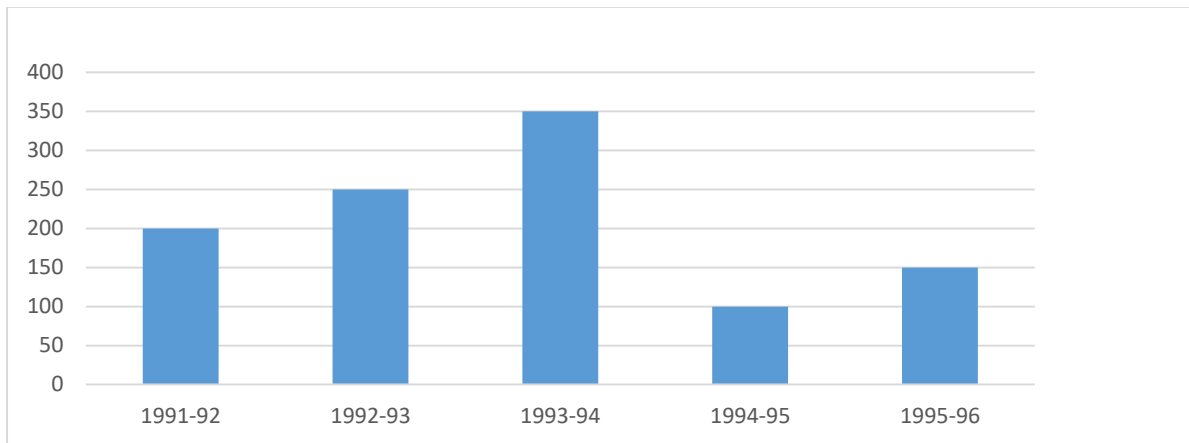
21."The weights of 5th grade children are given below. Represent this in a bar graph. (Skill- Difficult)

Name	Girish	Rama	Raghu	Harish	Raja	Chiranth
Weight (Kg)	20	22	15	25	30	40

22. In a school, the breakfast preferred by 200 students are given in the table. Construct a bar graph. (Application, Difficult)

Breakfast	Idli	Upama	Bisibele Bath	Puliyogre	Pulav
No.of Students	45	17	50	48	40

23.The bar graph below represents the number of students who failed each year. Observe and answer the questions below. (Knowledge - Average)



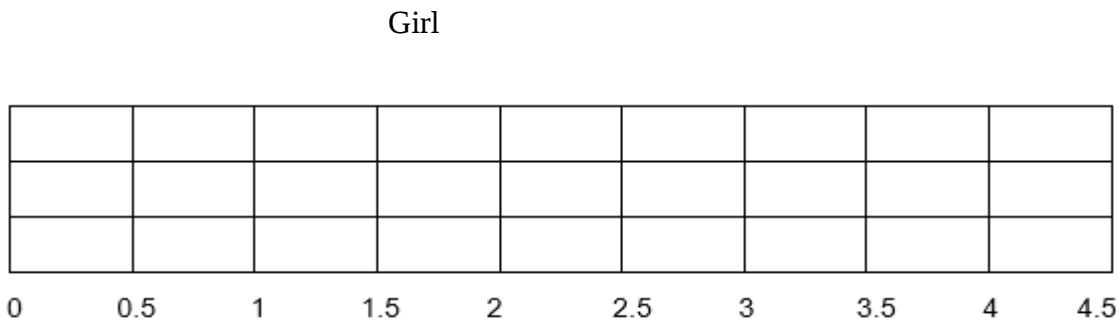
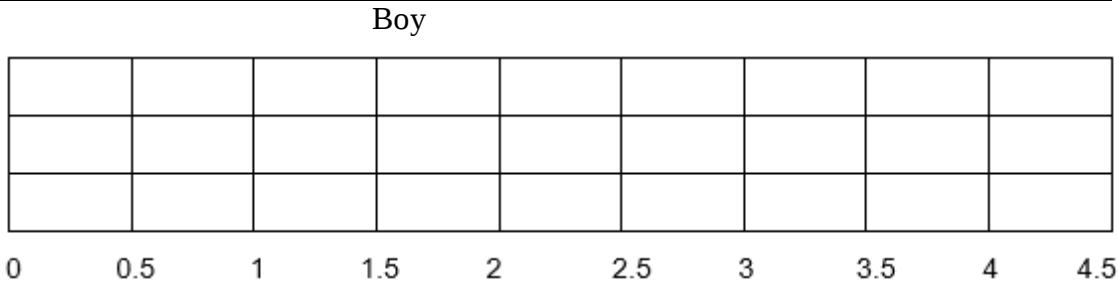
a. In which year, most students are failed?

b.In which year did 200 students fail?

c.Write the scale of this graph?

24. The weights of newborn babies born on the same day in a hospital are given. Draw a dot plot from the table below. (Application- Average)

Boy	3.5	4.1	2.6	3.2	3.4	3.8
Girl	4.0	3.1	3.4	3.7	2.5	3.4



25.The scores earned by each player in each game are given in the table below. (Understanding- Average)

Players	1	2	3	4
A	14	16	10	10
B	0	8	6	4
C	8	11	Not Played	13

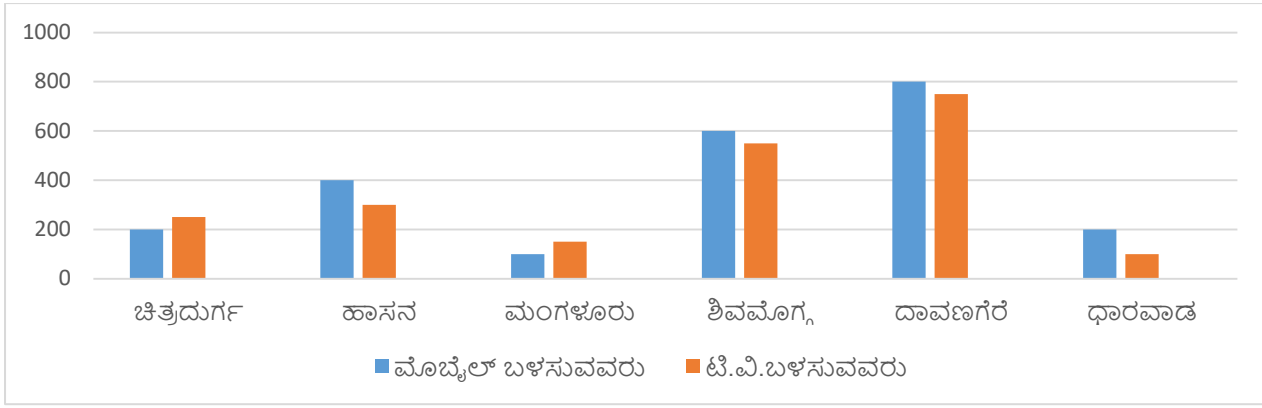
- What is the average of A player?
- For player C, how many games' average will you give?
- What is the average of three players in the fourth game?
- Who are the best players?

VI. Solve the problems below. 5×5=25

26. Represent the marks obtained by 6th class students in the first semester and second semester in a double bar graph. (Skill- Difficult)

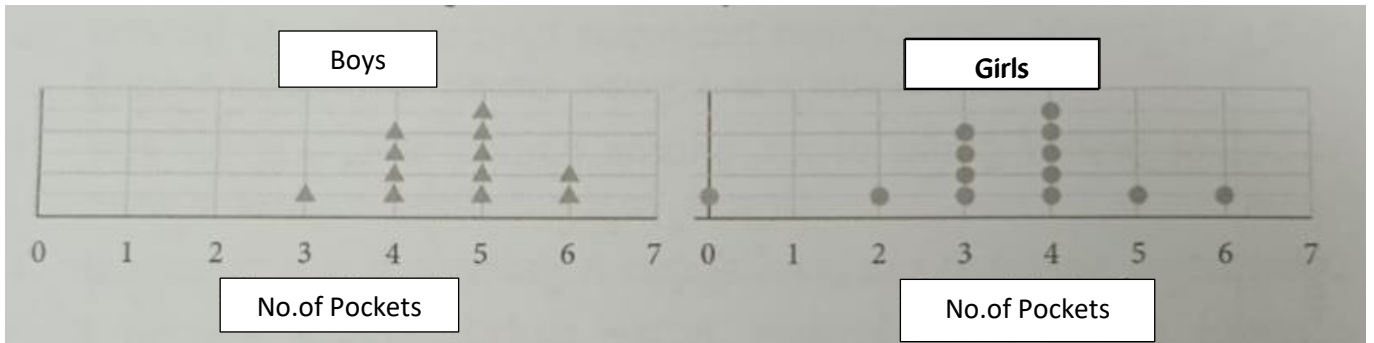
Subject	Kannada	English	Hindi	Maths	Science	Social
I Semester	67	72	88	81	73	90
II Semester	70	65	95	85	75	95

27. Observe this double bar graph and answer the questions below.(Application- Average)



- In which district , mobile users are highest?
- In which district TV users the lowest?
- How many TV and mobile users are there in Shivamogga?
- Write the scale in this graph.

28.The following dot plots show the distribution of number of packets on clothes for a group of boys and a group of girls.
(Application- Average)



Which of the following statements are correct?

- The data varies more for boys than for girls.
- The median number of pockets for boys is more than for girls.
- The average number of pockets for girls is more than for boys.
- The maximum number of pockets for boys is more than for girls.

29. Find the median, mean, and range of the following temperatures. (Understanding- Average)

35°, 15°, 40°, 50°, 35°, 55°, 60°, 10°, 45°,

- Which is the maximum value in the range?

30. Make a table and double bar graph for the five sweets liked by boys and girls in your class.

(Application-Difficult)

Chapter – 06 - Construction & Tiling

Lo.No	Learning Outcomes	Question numbers
38	Use congruence properties to construct angles and perpendicular bisectors using only a ruler and compass also construct various art patterns.	1 to 6, 8 to 13, 15 to 17, 24, 25, 27, 28, 29, 31, 32, 36, 38, 41, 43, 45, 47 to 49, 51 to 62, 66, 70, 71, 73, 74, 76, 77, 78
39	Create tiling techniques in square grid/rectangular grid	7, 14, 15 to 23, 26, 30, 33, 34, 35, 37, 39, 40, 42, 44, 46, 50, 63, 64, 65, 67, 68, 69, 72, 75, 79

Weightage to objectives

Sl no	objectives	No of question	marks	percentage
1	Knowledge	24	25	20%
2	Understanding	25	40	30%
3	Application	20	40	30%
4	skill	10	27	20%
Total		79	132	100%

Weightage to difficulty level:

Sl no	Difficulty level	No of question	marks	percentage
1	Easy	37	40	30%
2	Average	31	66	50%
3	Difficult	11	26	20%
Total	total	79	132	100%

20X1=20

a. Protractor and eraser

2. The role of supporting line XY play in the construction of symmetrical Eyes. (knowledge-easy)

c. It is used to measure the radii of the arcs

d. It connects the two arcs centres directly

(Understanding-average)

c. More than half the length of xy d. Equal to the full length of xy

a. Only above the line segment b. Above and below the line segment

5. While performing geometrical constructions, a geometric tool did ancient builders in the Vedic period rely on instead of modern compasses and straightedge (knowledge-easy)

6. If the side of a square in a Petal construction is 16 cm, the radius of the largest possible Petal are

(Understanding-average)

a. 16cm b. 12 cm c. 8 cm d. 4 cm

7. A Hexagon is called a regular hexagon if (knowledge-easy)

a. All sides are equal b. All angles are equal c. All sides and angles are equal d. All angles are different

8. In the ancient construction of altars(Vedas) as described in the “sulba sutras “ ,the shape was commonly transformed into a square of equivalent area to perform different rituals (knowledge-easy)

a. A Circle b. A Rhombus c. A Rectangle d. An Equilateral Triangle

9. After constructing 60° angle bisector, the measure of each new angle. (Application-average)

a. 20° and 40° b. 15° and 45° c. 25° and 35° d. 30° and 30°

10. In a given figure $\angle ABC = 100^\circ$ and Ray BX bisects $\angle ABC$, the measure of $\angle ABX$ is

(Understanding – Easy)

a. 60° b. 50° c. 30° d. 90°

11. If a full circular design is divided into 12 identical repeating petals, the exact measure of each Central repeating angle.
(Understanding – Easy)
- a. 30° b. 45° c. 60° d. 90°
12. A geometric principle is used when constructing a line parallel to a given line using a ruler and compass
(Understanding – average)
- a. Drawing two perpendicular lines b. ensuring the corresponding angles are equal
c. Measuring the exact distance with the protractor d. bisecting the given line
13. An each pair of corresponding angles when two parallel lines are cut by a transversal line is
(Application-average)
- a. Supplementary angles b. Complementary angles c. Equal in measure d. 360°
14. The geometric tools are used by an architect to draw the supporting lines and perfect curves of an arch
(knowledge – Easy)
- a. Ruler and protractor b. Unmark ruler and compass c. Set square and rope d. Scale and eraser
15. The number of sides in a regular hexagon
(knowledge-easy)
- a. 4 sides b. 6 sides c. 5 sides d. 7 sides
16. The sum of all interior angles of a regular hexagon
(knowledge-easy)
- a. 540° b. 720° c. 360° d. 90°
17. A tool is not required for constructing the perpendicular bisector of a line segment a
(knowledge-easy)
- a. Ruler b. Compass c. Set square d. Pencil
18. Number of regular hexagon meet at a single vertex to completely tile the plane is
(Understanding – Easy)
- a. 4 b. 5 c. 6 d. 8
19. The total number of triangles present in a standard tangram set. (knowledge-easy)
- a. 3 b. 4 c. 5 d. 7
20. The rule for farming figures using a tangram puzzle
(Knowledge-average)
- a. You must use only 5 pieces. b. You can overlap pieces to fit them.
c. You must use all 7 pieces without overlapping d. You must cut pieces to change their size
- II. Fill in the blanks.** **10X1=10**
21. Perpendicular bisector is a line that divides a line segment into two equal halves at a _____ angle
(Knowledge- easy)

22. The individual geometric shapes used to cover a surface in a tiling pattern are known as _____. (Knowledge- easy)
23. To tile an $m \times n$ grid using 2×1 tiles, _____ must be even. (Application - Easy)
24. A hexagon having all sides and angles are equal, is called a _____ hexagon. (Knowledge- easy)
25. During construction of a perpendicular bisector of a line segment, the distance from the intersection points of the arcs to the line segment's ends is always _____. (Application – Easy)
26. A tangram has _____ isosceles triangles. (Knowledge –Average)
27. Any point on the angle bisector is _____ from both arms of the angle .
(Application -average)
28. Two lines are _____ if they lie in the same plane and do not intersect even when extended infinitely on both sides. (Understanding- Average)
29. A line that intersects two or more lines at distinct points is called a _____ line
(Understanding-Easy)
30. Regular tiling is done using _____ (Understanding – Easy)

III. True or false

10X1=10

31. In geometric construction, you can use any three everyday objects to draw shapes.
(Knowledge-Easy)
32. A 60° angle can be easily constructed using a ruler and compass for constructing an Equilateral triangle.
(Understanding-Easy)
33. All regular polygons can perfectly tile a plane without any overlaps. (Application –Easy)
34. The only three regular polygons that can tile a floor completely by themselves are the Equilateral triangle, the square, and the regular hexagon.
(Understanding- Difficult)
35. Tessellation is also known as tiling. (Knowledge-Easy)
36. Any point on a perpendicular bisector is not equidistant from the endpoints of the segment.
(Understanding-Difficult)
37. In a symmetrical arch, support lines AB and CD must be equal. (Application Average)
38. Each angle inside a regular hexagon is 120° (Understanding –Easy)
39. The 6-pointed star design has rotational symmetry. (Application-Difficult).
40. Trefoil arch is seen in Central Park, a famous place. (Knowledge-easy)

IV. Define

4X1=4

41. Angle bisector (knowledge-easy)
42. Tessellation? (knowledge-easy)

43. Perpendicular bisector

(Understanding-Easy)

44. TANGRAM

(knowledge-easy)

V. Solve the following.

6X1=6

45. What is a supporting line in an ‘eye’ construction? (Application –Average)

46. Write the formula to calculate the number of tiles required to cover a floor? (Application- Difficult)

47. Write the measure of each angle when a 360° angle is divided by 8 equal parts?

(Understanding – average)

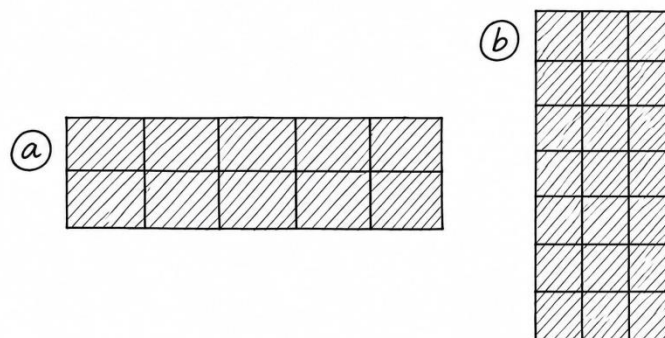
48. Name the point that divides a line segment into two equal halves? (Knowledge- average)

49. What is the sum of two interior angles on the same side of a transversal intersecting two parallel lines?

(Understanding-average)

50. .Name the following grid ?

(Skill-easy)



VI. Solve the following problems:

15X2=30

51. How do you construct a 90° angle at a specific point on a line with only a ruler and compass?

(Understanding-difficult)

52. Why can regular hexagons tile the plane without gaps? (Understanding-easy)

53. Describe the basic steps to construct a perpendicular bisector of a line segment XY using a ruler and compass?

(Understanding-easy)

54. Describe the steps to construct a 135° angle using only a compass and ruler. (Application-average)

55. Why does the line joining the two Arc centres of an “eye figure” always become the perpendicular bisector of XY?

(Application-average)

56. Describe the steps to construct an equilateral triangle with a side length of 5 cm.

(Understanding-average)

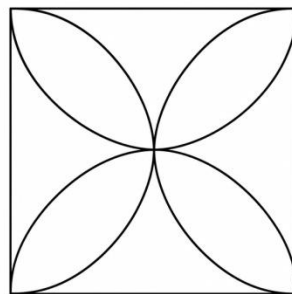
57. Can you think of different methods to construct a 90° angle at a given point on a line using a rope? (Knowledge-easy)

58. Write the steps to construct a triangle ABC given the base $BC = 6\text{ cm}$ and the sum of the other two sides $AB + AC = 10\text{ cm}$.
(Understanding- Difficult)
59. Draw a line segment of length 8 cm and draw its perpendicular bisector? (skill-average)
60. Draw a line segment of length 10 cm and draw its perpendicular bisector ? (skill-average)
61. Draw an angle bisector of 90° ? (skill-easy)
62. Draw an angle bisector of 30° ? (skill-easy)
63. Why can a regular pentagon not tessellate a plane? (Application-average)
64. Can a 4×6 grid be tiled using 2×1 tiles? (Application-average)
65. Can a 5×7 grid be tiled using 2×1 tiles? (Application-average)

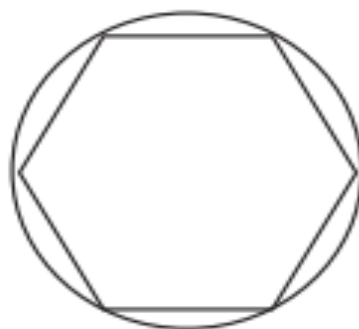
VII. Solve the following problems:

7X3=21

66. Recreate this design using only a ruler and compass. (skill-Difficult)

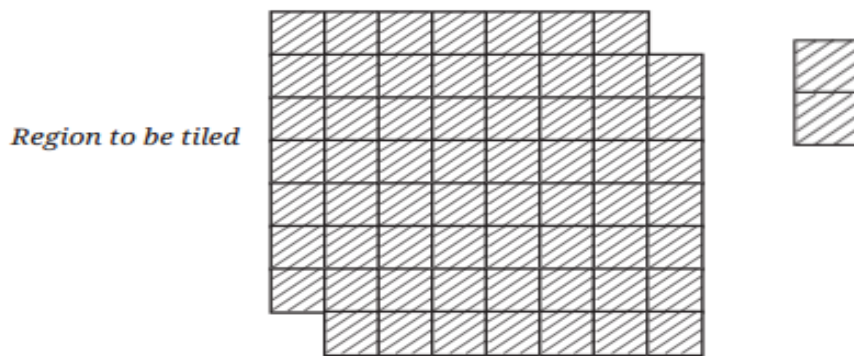


67. Find the number of square tiles of side 20 cm needed to cover a floor measuring 4 m by 3m without any gaps or overlaps? (Understanding-average)
68. A rectangular park is to be paved with square tiles of side 25 cm. The length and breadth of the park are 20 m and 15 m respectively. Find the number of tiles needed. (Application- average)
69. Define perpendicular bisector? How is it constructed using a ruler and compass? (Application -average)
70. What are the other angles that can be constructed using angle bisection? Can you construct a 65.5° angle? (Application -difficult)
71. Construct the following figures? (Skill-average)



72. Is the following tiling possible?

(Application -average)



VIII. Solve the following problems:

4X4=16

73. Construct at least 4 different angles. Draw their bisectors.

(Skill-Average)

74. Construct 4 pairs of parallel lines in different orientations.

(Skill-difficult)

75. A rectangular floor measures 4 m by 3 m. We need to tile it using square tiles of side 25 cm. Calculate how many tiles are required and the total cost if 1 tile costs ₹15. (Application-Average)

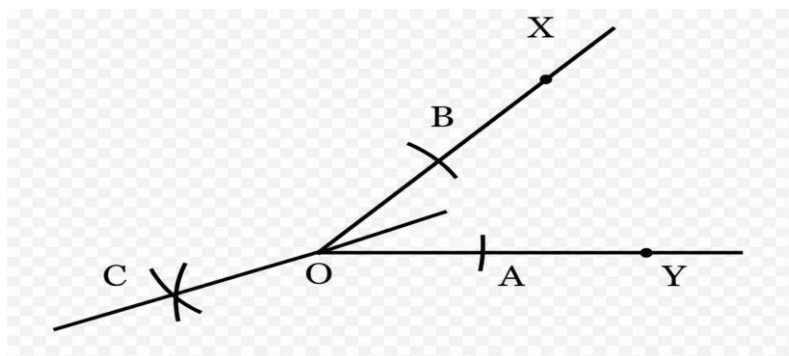
76. While constructing one pair of intersecting arcs, is it necessary that we use the same radii for both of them? Explore this through construction. (Understanding-average)

IX. Solve the following problems:

5X3=15

77. When constructing the perpendicular bisector, is it necessary to have the same radius for the arcs above and below XY? Explore this through construction, and then justify your answer.(Application-Difficult)

78. In the process of angle bisection, if arcs of equal radius are drawn on the other side, as shown in the figure, will the line OC still be an angle bisector? Explore this through construction, and then justify your answer. (Skill- Difficult)



79. How can the tangram pieces be rearranged to form each of the following figures? (Skill-average)

i



ii



iii



iv



v



vi



vii



viii



ix



x



Chapter – 07- Finding the Unknown

Lo.No	Learning Outcomes	Question numbers
24	Convert word problems into algebraic equations and solve one-step and two-step equations using balancing or transposition methods.	4, 7 to 11, 59, 62 to 66
25	Develop logical reasoning, analytical skills, and algebraic thinking required to solve real-world problems.	1, 2, 5, 12 to 16, 37 to 46, 52 to 56, 60 61, 67
26	Generate equations and solve real life problems. Express patterns as algebraic expression.	3, 6, 17 to 36, 47 to 51, 57, 58

Weightage to Objectives

Sl.NO	Objectives	No. of questions	Marks	Percentage
1	Knowledge	20	24	20%
2	Understanding	14	36	30%
3	Application	16	36	30%
4	Skill	17	24	20%
Total		67	120	100%

Weightage to difficulty level

Sl.NO	Difficulty level	No. of questions	Marks	Percentage
1	Easy	27	36	30%
2	Average	34	60	50%
3	Difficult	6	24	20%
Total		67	120	100%

I. Choose the correct answer:**5×1=5**

1. Comparing the objects, the values of quantities must be . (Knowledge- Easy)
A. same B. Two C. Zero D. Different
2. The statement of equality of two algebraic expressions is called. (Knowledge- Easy)
A. Rank B. Median C. Equation D. Deviation
3. In an equation, value of letter/numbers . (Knowledge- Easy)
A. constant B. different C. Zero D. same
4. Symbol of equality _____ (Knowledge, Easy)
A. + B. × C. ÷ D. =
5. The value of the unknown term in an equation means (Knowledge-Average)
A. Deduce B. Solve C. State D. Inform

II. 6. Match the unknown terms. 5×1= 5

(Knowledge- Easy)

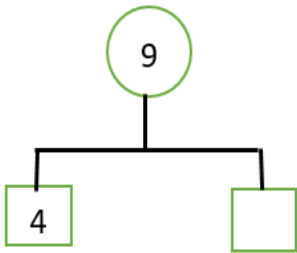
- a. $7a + 5$ - t
b. $4m - 6$ - a
c. $27b - 5$ - m
d. $6 - 2p$ - b
e. $25 - 3t$ - p

II. Find the value of each unknown term. 5×1= 5

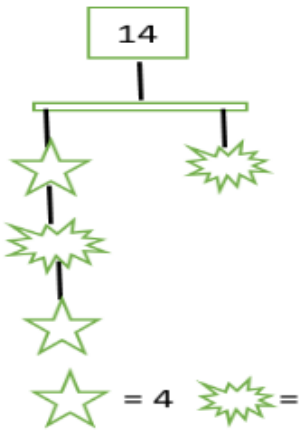
7. $2y = 60$ (Knowledge-Easy)
8. $3n = 10 + n$ (Understanding- Average)
9. $4l = 16$ (Understanding-Easy)
10. $k + 8 = 12 - k$ (Understanding- Average)
11. $13 - z = 8$ (Understanding- Average)

IV. Find the unknown weights in the following cases. $5 \times 1 = 5$ (Knowledge- Easy)

12.



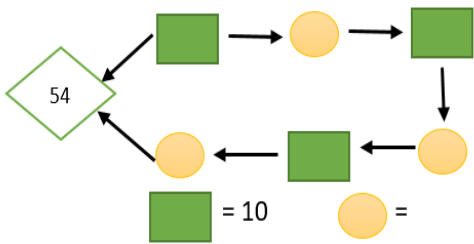
13.



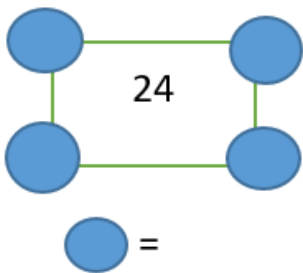
14.



15.



16.



V. Form equations for these statements: $10 \times 1 = 10$

- | | |
|---|---------------------|
| 17. Sum of x and y. | (Knowledge- Easy) |
| 18. When 7 is subtracted from m, we get 3. | (Skill- Easy) |
| 19. Twice of m is equal to 7. | (Application- Easy) |
| 20. Twice of a number is equal to 30. | (Application- Easy) |
| 21. Product of 5 and y is 20. | (Knowledge- Easy) |
| 22. Difference of 19 and m is 16. | (Knowledge- Easy) |
| 23. Ten times of a is 70. | (Knowledge- Easy) |
| 24. When b is divided by 5, 6 are obtained. | (Knowledge- Easy) |
| 25. One-fifth is equal to 20. | (Knowledge- Easy) |
| 26. When 9 is multiplied by x, 18 is obtained | (Knowledge- Easy) |

VI. Write statement for the following statements: $10 \times 1 = 10$

(Skill - Average)

- 27. $p+4=15$
- 28. $x+9=8$
- 29. $6p=24$
- 30. $\frac{p}{2} + 2=8$
- 31. $\frac{m}{5} = 3$
- 32. $3l = 42$
- 33. $4-y=2$
- 34. $\frac{2}{5}x = 6$
- 35. $6y-6=60$
- 36. $10x+6x=50$

VII. Value of the unknown variable is given in the below equations, Solve the following.

$5 \times 2 = 10$

(Easy- Understanding)

- 37. $5n + 5 = 20$ (n = 3)
- 38. $6p - 4 = 32$ (p = 6)
- 39. $9d + 10 = 100$ (d = 10)
- 40. $3m + 9 = 27$ (m = 6)
- 41. $2t + 5 = 65$ (t = 5)

VIII. Write and solve equations for these statements: $5 \times 2 = 10$. (Skill- Average)

- 42. When 6 is added to a number, 10 are obtained.
- 43. When a number is subtracted from 15, 8 are obtained.
- 44. When a number is multiplied by 9, 72 are obtained.

45. When 49 are divided by a number, 7 is obtained.

46. When the unknown term is subtracted from 55, 45 is obtained.

IX. Find the inputs in the following cases. (5X2=10)

(Application- Average)

47. $\boxed{\longrightarrow + 3 \longrightarrow \times 4 \longrightarrow - 5 = 75}$

48. $\boxed{\longrightarrow + 3 \longrightarrow \times 4 \longrightarrow - 5 = 43}$

49. $\boxed{\longrightarrow + 3 \longrightarrow \times 4 \longrightarrow - 5 = 47}$

50. $\boxed{\longrightarrow + 3 \longrightarrow \times 4 \longrightarrow - 5 = 67}$

51. $\boxed{\longrightarrow + 3 \longrightarrow \times 4 \longrightarrow - 5 = 79}$

X. Equation $4k+1=13$ is given. Find the values of the following. (5X2=10) (Application-Average)

52. $8k + 2$

53. $4k - 1$

54. $9k + 6$

55. $5k + 9$

56. $6k \times 9$

XI. Find the solution to the following problems: $5 \times 3 = 15$

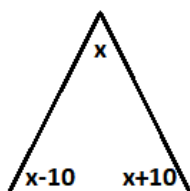
57. I am a two-digit number. When 5 are added to me, I get 60. When 10 is subtracted from me, I get the original number. What is that number? (Application- Average)

58. When the largest 3-digit number is added to me, I got the smallest 4-digit number. So who am I? (Application- Average)

59. Write three equations such that the solution is $y = 3$. (Skill-Difficult)

60. If $m = 3$, then find the values of $5m + 8$, $12m + 2$, and $10m + 5$ (Application- Average)

61. Find the angles in the triangles (Understanding- Average)



XII. Solve & verify the following equations. [LHS = RHS] $5 \times 4 = 20$

62. $3u - 7 = 2u + 3$ (Understanding-Average)

63. $3x + 4 = 2x + 8$ (Understanding- Difficult)

64. $4(m+6) - 8 = 2m - 4$ (Understanding- Difficult)

65. $6y + 7 = 4y + 21$ (Understanding- Difficult)

66. $3z + 3 = 4z + 5$ (Understanding- Difficult)

XIII. 67. Observe the following steps, write and solve the equation. $1 \times 5 = 5$

(Application-difficult)

- a. Think of a number.
- b. Subtract 3 from that number
- c. Multiply the result by 4
- d. Add 8

ANSWER KEY

PART-1

Chapter – 01-Large Number around

I.

1. a. 9
2. c. 10
3. b. 0
4. c. 98
5. d. 129
6. b. Sanskrit
7. d. 3
8. a. 5
9. b. 150
10. a. 5×4

II.

11. 10,000
12. 4000
13. 999
14. 1000 meters
15. 1001

III.

16. $700596 = 7,00,596$
= Seven Lakhs Five Hundred and ninety six
17. $251388 = 2,51,388$
= Two Lakhs Fifty-One Thousand Three Hundred and Eighty eight
18. $401010 = 4,01,010$
= Four lakh one thousand ten
19. $650111 = 6,50,111$
= Six lakh fifty thousand one hundred eleven
20. $946440 = 9,46,440$
= Nine lakh forty-six thousand four hundred forty

IV.

21. 5,00,010

22. 9,999,999

23. 1,00,110

24. 8,26,910

25. 6,00,001

V.

26. 26000 = 26 times

27. 5120 = 5 times

28. 17000 = 17 times

29. 44000 = 44 times

30. 12100 = 12 times

VI.

31. <

32. >

33. >

34. >

35. =

VII.

36. 45601 = 46,000

37. 6,56,400 = 6,56,000

38. 1,05,700 = 1,06,000

39. 27,301 = 27,000

40. 44,999 = 45,000

VIII.

41. 8490561

Indian System = 84,90,561

Eighty-four lakh ninety thousand five hundred sixty-one

Million System = 8,490,561

Eight million four hundred ninety thousand five hundred sixty-one

42. 6890010

Indian System = 68,90,010

Sixty-eight lakh ninety thousand ten

Million System= 6,890,010

Six million eight hundred ninety thousand ten

43. 772456

Indian System= 7,72,456

Seven lakh seventy-two thousand four hundred fifty-six

Million System= 7,724,456

Seven hundred seventy-two thousand four hundred fifty-six

44. 9116200

Indian System= 9,116,200

One lakh sixteen thousand two hundred

Million System= 9,116,200

Nine million one hundred sixteen thousand two hundred

45. 692010

Indian System= 6,92,010

Six lakh ninety-two thousand ten

Million System= 692,010

Six hundred ninety-two thousand ten

IX.

46. 56,000,000,426

Indian System = 56,00,00,00,426

47. 501,000,096

Indian System = 50,10,00,096

48. 120,145

Indian System =1,20,145

49. 7,000,001

Indian System =70,00,001

50. 601,014,007

Indian System = 60,10,14,007

X.

$$\begin{aligned} 51. & \boxed{1 \text{ digit}} \times \boxed{1 \text{ digit}} \\ & = 5 \times 7 \\ & = 35 \text{ (1 digit or 2 digit)} \end{aligned}$$

$$\begin{aligned} 52. & \boxed{2 \text{ digit}} \times \boxed{2 \text{ digit}} \\ & = 15 \times 12 \\ & = 180 \text{ (3 digit)} \end{aligned}$$

$$\begin{aligned} 53. & \boxed{3 \text{ digit}} \times \boxed{3 \text{ digit}} \\ & = 128 \times 426 \\ & = 54,528 \text{ (5 digit)} \end{aligned}$$

$$\begin{aligned} 54. & \boxed{4 \text{ digit}} \times \boxed{4 \text{ digit}} \\ & = 7248 \times 9345 \\ & = 54,528 \text{ (5 digit or 6 digit)} \end{aligned}$$

$$\begin{aligned} 55. & \boxed{5 \text{ digit}} \times \boxed{5 \text{ digit}} \\ & = 68254 \times 72963 \\ & = 4,98,00,16,602 \end{aligned}$$

XI.

$$56. 458 \times 64$$

$$\begin{array}{r} 458 \times 64 \\ \hline 1832 \\ 2748+ \\ \hline 29,312 \end{array}$$

Nearest to Thousand place value=29000

$$57. 226 \times 39$$

$$\begin{array}{r} 226 \times 39 \\ \hline 2034 \\ 678+ \\ \hline 8,814 \end{array}$$

Nearest to Thousand place value=9000

$$58. 974 \times 426$$

$$\begin{array}{r} 974 \times 426 \\ \hline 5844 \\ 1948+ \\ 3896+ \\ \hline \end{array}$$

4,14,924

Nearest to Thousand place value=4,15,000

$$\begin{array}{r} 59. 895 \times 34 \\ \hline 3580 \\ 2685+ \\ \hline 30,430 \end{array}$$

Nearest to Thousand place value=30000

$$\begin{array}{r} 60. 972 \times 49 \\ \hline 8748 \\ 3888+ \\ \hline 47,628 \end{array}$$

Nearest to Thousand place value=48,000

XII.

$$61. 5 \times 125 \times 50$$

$$\begin{aligned} &= 5 \times \frac{1000}{8} \times \frac{100}{2} \\ &= \frac{5 \times 500 \times 100}{8} \\ &= \frac{250000}{8} \\ &= 31.250 \end{aligned}$$

$$62. 200 \times 724$$

$$\begin{aligned} &= \frac{1000}{5} \times 724 \\ &= \frac{724000}{5} \\ &= 144800 \end{aligned}$$

$$63. 25 \times 595 \times 50$$

$$\begin{aligned} &= \frac{100}{4} \times 595 \times \frac{100}{2} \\ &= \frac{5950000}{8} \\ &= 7,43,750 \end{aligned}$$

$$64. 100 \times 24 \times 9$$

$$\begin{aligned} &= \frac{1000}{10} \times 24 \times 9 \\ &= \frac{108000}{5} \\ &= 21,600 \end{aligned}$$

65. $125 \times 43 \times 20$

$$= \frac{1000}{8} \times 43 \times \frac{100}{5}$$

$$= \frac{4300000}{8}$$

$$= 1,07,500$$

XIII.

66. The largest 3-digit number = 999

$$\begin{array}{r} \text{The largest 2-digit number} = 99 \\ \hline = 099 \end{array}$$

67. The smallest 4-digit number = 1000

$$\begin{array}{r} \text{The largest 3-digit number} = 999 \\ \hline = 001 \end{array}$$

$$\begin{array}{r} \text{The largest 2-digit number} = 99 \\ \hline \text{The smallest 4-digit number} = 100 \end{array}$$

68. A. $8415 = 7+4+2+5$

$$= 18 \text{ Sticks}$$

B. $6796 = 6+4+6+6$

$$= 22 \text{ Sticks}$$

C. $2221 = 5+5+5+2$

$$= 12 \text{ Sticks}$$

D. $1800 = 2+7+6+6$

$$= 21 \text{ Sticks}$$

69. Four digit numbers that can be made using 24 matchsticks

a. 6666

b. 9009

c. 6060

d. 22221

70. 5254 Estimated sum to the nearest thousand = 5000

$$\begin{array}{r} 3796 \\ \hline \end{array} \quad \begin{array}{r} = 4000 \\ \hline \end{array}$$

$$\text{Actual sum} = 9050 \quad = 9000$$

71. A. 3,87, 69,957

Nearest Ten = 3, 87,69,690

Nearest Hundred = 3,87,69,000

Nearest Thousand = 3,87,70,000

Nearest Ten Thousand = 3,87,70,000

Nearest Lakh = 3,88,00,000

72. 14,63,128

4,90,020

9,70,000 Exact Value

Nearest Ten = 9,73,110

Nearest Hundred = 9,73,100

Nearest Thousand = 9,73,000

Nearest Ten Thousand = 9,70,000

73. Numbers=1, 2, 3, 4, 5, 6, 7, 8, 9

Largest Numbers (5- digit)

= 98765, 89765, 97856, 87965, 79865

74. 1234321

123454321

12345654321

1234567654321

123456787654321

75. ~~1~~/~~2~~/~~3~~ 4 5/~~1~~/~~2~~/~~3~~ 4 5/~~1~~/~~2~~/~~3~~ 4/~~5~~/~~1~~ 2 3 4 5

a. 54545

b. 45453

c. 45454

d. 55544

e.55554

Chapter – 02-Arithmetic Expressions

I.

1. b. $13 + 2$

2. a. $6 + 3$

3. b. $10 \times 2 = 20$

4. d. $= -$

5. b. 12

6. d. 9

7. c. $10 + 2 > 7 + 1$

8. c. 20

9. c. $83, -14$

10. b. $5 - 2 + 10$

II.

11. $+$, $-$, $\times$, $\div$ operations

12. $<$, $>$, $=$ – comparison symbols

13. $=$ – equals sign

14. 18

15. $(-4) + 6$ or $6 + (-4)$ – commutative property

16. $8 - 5 - 2$

17. $100 - (15 + 56) = 29$

18. $-27 - 8 - 3$

19. 25

20. 22

III.

21

a. $(20 - 4) - 31$

b. $.48$

c. 33

d. $(100 - 2) \times 8$

$$e .0+0,1-1,0 \times 1,0 \div 1$$

IV .

22. The mathematical operations used to get mathematical phrases are called Arithmetic expressions

.Examples: $15 + 7$, $30 - 6$, 13×5 , $24 \div 3$

23. $+$, $-$, $\times$ & $\div$

24. We compare expressions based on their values and write the 'equal to'

greater than' or' less than' sign accordingly.i.e ' $=$ ', ' $<$ ' and ' $>$ ' symbols

25. $25 + 6 \times 5$

$$25 + 30 = 55$$

55 mangoes

26. $100 - (15 + 10)$

27. $150 - (40 + 25)$

$$150 - 65 = ₹85$$

She gets ₹ 85

28. The height of a Drone = 8 m

The height of a drone when it is downwards = 4 m

The net position of the drone is $8 + (-4) = 4$

29. Commutative Property of Addition

Formula: $a + b = b + a$

Example: $8 + 2 = 2 + 8$

30. Associative Property of Addition

$$a + (b + c) = (a + b) + c$$

$$2 + (3 + 4) = (2 + 3) + 4$$

31. Distributive Property

$$a \times (b + c) = (a \times b) + (a \times c)$$

$$2 \times (5 + 3) = (2 \times 5) + (2 \times 3)$$

V.

32 . Ascending Order

a)50 b) 47 c) 125, d) 100, e) 43, f) 35

f) $105 \div 3 = 35$ e) $57 - 14 = 43$ b) $67 - 20 = 47$ a) $35 + 15 = 50$ d) $60 + 40 = 100$ c) $25 \times 5 = 125$

33 a) $1023 + 125 < 1022 + 128$

b) $364 + 587 < 363 + 589$

c) $129 + 245 > 124 + 245$

34.

expression	Sum of the terms	Value
a) $15 - 2 + 6$	$(15) + (-2) + (6)$	$21 - 2 = 19$
b) $8 + 5 \times 3$	$(8) + (5 \times 3)$	$8 + 15 = 23$
c) $24 - 3 \times 4 + 16$	$(24) + (-3 \times 4) + (16)$	$24 - 12 + 16 = 28$

35.

a) $(5 + 10) - 3 = 5 + 10 - 3 = 12$

b) $16 - (8 - 3) = 16 - 8 + 3 = 11$

c) $32 - (15 + 4) = 32 - 15 - 4 = 32 - 19 = 13$

36.

a) $35 + (6 - 4) = 35 + 6 [-] \underline{4}$

b) $20 - 6 - 4 = 24 - 6 [-] \underline{4}$

c) $37 - (8 [-] \underline{3}) = 37 - 8 + 3$

VI .37

The entry ticket rate for adults ₹40

The entry ticket rate for children ₹ 20

The total cost for 4 adults and 2 children= a) $4 \times 40 + 3 \times 20$
 $= 160 + 60$

=Rs.220

38.

The cost of dosa = ₹25 .

The cost needed for 4 members= 4×25

The tips given for waiter= ₹10

The total expense = $4 \times 25 + 10 = 100 + 10 = ₹110$

39.

a) LHS: $(5 + 8) - 2 = 11$ | RHS: $5 + (8 - 2) = 11$

$\therefore 5 + (8 - 2) = (5 + 8) - 2$

b) LHS: $25 - (10 + 6) = 9$ | RHS: $25 + (-10 - 6) = 9$

$\therefore 25 + (-10 - 6) = 25 - (10 + 6)$

40.

$$2 \times (63 + 14) = 2 \times 63 + 2 \times 14 = 126 + 28 = 154$$

The total bill paid by Asha and Deepa is 154. The property used is Distributive property

41.

Multiplication via Expanded Number Splitting

a) 42×12 : 42 times 12 $(40 + 2) \times 12 = 480 + 24 = 504$

b) 104×5 : 104 times 5. $(100 + 4) \times 5 = 500 + 20 = 520$

c) 96×10 : 96 times 10. $(100 - 4) \times 10 = 1000 - 40 = 960$

d) 49×8 : 49 times 8. $(50 - 1) \times 8 = 400 - 8 = 392$

42•

a) $53 \times 16 = (43 + 10) \times 16 = 43 \times 16 + 10 \times 16 = 688 + 160 = 848$

b) $68 \times 15 = (58 + 10) \times 15 = 58 \times 15 + 10 \times 15 = 870 + 150 = 1020$

43.

Method-1: $2 + 2 \times 2 + 2 \times 3 + 2 \times 4 = 2[1 + 2 + 3 + 4] = 2[10] = 20$

Method-2: $2 + (2 \times 2) + (2 \times 3) + (2 \times 4) = 2 + 4 + 6 + 8 = 20$

Total number of square = 20

44.

Method-1: $(5 \times 3) + (4 \times 4) = 15 + 16 = 31$

Method-2: $2 \times (3 + 4 + 3) + 1 \times (4 + 3 + 4) = 20 + 11 = 31$

FIGURE-2

Method-1: $(8 \times 8) + (8 \times 5) = 64 + 40 = 104$

Method-2: $8(8 + 5) = 8 \times 13 = 104$

45.

a. $4 + 15 + (-9)$ → terms 4, 15 & (-9)

b. $5 + 6 \times 3$ → terms 5, 6 & 3

c. $21 - 2 \times 4 + 13$ → terms 21, -2, 4 & 13

d. $32 - 15 + 17$ → terms 32, -15 & 17

VII.

46. 1. $5 - 6 + 7 = 6$

2. $6 - (5 - 7) = 6 - (-2) = 6 + 2 = 8$

3. $5 + (6 - 7) = 5 + (-1) = 4$

4. $7 - (6 + 5) = 7 - 11 = -4$

5. $(5 + 6) + 7 = 18$

47.

4 Horizontal Rows with 5 students each get a prize= 4×5

Arithmetic expression for total = $4 \times 5 + 3 \times 5$

horizontal rows with 5 students 5 each get a rose = 3×5

Arithmetic expression for total = $4 \times 5 + 3 \times 5$

= $20+15$

number of prizes :20 number of roses: 15

Chapter – 03 - A peek beyond the point

I.

1. b. 0.5
2. b. 0.45
3. b. 4.5
4. b. 10mm
5. c. 0.25 kg
6. b. 0.02
7. a. 75 paise
8. a. 79
9. b. 2.5
10. b. equal

II. FILL IN THE BLANKS

11. 0.1
12. 1000
13. 9
14. 5.6
15. 1.0
16. 100
17. Four point zero five
18. 1.5
19. Equal
20. 3.25

III.

21.
 1. **0.1** → One tenth
 2. 0.75 → 75 paise
 3. 0.01 → One hundredth
 4. 0.001 → One thousandth
 5. 1.25 → One rupee twenty five paise

IV.

22. True
23. True
24. False
25. True
26. True
27. False
28. True
29. True
30. False
31. True

V.

- 32. Hundredth
- 33. 50
- 34. Rs 8
- 35. Twenty five hundredths
- 36. 0.2
- 37. Hundredth
- 38. 10000
- 39. Nine hundredths
- 40. 10 cm
- 41. Five point zero six.

VI.

- 42. Decimal Point:

A symbol used to separate whole number part and fractional part.

- 43. Tenths:

One part when a whole is divided into 10 equal parts.

- 44. Hundredths:

One part when a whole is divided into 100 equal parts.

- 45. Thousandths:

One part when a whole is divided into 1000 equal parts.

- 46. Decimal Notation:

A method of writing numbers using decimal point.

VII.

- 47. 0.7
- 48. 0.90 rupee
- 49. 0.068 kg
- 50. 0.254
- 51. 1.56 kg
- 52. 203.6 cm
- 53. 2.50 rupees
- 54. 0.704 kg

VIII.

- 55. Zero point four five
- 56. $3.5 > 3.05$
- 57. $5/10$ (0.5)
- 58. 3.9
- 59. 6.2
- 60. 0.02, 0.2, 0.22
- 61. 1.25 m

IX.

62. 5.08

= 5 ones and 8 hundredths

63. $12.45 + 5.25$

= 17.70

64. $18.5 - 9.25$

= 9.25

65. $\frac{4}{10}$, $\frac{41}{10}$, $4 \frac{1}{10}$, $41 \frac{1}{10}$

66. 5.6, 6.0, 6.4

67. Construction

68. A) nine tenths B) one and seven tenths.

69. A) $4 \frac{9}{10}$, $4 \frac{12}{10}$, $4 \frac{15}{10}$, $4 \frac{18}{10}$

B) $9 \frac{7}{10}$, $10 \frac{2}{10}$, $10 \frac{7}{10}$

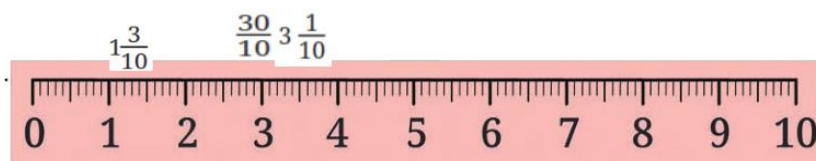
X.

70. $\frac{50}{100}$, $\frac{155}{100}$, $\frac{175}{100}$, $\frac{201}{100}$, $\frac{240}{100}$.

71. Ascending order:

4.005, 4.05, 4.5, 4.50

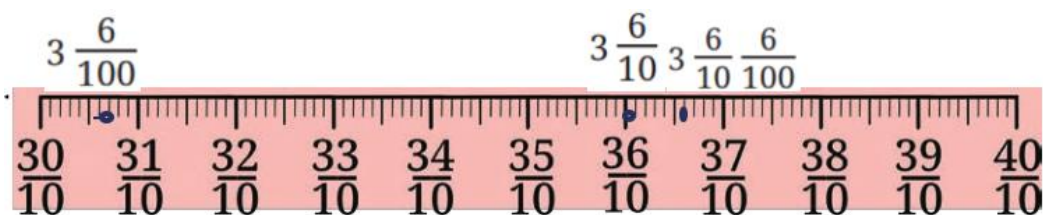
72.



73. $18 \frac{2}{100}$

74. $\frac{303}{100}$ or $3 \frac{3}{100}$

75.



76. 705, 70.5, 7.05

XI.

77. Place value table of 45.678

4 → tens

5 → ones

6 → tenths

7 → hundredths
8 → thousandths

78.

Decimal number	Hundreds	Tens	Units	•Tenths	Hundredths
705	7×100	0×10	5×1	•	
70.5		7×10	0×1	• $5 \times \frac{1}{10}$	
7.05			7×1	• $0 \times \frac{1}{10}$	$5 \times \frac{1}{100}$

79. Conversions

- a) 36 cm = 0.36 m
- b) 465 g = 0.465 kg
- c) 99 paise = 0.99 rupee
- d) 134 mm = 13.4 cm

80. Number line:

2.35 lies between 2.3 and 2.4

81. 7.0 cm, 9 mm, 13.4 cm, 2036 mm

82. Total weight

$$= 2.5 + 1.75 + 0.5$$

$$= 4.75 \text{ kg}$$

83. A) 1.01 B) 3.65

XII.

84. Milk supplied in first three days

$$3.79 + 4.2 + 4.25$$

$$= 12.24 \text{ L}$$

Milk supplied in last three days

$$25 - 12.24$$

$$= 12.76 \text{ L}$$

Chapter – 4 - Expression using letter - Numbers

I.

1. a . letter-numbers
2. b) $a + 3$
3. c) $2n$
4. b) $5s$
5. c) $4n$
6. a) $18c$
7. c) no, because they are unlike terms
8. b) 13
9. c) $-18 - 13$
10. b) $3n$

II.

11. $4q$
12. Value
13. 28
14. $10(y - 3)$
15. Like
16. $2x - 13$
17. $4n$
18. $4x + 4y$

III. True or False

19. False
20. False
21. True
22. True
23. False
24. False
25. True
26. False

IV.

27. $3s$
28. $35c$
29. 3 less than a
30. $18c + 11d$ (or any unlike combination)
31. 28
32. $-6x - 10y$
33. $3n$
34. $6p + 12$

V.

35. **Letter-numbers:** Letters of the alphabet used to represent numbers whose values can change or are unknown.
36. **Algebraic Expression:** A combination of letter-numbers, numbers, and arithmetic operation signs.
37. **Constant:** A constant is a fixed value.
38. **Like Terms:** Terms within an expression that contain exactly the same letter-numbers.
39. **Unlike Terms:** Terms that contain different letter-numbers or configurations, preventing them from being merged.
40. **Distributive Property:** The mathematical law where multiplying a sum by a number is equal to multiplying each addend individually: $a(b+c) = ab + ac$.
41. **Regular Polygon:** A geometric closed shape where all side lengths are equal and all angle measures are equal.

VI.

42. $z + 5$
43. $3a$
44. 0
45. $7 \times 5 = 35$
46. $y - 4$

VII.

47. $8a-30b$
48. $14m-29n$
49. $8x, 14x$
- $3y, 16y, 20y$
- $1xy, -xy$
50. $34x + 65y$
51. Perimeter = $4 \times 7 = 28$ cm.

VII.

52. Given: $5m + 3$, substitute $m = 4$.

$$5(4) + 3 = 20 + 3 = 23$$

53. 55

$$40$$

$$25$$

54. Total money = $5c + 3c + 10c$

Combine like terms: $(5 + 3 + 10)c = 18c$.

55. A) 2 less than 13 times a number $n = 3n - 2$.

B) 13 less than 2 times a number $n = 2n - 13$.

56. $3 \times 100 + 5 \times 20 + 6 \times 5 = 430$

6, 4, 3

$$8 \times 100 + 4 \times 20 + z \times 5 = 880 + 5z$$

$$x \times 100 + y \times 20 + z \times 5$$

57.

w-8	w-7	w-6
w - 1	w	w + 1

58. Combined length = $20 + k$.

If $k = 15$, Total length = $20 + 15 = 35$ meters.

59. $4(x + y) - y = 4x + 4y - y$

Combine y terms: $4x + (4 - 1)y = 4x + 3y$.

60. $u = 2$:

$$5u = 5 \times 2 = 10.$$

$$5 + u = 5 + 2 = 7.$$

Since $10 \neq 7$ the expressions are not equal.

61. Number of sticks = $2n$



62. a) Cost of coconuts = $35c$; Cost of jaggery = $60j$. Total expression = $35c + 60j$.

b) Substitute $c = 7$, $j = 4$:

$$\text{Total amount} = 35(7) + 60(4) = 245 + 240 = \text{₹}485.$$

63. a) $3a + 9b - 6 + 8a - 4b - 7a + 16$

Group like terms: $(3a + 8a - 7a) + (9b - 4b) + (-6 + 16) = 4a + 5b + 10.$

b) $2(2x - 3) + 8x + 12 = 4x - 6 + 8x + 12$

Group terms: $(4x + 8x) + (-6 + 12) = 12x + 6.$

64. a) $(4d - 7c + 9) + (8c - 11 + 9d) = (4d + 9d) + (-7c + 8c) + (9 - 11) = 13d + c - 2.$

b) $(6f - 20 + 8s) + (23 - 13f - 12s) = (6f - 13f) + (8s - 12s) + (-20 + 23) = -7f - 4s + 3.$

65. $(6a + 9b - 18) - (9a - 6b + 14)$

$$6a + 9b - 18 - 9a + 6b - 14$$

$$(6a - 9a) + (9b + 6b) + (-18 - 14) = -3a + 15b - 32.$$

66. a) Situation: A fruit seller sells apples at ₹8 each and oranges at ₹3 each. If a customer buys x apples and y oranges, the total cost is $8x + 3y$.

b) Situation: A shopkeeper has $15x$ notebooks. He sells $2x$ notebooks to a student. The remaining notebooks with him are described by $15x - 2x$.

VIII.

67. a) Startup time = 10 seconds. Grinding time for y kg = $8y$ seconds.

Total time expression = $10 + 8y$ seconds.

b) For $y = 5$: Total time = $10 + 8(5) = 10 + 40 = 50$ seconds.

68. a) Expression = $4t + 6$ minutes.

b) If $t = 4$: Travel time = $4(4) + 6 = 16 + 6 = 22$ minutes.

69. (Figure of Triangular match sticks)

Step-1: 3 match sticks

Step-2 : $3 + 2 = 5.$

Step-3 : $3 + 2 + 2 = 7.$

Algebraic expression: $3 + 2(y - 1) = 3 + 2y - 2 = 2y + 1.$

70. a) Expression: $100x + 20y + 5z.$

b) For $x=6, y=5, z=6$ (From book text sample): $6 \times 100 + 4 \times 20 + 3 \times 5 = 600 + 80 + 15 = ₹ 695$.

c) For $x=8, y=4, z=2$: $8(100) + 4(20) + 2(5) = 800 + 80 + 10 = ₹ 890$.

71. a) $(-6f + 19 - 8s) + (-23 + 13f + 12s) = (-6f + 13f) + (-8s + 12s) + (19 - 23) = 7f + 4s - 4$.

b) $(11 - 10g + 3h) - (17g + 9 - 7h) = 11 - 10g + 3h - 17g - 9 + 7h = (-10g - 17g) + (3h + 7h) + (11 - 9) = -27g + 10h + 2$.

72. a) $23 + 4(6m - 3n) - 8n - 3m - 18$

$$= 23 + 24m - 12n - 8n - 3m - 18$$

Group terms: $(24m - 3m) + (-12n - 8n) + (23 - 18) = 21m - 20n + 5$.

b) $5(2w + 3x + 4w) - 10w = 5(6w + 3x) - 10w = 30w + 15x - 10w = 20w + 15x$.

73. a) Initial amount paid = $40x + 75y$. Amount returned = $6x + 10y$.

$$\text{Net expression} = (40x + 75y) - (6x + 10y).$$

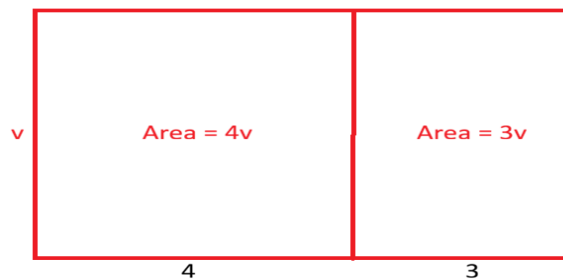
b) Simplify: $40x + 75y - 6x - 10y = (40 - 6)x + (75 - 10)y = 34x + 65y$.

74. a) Sum = $8 + 14 + 15 + 16 + 22 = 75$. Center number = 15. $75 = 5 \times 15$. It is exactly 5 times.

b) Surrounding numbers in terms of center a : Top: $a - 7$, Left: $a - 1$, Right: $a + 1$, Bottom: $a + 7$.

c) Total Sum = $a + (a - 7) + (a - 1) + (a + 1) + (a + 7) = a + a + a + a + a - 7 - 1 + 1 + 7 = 5a$. Proved.

75.



$$\text{Area of part 1} = 4v, \text{ Area of part 2} = 3v, \text{ Total area} = 4v + 3v = (4+3)v = 7v.$$

76. For $y = 2$:

$$10y - 3 = 10(2) - 3 = 20 - 3 = 17.$$

$$10(y - 3) = 10(2 - 3) = 10(-1) = -10.$$

For $y = 10$:

$$10y - 3 = 10(10) - 3 = 100 - 3 = 97.$$

$$10(y - 3) = 10(10 - 3) = 10(7) = 70.$$

Since the values are completely different, the two expressions are not equal.

IX.

77. a) Charu's Round 1 score = $7p - 3q$. For $p = 4$, $q = 1$: $7(4) - 3(1) = 28 - 3 = 25$.

b) Total score = $(7p - 3q) + (8p - 4q) + (6p - 2q)$

Remove brackets and combine: $(7p + 8p + 6p) + (-3q - 4q - 2q) = 21p - 9q$.

c) Difference = Krishita - Charu = $(23p - 7q) - (21p - 9q)$

$$= 23p - 7q - 21p + 9q = (23p - 21p) + (-7q + 9q) = 2p + 2q.$$

78. a) $p - q + p - q = (p + p) + (-q - q) = 2p - 2q$.

b) $2d - d - d - d = (2d - d - d) - d = 0 - d = -d$.

c) $2d - d - (d - c) = 2d - d - d + c = 0 + c = c$.

d) $2d - (d - d) - c = 2d - (0) - c = 2d - c$.

(e) $2d - d - c - c = 1d - 2c = d - 2c$.

79. A Table

step (y)	1	2	3	4	5
sticks	3	5	7	9	11
B) simplify student A expression $3 + 2(y - 1) = 3 + 2y - 2 = 2y + 1$. This is identical to students B expressio					
C) using $2y + 1$:					
step 33: $2(33) + 1 = 66 + 1 = 67$ sticks.					
step 84: $2(84) + 1 = 168 + 1 = 169$ sticks.					
step 108: $2(108) + 1 = 216 + 1 = 217$ sticks.					

80. a) Addition: $(8d - 14c + 9) + (16c - (11 + 9d))$

$$= 8d - 14c + 9 + 16c - 11 - 9d$$

$$= (8d - 9d) + (-14c + 16c) + (9 - 11) = -d + 2c - 2.$$

b) Subtraction: $(6a - (9b + 18)) - (9a - 6b + 14)$

$$= 6a - 9b - 18 - 9a + 6b - 14$$

$$= (6a - 9a) + (-9b + 6b) + (-18 - 14) = -3a - 3b - 32.$$

Chapter – 5 - Parallel & Intersecting

I.

1. a. They never meet, however far extended

2. b. 90°

3. c. Always equal

4. a. Corresponding angles

5. c. $\angle 4 = \angle 7$

6 b. 110°

7. c. Perpendicular

8. a. 135°

9. a. 360°

10. b. Right

II. 11. Parallel

12. Vertically opposite angles

13. Transversal

14. Perpendicular lines

15. Adjacent angles

16. 180°

17. Equal

18. Parallel lines

III. 19. False

20. True

21. True

22. False

23. True

24. True

IV. 25. Parallel lines are straight lines that never meet each other no matter how far they are extended in either side.

26. Pairs of angles in the same relative position at each and intersection.

27. A transversal is a single line that passes through two or more other lines at distinct points.

28. Perpendicular lines are two straight lines that intersect each other at an exact 90° angle, forming a right angle.

29. Two or more straight lines that cross or meet each other at exactly one common point.

V. 30. 70°

31. l and m

J and k

32. $\angle AOB$ and $\angle BOC$

33. $\angle C = 60^\circ$

34. Yes, they are parallel

VI. 35. 48°

36. 52°

37. 81°

38. 99°

39. 69°

40. 48°

41. 122°

42. 15°

43. 54°

44. 97°

VII.

45. $\angle 2 = 80^\circ$, $\angle 3 = 100^\circ$, $\angle 4 = 80^\circ$, $\angle 6 = 80^\circ$, $\angle 5 = 100^\circ$, $\angle 7 = 100^\circ$, $\angle 8 = 80^\circ$

46. a) $b = 40^\circ$

$$a = 140^\circ$$

$$5c = 140^\circ$$

$$c = \frac{140}{5}$$

$$c = 28^\circ$$

b) $y = 45^\circ$, $2y = 90^\circ$

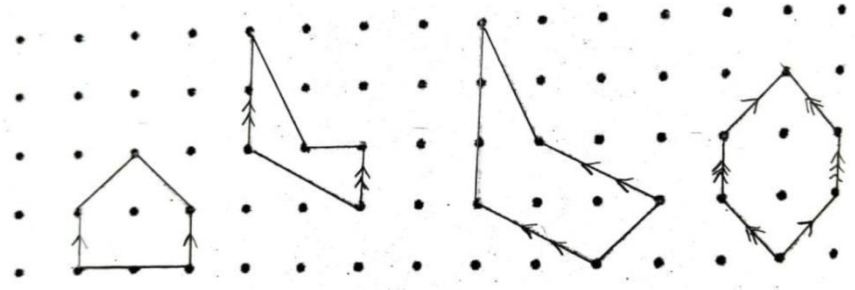
$$45 + 3x = 180^\circ$$

$$3x = 180 - 45$$

$$3x = 135$$

$$x = 45^{\circ}$$

47.

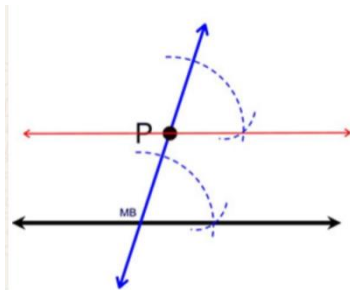


48. a) Adjacent angles : p and q, r and s, q and r, p and s

b) Vertically opposite angles: p and r, q and s, a and c, b and d

c) Corresponding angles: p and a, q and b, r and c, s and d

49.



$$50. \angle b = 65^{\circ}, \angle c = 115^{\circ}, \angle d = 65^{\circ}$$

$$51. x + (2x - 30) = 90$$

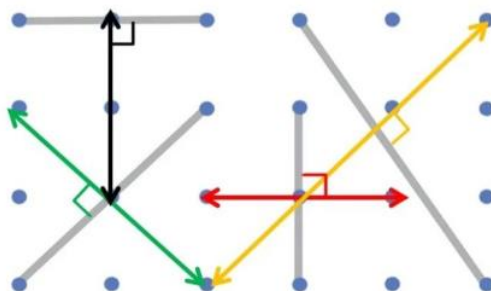
$$2x - 30 = 2(40) - 30 = 50^{\circ}$$

$$x = 40^{\circ} \quad \therefore \text{larger angle is } 50^{\circ}$$

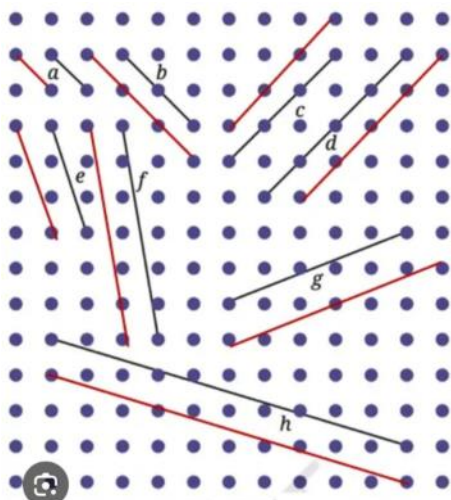
52. a) Vertically opposite angles

b) Linear pair of angles

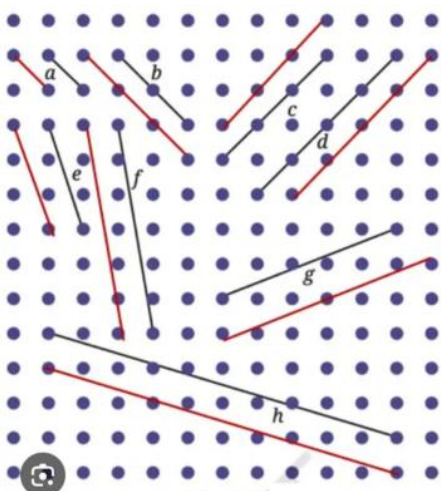
53.



54.



55.



56. In the given figure, line a is parallel to line c. Because these two lines are always the same distance apart and never meet, no matter how far they go.

57. a) $\angle 1 = x^0$ [alternate angles]

$$\angle 1 + 65^0 = 90^0 \text{ [linear pair]}$$

$$\angle 1 = x^0 = 25^0$$

$$x + y = 180^0$$

$$\angle y = 155^0$$

b) $\angle 3 = 78^0$ [alternate angles]

$$\angle 1 = 53^0 \text{ [alternate angles]}$$

$$\angle 2 = \angle 3 - \angle 1 = 78^0 - 53^0$$

$$\angle 2 = 25^0 = x^0$$

$$x = 25^0$$

VIII. 58. $\angle 1 = 42^\circ$ [Vertically opposite angle]

$$42^\circ + a = 180^\circ$$

$$a = 138^\circ$$

59. $\angle 1 = 62^\circ$

$$\angle 1 + \angle 2 = 180^\circ$$

$$\angle 2 = 118^\circ$$

$$a = 118^\circ \text{ [Corresponding angles]}$$

60. $\angle 1 = 110^\circ$

$$\angle 1 = \angle 2 = 110^\circ$$

$$\angle 3 = \angle 2 - 35^\circ$$

$$\angle 3 = 110^\circ - 35^\circ$$

$$\angle 3 = 75^\circ$$

$$\angle 3 = \angle 4 = 75^\circ \text{ [Corresponding angles]}$$

So, $\angle a = 180^\circ - 75^\circ$

$$a = 105^\circ$$

61. $67^\circ + a + 90^\circ = 180^\circ$

$$a = 23^\circ$$

62. a) $\angle AOE$ and $\angle EOC$

$\angle EOC$ and $\angle COB$

$\angle COB$ and $\angle BOD$

$\angle BOD$ and $\angle DOA$

$\angle DOA$ and $\angle AOE$

b) $\angle DOA$, $\angle AOE$ and $\angle EOC$

$\angle DOB$ and $\angle BOC$

$\angle AOE$, $\angle EOC$ and $\angle COB$

c) $\angle AOD$ and $\angle BOC$

$\angle BOD$ and $\angle COA$

$$63. \angle BDC = 35^{\circ}$$

$$\angle ABD = \angle BDC$$

$$\angle ABD = 35^{\circ}$$

$$\angle BAD = \angle BCD$$

$$\angle BAD = 75^{\circ}$$

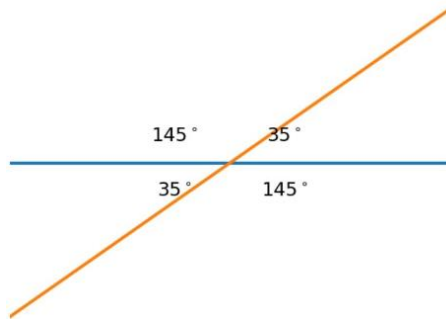
$$\angle BAD + \angle ADC = 180^{\circ}$$

$$75^{\circ} + \angle ADC = 180^{\circ}$$

$$\angle ADC = 180^{\circ} - 75^{\circ}$$

$$\angle ADC = 105$$

64.



$$\angle a = \angle c$$

$$\angle a + \angle b = 180$$

$$\angle b = \angle d$$

$$c = 35^{\circ}$$

$$\angle b = 180 - 35$$

$$\angle d = 145^{\circ}$$

$$\angle b = 145^{\circ}$$

65. If corresponding angles are equal, then lines are parallel

$$\angle a \text{ and } \angle b, \quad \angle f \text{ and } \angle b$$

$$\angle a + \angle b = 180^{\circ}$$

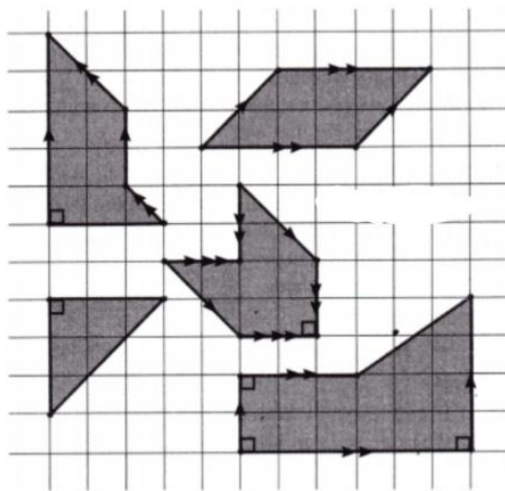
$$120^{\circ} + \angle b = 180^{\circ}$$

$$\angle b = 60^{\circ}$$

$\angle b$ and $\angle f$ are corresponding angles and they are not equal

$\therefore$ Lines l and m are not parallel

66.



- To spot perpendicular lines in a geometric figure, observe if lines intersect at a 90° angle.
- To spot parallel lines in a geometric figure, observe if lines never intersect at any point.

X. 67. Corresponding angles are equal

$$\angle 2 = \angle 6$$

$$\angle 2 = 135^\circ$$

And vertically opposite angles are equal

$$\angle 4 = \angle 2$$

$$\angle 4 = 135^\circ$$

Similarly, $\angle 6$ and $\angle 8$ are vertically opposite angles.

$$\angle 6 = \angle 8$$

$$\angle 8 = 135^\circ$$

Now, on line l

$$\angle 1 + \angle 2 = 180^\circ$$

$$\angle 1 + 135^\circ = 180^\circ$$

$$\angle 1 = 45^\circ$$

Corresponding angles

$$\angle 1 = \angle 5$$

$$\angle 5 = 45^\circ$$

Vertically opposite angles $\angle 1$ and $\angle 3$

$$\angle 1 = \angle 3$$

$$\angle 3 = 45^\circ$$

Also, vertically opposite angles $\angle 5$ and $\angle 7$

$$\angle 5 = \angle 7$$

$$\angle 7 = 45^\circ$$

68. Given $AB \parallel CD$

and BE is the transversal

So, $x = y$ [corresponding angles]

Also

$CD \parallel EF$ and BE is transversal

$$\text{So, } y + 55^\circ = 180^\circ$$

$$y = 180^\circ - 55^\circ$$

$$y = 125^\circ$$

$$x = y$$

$$x = 125^\circ$$

XI. 69. Take JF as transversal

$$\angle FED = 78^\circ \text{ [alternate exterior angle]}$$

Take line CH as transversal

$$\angle GEH = 45^\circ \text{ [alternate exterior angle]}$$

By linear pair,

$$\angle GEH + \angle HEF + \angle FED = 180^\circ$$

$$45^\circ + \angle HEF + 78^\circ = 180^\circ$$

$$\angle HEF = 180^\circ - 123^\circ$$

$$\angle HEF = 57^\circ$$

70.

a) Parallel lines

b) Perpendicular lines

c) Perpendicular lines

d) Parallel lines

e) Perpendicular lines

Chapter – 06 - Number Play

I.

1. d. 55
2. b. 7
3. d. $2n$
4. a. even
5. a. even
6. a. odd
7. b. 21
8. c. 55
9. c. 5
10. b. 15
11. a. 12321
12. b. odd
13. b. adding two even numbers
14. b. odd numbers
15. b. odd

II.

16. Even
17. Odd
18. Even
19. Odd
20. Even
21. 15
22. Magic 5
23. 5 and 1
24. $4n+6$
25. Odd

26. Even

27. 3

III.

28. True

29. True

30. False

31. True

32. False

33. False

34. False

35. True

36. True

37. True

IV.

38.

a) $2n$

b). $2n-1$

c). $a_n = a_{n-1}$

d). $4n$

e). Even

f). Even

g). Odd

h). Odd

V.

39. 5 (Because $5+5+5=15$, so $T=5$ and $U=1$)

40. 2584 and 4181 (Each term is the sum of the preceding terms: $987+1597=2584$)

41. A number that reads the same forward and backward is called a palindromic number.

42. Odd

43. 1, 2, 3, 5, 8

44. Odd

45. Parity refers to whether a number is even or odd.

46. A cryptarithm is a mathematical puzzle in which digits are replaced by letters and you have to figure out which digit each letter stands for.

VI.

47. The formula for the n^{th} odd number is

$$2n - 1$$

$$n = 20, (2 \times 20) - 1$$

$$= 40 - 1$$

$$= 39$$

48. Here, T is at hundred place.

$$U = 9, T = 1 \text{ and } A = 0$$

49. The sequence is in pattern

$$1 + 2 = 3$$

$$2 + 3 = 5$$

$$3 + 5 = 8$$

.....

$$55 + 89 = 144$$

$$89 + 144 = 233$$

$$144 + 233 = 3779$$

$\therefore$ The next three numbers are = 144, 233, 3779

50. 2 even numbers = Even

3 odd numbers = Odd

Even + Odd = Odd

The overall parity is odd.

51. All numbers in the square cannot be zero, we can use negative numbers as needed so, we will use the numbers (-4) to 4

To create a magic square whose magic sum is zero

-3	2	1
4	0	-4
-1	-2	3

VII.

52. In a Fibonacci-style sequence, the next number is found by adding the two previous numbers.

a) The first next number

$$987+1597=2584$$

b) The second next number

$$1597+2584=4181$$

∴ The next two numbers are 2584 and 4181.

53.

23	16	21
18	20	22
19	24	17

54. Total sheets = 50

Each sheet has one even and one odd page numbers.

Thus, the total of 50 sheets consist of 50 even numbers and 50 odd numbers.

The sum of the even numbers is even (because adding any number of even numbers is even)

The sum of the odd numbers is even (because adding any even number of odd numbers is even)

Thus, the total sum is

Even + even = even

Since 6000 is an even number, it is possible for the sum of the page numbers of the loose sheets to be 6000.

VIII.

$$55. \quad \begin{array}{r} A \quad B \\ + 7 \quad 1 \\ \hline 1 \quad 8 \quad 0 \\ \hline \end{array}$$

$B + 1 = 0$ (or a number ending in 0, like 10)

Since $B + 1 = 10$, $B = 9$

$$A + 7 = 8$$

So, $8 + A = 8$ which means $A = 0$

56. The 3X3 magic square using the consecutive numbers from 13 to 21 results in a magic sum of 51.

20	13	18
15	17	19
16	21	14

$$20 + 13 + 18 = 51$$

$$15 + 17 + 19 = 51$$

$$16 + 21 + 14 = 51$$

IX.

57. Yes, it is possible

Let us consider the two magic squares with a magic sum 45

18	11	16
13	15	17
14	19	12

9 consecutive numbers and

24	3	18
9	15	21
12	27	6

9 consecutive numbers

58. Let p be a digit (0-9)

$$3p = Qp$$

$$10Q - p$$

$$\text{So, } 3p - p = 10Q$$

$$2p = 10Q$$

$$p = \frac{10}{2}Q$$

$$p = 5Q$$

Since p and Q are single digits Q=1 gives

p = 5 (other values of Q make p exceed a single digit)

$$p + p + p = Qp$$

Check: $5 + 5 + 5 = 15$ which matches

$$Qp = 15 \text{ (} Q = 1, p = 5 \text{)}$$

59. Considering a magic square with numbers 2-10

9	2	7
4	6	8
5	10	3

Taking 'm' as the letter-number of the number in the centre and expressing other numbers in relation to 'm'

$m + 3$	$m - 4$	$m + 1$
$m - 2$	m	$m + 2$
$m - 1$	$m + 4$	$m - 3$

X.

60. a) After increasing each number by 1

9	2	7
4	6	8
5	10	3

This is still a magic square

b) After doubling each number

16	2	12
6	10	14
8	18	4

This is still a magic square

61. Yes, Ramu made a mistake.

Step-1:- The total value of an odd number of odd coins (1 Rs) is odd.

Step-2:- The total value of an odd number of 5 Rs coins is also odd.

Step-3:- The total value of an even number of 10 Rs coins is always even.

Step-4:- Adding these parities together

Odd + Odd + Even = Even + Even

= Even

Conclusion:- Since the total value of these coins must be an even numbers, a total of 205 Rs (which is odd) is impossible.

Chapter – 07 - A Tale of three intersecting Lines

I.

1. d. Triangle
2. b. 2
3. b. 180°
4. c. 3
5. a. Equilateral triangle
6. c. A triangle cannot be formed
7. a. 10
8. c. 90° , 45° , 45°
9. d. PRS
10. b. AD
11. d. Equal to sum of interior opposite angles
12. a. should be less than 180°
13. a. 70°
14. b. B

II.

15. Triangle
16. 3
17. Hypotenuse
18. 60°
19. Unequal
20. 50°
21. 1
22. Exterior angle
23. Altitude

III.

24.
 - a) 3 equal sides
 - b) Two sides are equal

- c) 3 unequal sides
- d) Each angle less than 90°
- e) 90°
- f) One angle between 90° and 180°
- g) 3 equal angles
- h) Sum of interior opposite angles

IV.

- 25. A triangle in which all sides are equal is called a equilateral triangle.
- 26. A triangle in which two sides are equal is called an isosceles triangle
- 27. A triangle in which all sides are unequal is called scale in triangle
- 28. A triangle in which all angles are equal is called an equiangular triangle.
- 29. A triangle which one angle is equal to 90 degree is called right angle triangle.
- 30. A triangle in which each angle is less than 90 degree is called acute angle triangle.
- 31. Angle in which one angle is more than 90 degree but less than 180 degree is called an obtuse angle triangle
- 32. The shortest distance from a vertex of a triangle to its opposite side is called altitude.
- 33. When one side of a triangle is extended the angle formed between the extended side and the adjacent side is called exterior angle.

V.

- 34. 3 vertices, 3 sides and 3 angles
- 35. Sums of two sides must be greater than third side.
- 36. 3
- 37. 6
- 38. Exterior angle=sums of interior opposite angle
- 39. 3

VI.

- 40. For any three lengths to form a triangle, the sum of any two sides must be greater than the third side.
 $a + b > c$, $b + c > a$, $c + a > b$
- 41. The sum of the angles of a triangle is 180° .
 $70^\circ + 70^\circ + 70^\circ = 210^\circ$, which is greater than 180° .
- 42. Right-angled Triangle Isosceles Triangle

43. a. 3 cm, 5 cm, 4 cm

Yes.

$$3 + 4 = 7 > 5$$

$$3 + 5 = 8 > 4$$

$$4 + 5 = 9 > 3$$

b. 2 cm, 1 cm, 10 cm

No.

$$2 + 1 = 3 < 10$$

Triangle condition is not satisfied.

44. a. 3 cm, 30° , 4 cm

Yes.

Two sides and the included angle are given, so a triangle can be constructed.

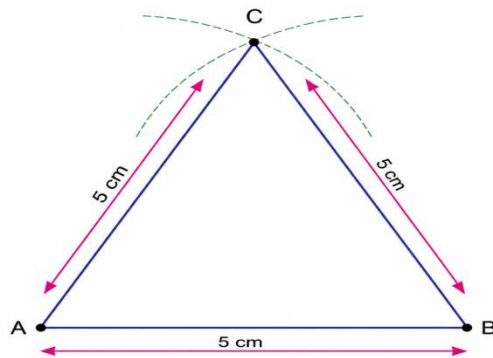
b. 100° , 84° , 6 cm

No.

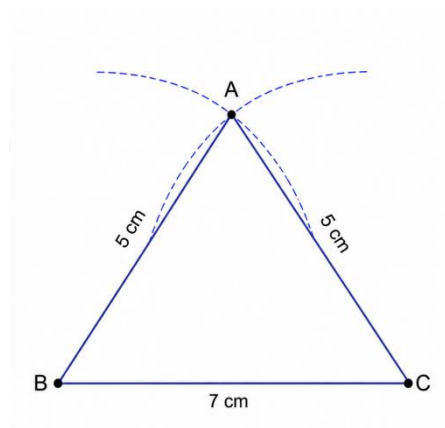
$$100^\circ + 84^\circ = 184^\circ > 180^\circ$$

The sum of two angles of a triangle must be less than 180° .

45.



46.



47. a. The sum of the interior angles of a triangle is 180° .

b. The sum of any two sides is greater than the third side.

48. It is Not possible to construct a triangle.

$$3 + 4 = 7 < 8$$

Since the sum of two sides is less than the third side, a triangle cannot be constructed.

49. Exterior angle = Sum of the two interior opposite angles

$$= 50^\circ + 70^\circ$$

$$= 120^\circ$$

50. Let each interior opposite angle be x .

$$x + x = 100^\circ$$

$$2x = 100^\circ$$

$$x = 50^\circ$$

Therefore, the two interior opposite angles are 50° and 50° .

51. The sides are: 3 m, 4 m, 5 m

Since:

$$3^2 + 4^2 = 5^2$$

$$9 + 16 = 25$$

$$25 = 25$$

The triangle formed is a Right-angled Triangle.

Construction:

Draw $AB = 3$ cm.

At B, draw a perpendicular line.

Mark $BC = 4$ cm on the perpendicular.

Join AC. Then $AC = 5$ cm.

Thus, $\triangle ABC$ is a right-angled triangle

52. The sum of the interior angles of a triangle is 180° .

$$\text{So, the third angle} = 180^\circ - (40^\circ + 50^\circ)$$

$$= 180^\circ - 90^\circ = 90^\circ$$

53. Using the angle-sum property of a triangle:

$$\text{Third angle} = 180^\circ - (30^\circ + 45^\circ)$$

$$= 180^\circ - 75^\circ$$

$$= 105^\circ$$

$$\text{Third angle} = 105^\circ$$

Since one angle is greater than 90° , it is an obtuse-angled triangle.

54. Using the angle-sum property of a triangle:

$$\begin{aligned}\text{Third angle} &= 180^\circ - (20^\circ + 50^\circ) \\ &= 180^\circ - 70^\circ \\ &= 110^\circ\end{aligned}$$

$$\text{Third angle} = 110^\circ$$

Since one angle is greater than 90° , the triangle is an obtuse-angled triangle.

VIII.

55. Using the triangle inequality:

$$10 + 15 = 25,$$

$$15 + 25 > 10$$

$$10 + 25 > 15$$

Since $10 + 15$ is equal to 25 (not greater than 25), a triangle cannot be formed. No, a triangle cannot be formed.

56. a) 1, 100

Third side x must satisfy:

$$100 - 1 < x < 100 + 1$$

$$99 < x < 101$$

Possible values: 99.1, 99.3, 99.5, 99.8, 100.5

b) 5, 5

$$5 + 5 > x \text{ and } x > 0$$

$$0 < x < 10$$

Possible values: 1, 3, 5, 7, 9

c) 3, 7

$$7 - 3 < x < 7 + 3$$

$$4 < x < 10$$

Possible values: 5, 6, 7, 8, 9

57. a) 2, 4, 8

$$2 + 4 = 6 < 8$$

Not possible

b) 5, 5, 8

$$5 + 5 = 10 > 8$$

$$5 + 8 > 5$$

$$5 + 8 > 5$$

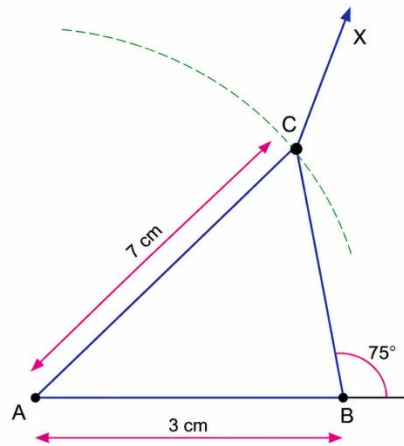
Possible

c) 10, 20, 35

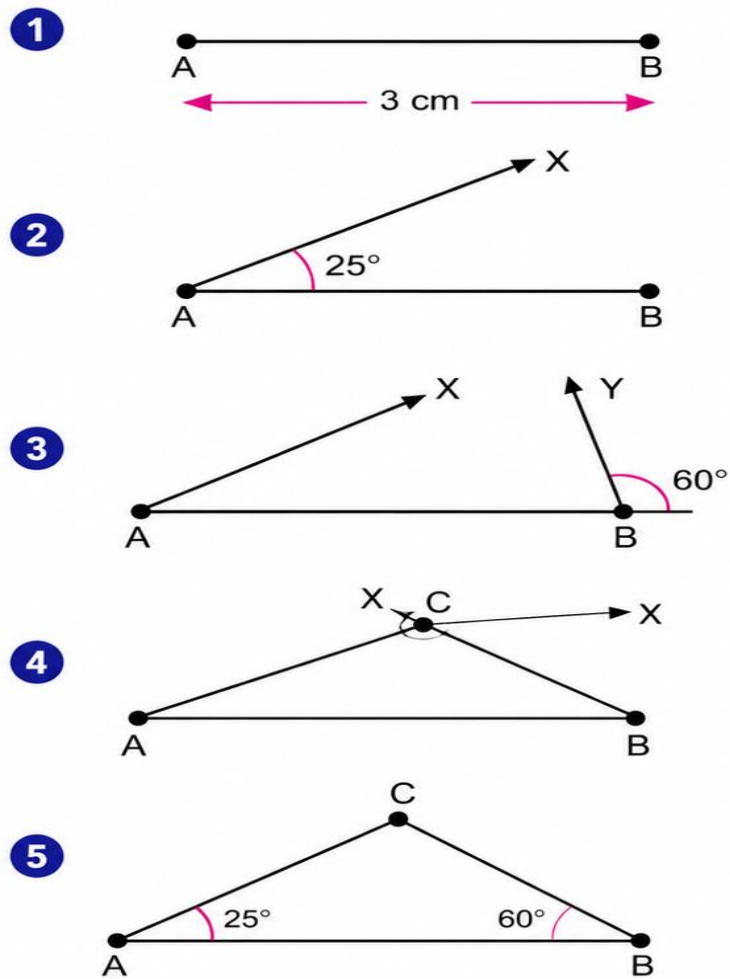
$$10 + 20 = 30 < 35$$

Not possible

58.



59. Construction:



60. Let $\angle B = \angle C = x$

Using the angle-sum property:

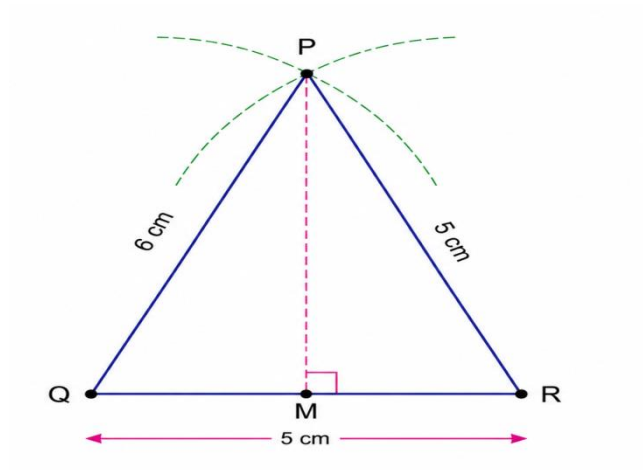
$$80^\circ + x + x = 180^\circ$$

$$2x = 100^\circ$$

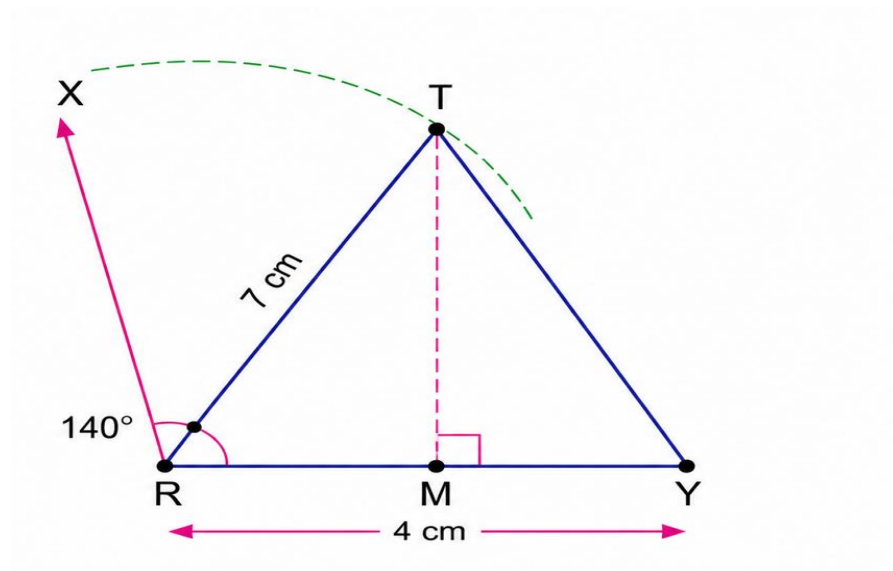
$$x = 50^\circ$$

$$\angle B = 50^\circ, \angle C = 50^\circ$$

61.



62.



63. For a triangle, the sum of any two angles must be less than 180° .

Given Angle	Possible Angles	Not Possible Angles
30°	$40^\circ, 100^\circ$	$150^\circ, 170^\circ$
70°	$50^\circ, 80^\circ$	$110^\circ, 120^\circ$
54°	$60^\circ, 90^\circ$	$130^\circ, 140^\circ$
144°	$20^\circ, 30^\circ$	$40^\circ, 50^\circ$

Explanation: Possible if the sum of the two given angles is less than 180° .

Not possible if the sum is 180° or more.

64.

Pair of Angles	Possible/ Not Possible	Reason
a) $35^\circ, 150^\circ$	Not possible	$35^\circ + 150^\circ = 185^\circ > 180^\circ$
b) $70^\circ, 30^\circ$	Possible	$70^\circ + 30^\circ = 100^\circ < 180^\circ$
c) $90^\circ, 85^\circ$	Possible	$90^\circ + 85^\circ = 175^\circ < 180^\circ$
d) $50^\circ, 150^\circ$	Not possible	$50^\circ + 150^\circ = 200^\circ > 180^\circ$

65) Third Angle = $180^\circ - (\text{sum of other two angles})$

(a) $36^\circ, 72^\circ$:

$$180^\circ - (36^\circ + 72^\circ) = 72^\circ$$

(b) $150^\circ, 15^\circ$

$$180^\circ - (150^\circ + 15^\circ) = 15^\circ$$

(c) $90^\circ, 30^\circ$

$$180^\circ - (90^\circ + 30^\circ) = 60^\circ$$

66) Using the triangle inequality:

$$3 + 3 = 6$$

$$6 < 7$$

Since the sum of two sides is less than the third side, a triangle cannot be formed.

Verification by construction:

Draw a line segment $AB = 7$ cm.

With A as centre and radius 3 cm draw an arc.

With B as centre and radius 3 cm draw another arc.

The arcs do not intersect.

Hence, no triangle can be constructed.

67) Sunil travels:

From starting point to Kumar's town = 1000 km

From Kumar's town to Dev's town = 750 km

Returns directly to the starting point.

(a) Yes.

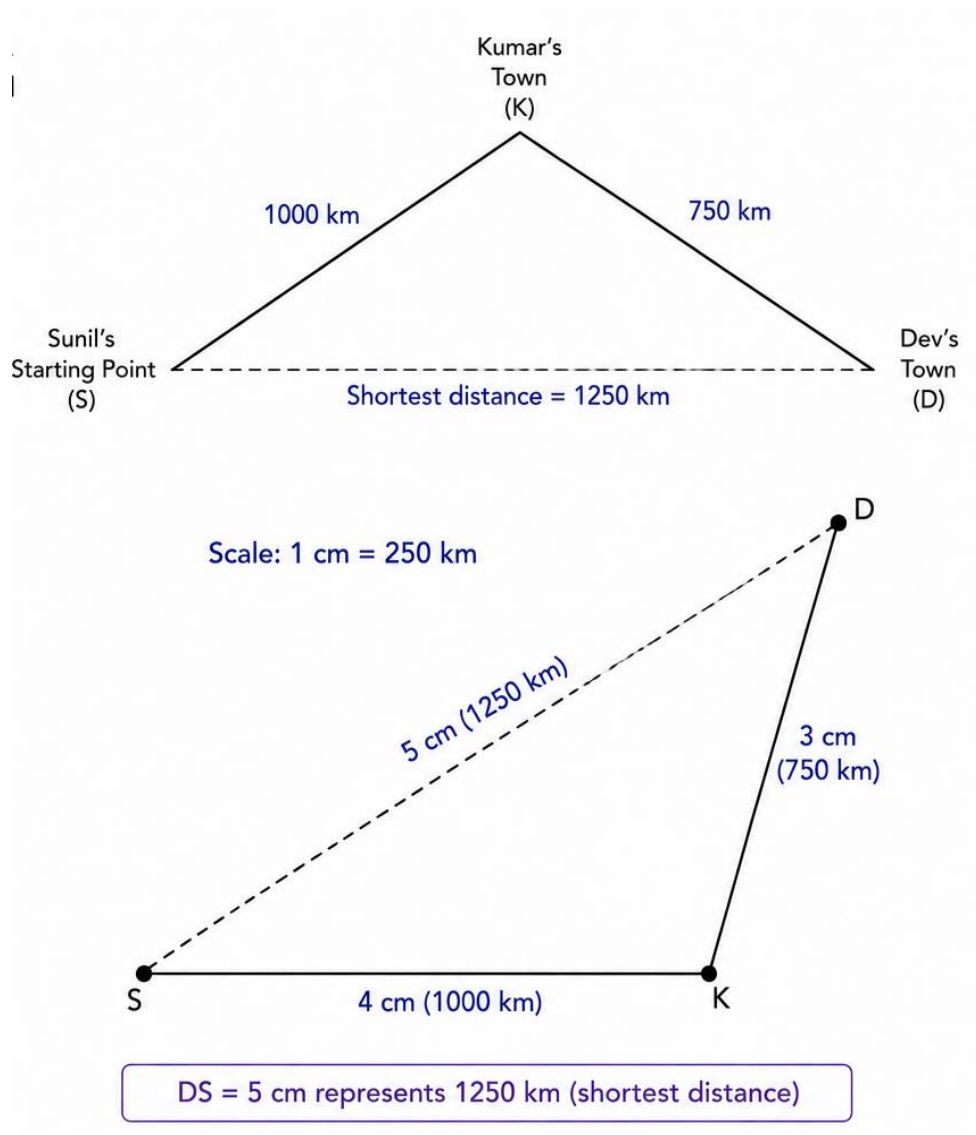
The three journeys represent three sides joining three locations, so they form a closed figure (triangle).

(b) Using the triangle inequality:

$$1000 - 750 < x < 1000 + 750$$

$$250 < x < 1750$$

(c)



68. a) Identify the type of triangle.

Right-angled triangle

b) Give reason for your answer.

Using the Pythagoras theorem:

$$6^2 + 8^2 = 10^2$$

$$36 + 64 = 100$$

$$100 = 100$$

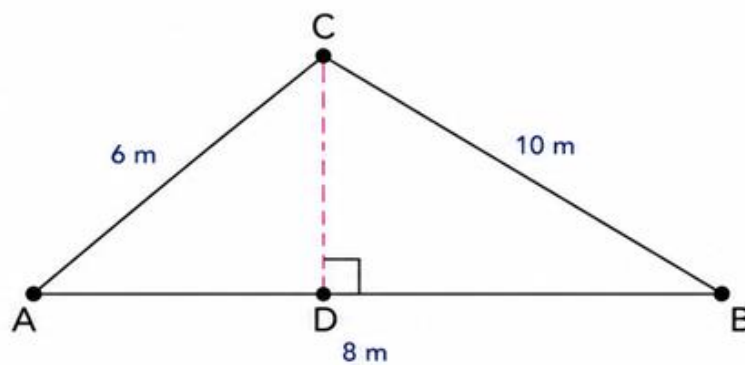
Since the square of the longest side equals the sum of the squares of the other two sides, the triangle is a right-angled triangle.

c) Write one advantage of triangular shapes in construction work.

Advantage:

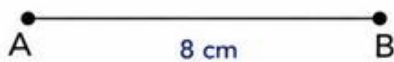
Triangles are very strong and rigid structures. They do not change shape easily when force is applied, so they provide stability in constructions such as tents, bridges, roofs, and towers.

d)



Construction Steps (Scale 1 cm = 1 m)

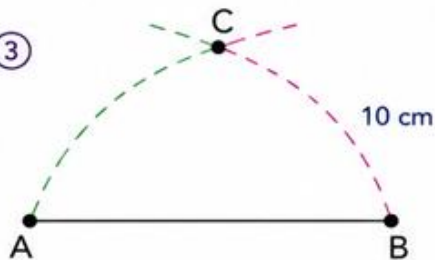
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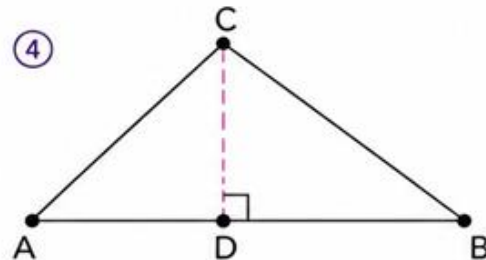
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③



④



Chapter – 08 - Working with Fraction

I.

1. b. addition

2. a. multiplication

3. b. $1\frac{3}{5}$

4. c. $\frac{1}{4}$

5. c. length $\times$ breadth

II.

6. Product

7. One

8. Multiplication

9. Zero

10. Square feet

III.

11. a. 4×4

b. 5×3

c. product

d. quotient

IV.

$$12. 6 \times \frac{2}{5}$$

$$= \frac{6}{1} \times \frac{2}{5}$$

$$= \frac{12}{5} = 2\frac{2}{5}$$

$$13. 5 \times \frac{12}{9}$$

$$= \frac{5}{1} \times \frac{12}{9}$$

$$= \frac{60}{9} = 6\frac{6}{9}$$

$$14. \frac{7}{8} \times 4$$

$$= \frac{7}{8} \times \frac{4}{1}$$

$$= \frac{28}{8} = 3 \frac{4}{8}$$

$$15. \frac{13}{5} \times 2$$

$$= \frac{13}{5} \times \frac{2}{1}$$

$$= \frac{26}{5} = 2 \frac{4}{9}$$

$$16. 11 \times \frac{2}{9}$$

$$= \frac{11}{1} \times \frac{2}{9}$$

$$= \frac{22}{9} = 2 \frac{4}{9}$$

$$17. 14 \times \frac{5}{13}$$

$$= \frac{14}{1} \times \frac{5}{13}$$

$$= \frac{70}{13} = 5 \frac{5}{13}$$

V.

$$18. \frac{5}{16} \times \frac{2}{3}$$

$$= \frac{5}{9}$$

$$19. \frac{3}{4} \times \frac{2}{5}$$

$$= \frac{3}{10}$$

$$20. \frac{7}{8} \times \frac{1}{5}$$

$$= \frac{7}{40}$$

$$21. \frac{4}{9} \times \frac{2}{3}$$

$$= \frac{8}{7}$$

$$22. \frac{1}{6} \times \frac{1}{4}$$

$$= \frac{1}{24}$$

$$23. \frac{12}{15} \div 3$$

$$= \frac{12}{15} \times \frac{1}{3}$$

$$= \frac{4}{15}$$

VI.

$$24. 4 \div \frac{1}{8}$$

$$= \frac{4}{1} \times \frac{8}{1}$$

$$= 32$$

$$25. 15 \div \frac{2}{5}$$

$$= \frac{15}{1} \times \frac{5}{2}$$

$$= \frac{75}{2}$$

$$26. 21 \div \frac{7}{3}$$

$$= \frac{21}{1} \times \frac{3}{7}$$

$$= \frac{63}{9}$$

$$= 7$$

$$27. 12 \div \frac{3}{60}$$

$$= \frac{15}{1} \times \frac{60}{3}$$

$$= 240$$

$$28. 65 \div \frac{2}{13}$$

$$= \frac{65}{1} \times \frac{13}{2}$$

$$= \frac{845}{2}$$

VII.

$$29. \frac{6}{15} \div \frac{5}{12}$$

$$= \frac{6}{15} \times \frac{12}{5}$$

$$= \frac{24}{25}$$

$$30. \frac{5}{25} \div \frac{25}{5}$$

$$= \frac{5}{25} \times \frac{5}{25}$$

$$= \frac{1}{25}$$

$$31. \frac{3}{9} \div \frac{3}{9}$$

$$= \frac{3}{9} \times \frac{9}{3}$$

$$= 1$$

$$32. \frac{25}{20} \div \frac{5}{4}$$

$$\frac{25}{20} \times \frac{4}{5}$$

$$= 1$$

$$33. \frac{22}{66} \div \frac{22}{11}$$

$$= \frac{22}{66} \times \frac{11}{22}$$

$$= \frac{1}{6}$$

$$\text{VIII. } 34. \frac{2}{15} \times \frac{10}{3}$$

$$= \frac{20}{45} = \frac{4}{9}$$

$$35. \frac{5}{6} \times \frac{4}{10}$$

$$= \frac{20}{60} = \frac{1}{3}$$

$$36. \frac{3}{4} \times \frac{9}{9}$$

$$= \frac{27}{36} = \frac{3}{4}$$

$$37. \frac{12}{25} \times \frac{5}{2}$$

$$= \frac{60}{50} = \frac{6}{5}$$

$$38. \frac{7}{9} \times \frac{8}{4}$$

$$= \frac{56}{36} = \frac{28}{18} = \frac{14}{9}$$

IX.

$$39. 1 \text{ hour} = \text{Rs } 20$$

$$1\frac{1}{2} \text{ hour} = ?$$

$$= 1\frac{1}{2} \times 20$$

$$= \frac{3}{2} \times 20$$

$$= \text{Rs.}30$$

$$40. \text{ Length of the rectangular plot} = \frac{12}{5} \text{ m}$$

$$\text{Breadth of the rectangular plot} = \frac{25}{24} \text{ m.}$$

$$\text{Area of the Plot} = \text{Length} \times \text{Breadth}$$

$$= \frac{12}{5} \times \frac{25}{24}$$

$$\text{Area} = \frac{5}{2} \text{ Square meter.}$$

$$41. \text{ Water bottles distributed by Janya} = \frac{1}{2} \text{ litre.}$$

$$\text{Friends} = 4$$

$$= \frac{1}{2} \div 4$$

$$= \frac{1}{2} \times \frac{1}{4}$$

$$\text{Amount of water distributed to each} = \frac{1}{8} \text{ litre}$$

$$42. \text{ Number of boys in a school} = \frac{4}{5}$$

$$\text{Number of girls} = 200$$

$$= \frac{4}{5} \times 200$$

$$= 160 \text{ Boys}$$

$$\text{Total number of students} = \text{Girls} + \text{Boys}$$

$$= 200 + 160 = 360$$

$$43. \text{ Number of pages in a book} = 50$$

$$\text{Number pages Neha read} = \frac{2}{5}$$

$$= 50 \times \frac{2}{5}$$

$$= 20 \text{ Pages}$$

X.

$$\begin{aligned} 44. & \left(1 \div \frac{1}{2}\right) \times \left(1 \div \frac{1}{3}\right) \times \left(1 \div \frac{1}{2}\right) \\ &= \left(1 \times \frac{2}{1}\right) \times \left(1 \times \frac{3}{1}\right) \times \left(1 \times \frac{2}{1}\right) \\ &= 2 \times 3 \times 2 \\ &= 12 \end{aligned}$$

$$\begin{aligned} 45. & \left(2 \div \frac{1}{3}\right) \times \left(2 \div \frac{1}{4}\right) \times \left(1 \div \frac{1}{2}\right) \\ &= \left(1 \times \frac{3}{1}\right) \times \left(1 \times \frac{4}{1}\right) \times \left(1 \times \frac{2}{1}\right) \\ &= 6 \times 8 \times 10 \\ &= 480 \end{aligned}$$

$$\begin{aligned} 46. & \left(3 \div \frac{1}{3}\right) \times \left(2 \div \frac{1}{4}\right) \times \left(1 \div \frac{1}{2}\right) \\ &= \left(1 \times \frac{3}{1}\right) \times \left(1 \times \frac{4}{1}\right) \times \left(1 \times \frac{2}{1}\right) \\ &= 6 \times 8 \times 10 \\ &= 480 \end{aligned}$$

$$47. \text{ a. } \frac{2}{5} = \frac{3}{10} \times \frac{2}{5} = \frac{6}{50} = \frac{3}{25} \quad \text{Part}$$

$$\text{b. } \frac{3}{4} = \frac{3}{4} \times \frac{3}{10} = \frac{9}{40} \quad \text{Part}$$

$$\text{c. } \frac{1}{3} = \frac{1}{3} \times \frac{3}{10} = \frac{9}{40} \quad \text{Part}$$

$$\text{d. } \frac{2}{3} = \frac{2}{3} \times \frac{3}{10} = \frac{1}{5} \quad \text{Part}$$

48. Monthly income = Rs. 30,000

$$\text{House grocery} = \frac{1}{10} \times 30000 = \text{Rs. 3000}$$

$$\text{Medicine, Vegetables, Milk} = \frac{2}{10} \times 30000 = \text{Rs. 6000}$$

$$\text{Children school fees} = \frac{3}{10} \times 30000 = \text{Rs. 9000}$$

$$\text{For his expenditure} = \frac{4}{10} \times 30000 = \text{Rs. 12000}$$

Money left for his expences = Rs. 12,000

XI.

$$49. 1 \div \frac{1}{6} = 1 \times \frac{6}{1} = 6$$

$$1 \div \frac{1}{10} = 1 \times \frac{10}{1} = 10$$

$$1 \div \frac{1}{9} = 1 \times \frac{9}{1} = 9$$

$$1 \div \frac{1}{2} = 1 \times \frac{2}{1} = 2$$

$$\text{Sum} = 6 + 10 + 13 + 9 + 2$$

$$= \text{Rs.}40$$

50.



$$\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$$



$$\frac{1}{4} \times \frac{3}{4} = \frac{3}{16}$$

PART – 2

Chapter – 01 - Geometric Twins

I.

1. c. both length of the arms and angle between them
2. d. 
3. c. shape and size
4. b. If two squares have equal sides, they are congruent.
5. b . 60°
6. d. $\cong$
7. d. AAA
8. a. equal
9. b. SAS
10. b. triangles are geometric twins
11. a. SSS
12. c. two angles and included sides
13. c. PR
14. c. radius
15. b. 5 cm

II.

16. 4 sides
17. Same shape
18. Equal radius
19. Congruent rectangle.

III.

20. sides
21. Congruent figures
22. hypotenuse
23. size
24. $\triangle DEF$
25. TU
26. 5 cm
27. $\angle X$
28. 70°

IV.

- 29. True
- 30. False
- 31. True
- 32. False
- 33. False

V.34.

A	B
a	All three sides are equal
b	Two sides of a triangle are equal
c	Same shape, may be different size
d	Same radius
e	Same shape and size

VI.

35. Congruent Figures:

Congruent figures are figures that have the same shape and size. They coincide exactly when one is placed over the other.

36. SSS Criteria:

If the three sides of one triangle are equal in length to the corresponding three sides of another triangle, then the two triangles are congruent.

37. RHS Criteria:

If the hypotenuse and one side of a right-angled triangle are equal to the hypotenuse and the corresponding side of another right-angled triangle, then the two triangles are congruent.

38. SAS Criteria:

If two sides and the included angle of one triangle are equal to the corresponding two sides and the included angle of another triangle, then the two triangles are congruent.

39. ASA Criteria:

If two angles and the included side of one triangle are equal to the corresponding two angles and the included side of another triangle, then the two triangles are congruent.

40. Congruent Circles:

Two or more circles having the same radius are called congruent circles.

VII.

41. In a triangle, if two sides are equal, then the triangle is called an **isosceles triangle**.

42. In a triangle, if one angle is more than 90° , then the triangle is called an **obtuse-angled triangle**.

43. If $\triangle ABC \cong \triangle PQR$, then the corresponding vertices are:

$A \leftrightarrow P$

$B \leftrightarrow Q$

$C \leftrightarrow R$

44. Two circles with equal radii.

45. In a right-angled triangle, the side opposite to the right angle is called the **hypotenuse**.

46. We conclude that they are **congruent triangles**.

VIII.

47. The corresponding sides are:

$AB \leftrightarrow DE$

$BC \leftrightarrow EF$

$AC \leftrightarrow DF$

48.

1. Congruent figures have the same shape and size.

2. They have equal area.

49. No. Because two figures having the same shape may have different sizes.

50. $PQ = 6$ cm

$QR = 8$ cm

$PR = 10$ cm

51. In $\triangle ABQ$ and $\triangle ACQ$:

$AB = AC$, $BQ = QC$ and $AQ = AQ$

$\therefore \triangle ABQ \cong \triangle ACQ$

52. In $\triangle PQR$ and $\triangle XYZ$:

$PQ = XY = 5$ cm

$PR = XZ = 8$ cm

$QR = YZ = 7$ cm

Therefore, $\triangle PQR \cong \triangle XYZ$ by **SSS criterion**.

53. The statement is false because all equilateral triangles have the same shape but may have different sizes.

54. In two right-angled triangles, the hypotenuse is 13 cm and one corresponding side is 5 cm each.

Therefore, the two triangles are congruent according to the **RHS Congruence Criterion**.

55. In $\triangle ACB$ and $\triangle ACD$:

$AB = CD$ (Opposite sides of a rectangle)

$BC = DA$ (Opposite sides of a rectangle)

$AC = AC$ (Common side)

$\therefore \triangle ACB \cong \triangle ACD$ (SSS Criterion)

IX.

56.

$PQ \leftrightarrow AB$

$PR \leftrightarrow AC$

$\angle Q \leftrightarrow \angle B$

57. In the figure, consider $\triangle AOB$ and $\triangle DOC$.

$AO = OD = 5 \text{ cm}$

$BO = OC = 3 \text{ cm}$

$\angle AOB = \angle COD$ (Vertically opposite angles)

$\therefore \triangle AOB \cong \triangle DCO$ (SAS Criterion)

58. In the figure, consider $\triangle PQR$ and $\triangle ABC$.

$PQ = AB = 5 \text{ cm}$

$\angle P = \angle A = 40^\circ$

$\angle Q = \angle B = 70^\circ$

$\therefore \triangle PQR \cong \triangle ABC$ (ASA Criterion)

59. In $\triangle ABC$, $AD \perp BC$.

Consider $\triangle ABD$ and $\triangle ACD$.

$BD = DC$ (AD bisects BC)

$AD = AD$ (Common side)

$\angle ADB = \angle ADC = 90^\circ$ ($AD \perp BC$)

$\therefore \triangle ABD \cong \triangle ACD$ (SAS Criterion)

60. In $\triangle ABC$ and $\triangle PQR$:

$AB = PQ$

$AC = PR$

$\angle B = \angle Q = 90^\circ$ (Given)

$\therefore \triangle ABC \cong \triangle PQR$ (RHS Criterion)

(AC and PR are the hypotenuses.)

61. Corresponding sides:

$AB \leftrightarrow QP$

$BC \leftrightarrow QR$

$$AC \leftrightarrow PR$$

Corresponding angles:

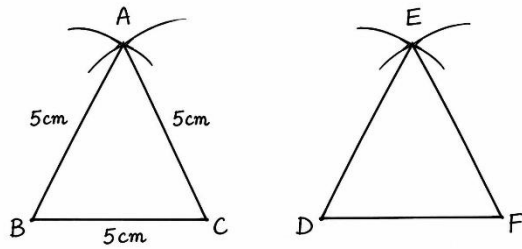
$$\angle A \leftrightarrow \angle P$$

$$\angle B \leftrightarrow \angle Q$$

$$\angle C \leftrightarrow \angle R$$

X.

62.



63. In the figure, consider $\triangle ABC$ and $\triangle BCD$.

$$AB = BD \text{ (Given)}$$

$$\angle ABC = \angle DBC \text{ (Given)}$$

$$BC = BC \text{ (Common side)}$$

$$\therefore \triangle ABC \cong \triangle BCD \text{ (SAS Criterion)}$$

64. In $\triangle AOB$ and $\triangle COD$:

$$AB = CD \text{ (Given)}$$

$$AO = OD \text{ (O is the midpoint of BD)}$$

$$BO = OC \text{ (O is the midpoint of AC)}$$

$$\therefore \triangle AOB \cong \triangle COD \text{ (SSS Criterion)}$$

65.

$$\text{a) } BC = DC$$

$$\text{b) } \angle BCA = \angle DCA$$

$$\text{c) } \angle ABD = \angle ADC$$

$$\text{d) } AC \text{ bisects } \angle BAD \text{ and } \angle BCD.$$

66.

a) yes

b) yes,

In $\triangle PQR$ and $\triangle PSR$,

$PQ = PS$ (Given)

$\angle QPR = \angle SPR$ (Given)

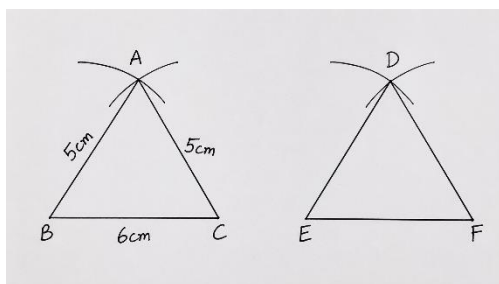
$PR = PR$ (Common side)

$\therefore \triangle PQR \cong \triangle PSR$ (**SAS Criterion**)

Therefore,

$QR = SR$ (**CPCT**)

67.



68. In $\triangle AOB$ and $\triangle DOE$:

$\angle C = 50^\circ$ (given)

$\angle DOC = 70^\circ$ (CPCT)

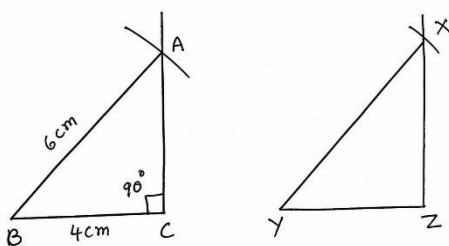
$\angle D = 180^\circ - (70^\circ + 50^\circ)$

$\angle D = 60^\circ$

($\because$ Sum of interior angles of a triangle = 180°)

XI.

69.



70. In $\triangle AOB$ and $\triangle COD$

$AO = OD$ (radii of a circle)

$BO = OC$ (radii of a circle)

$\angle AOB = \angle COD$ (vertically opposite angle)

$\therefore \triangle AOB \cong \triangle COD$ (SAS)

$\angle A = (180-120)/2 = 60/2$

$= 30^\circ$ ($\because$ opposite angles of equal sides)

71. a) $AB = DE$

$AC = DF$

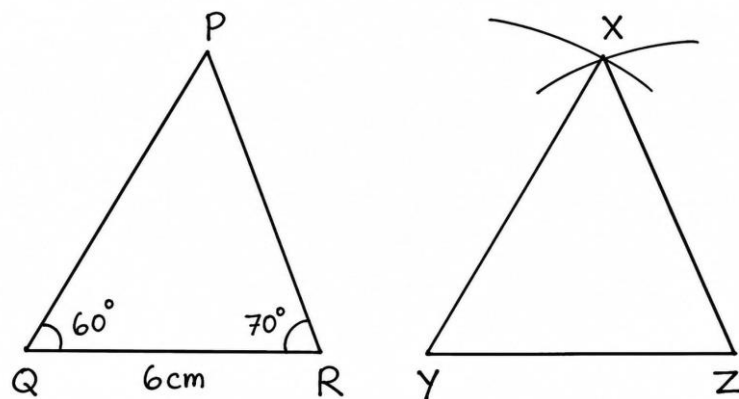
$BC = EF$

b) Yes, $\triangle ABC \cong \triangle DEF$

c) SSS Congruence Criterion

d) The triangles are called **geometric twins** because they have the **same shape and the same size**. When one triangle is placed over the other, they coincide exactly.

72.



Chapter – 02 - Operation with Integers

I.

1. c. Integers

2. b. -17, -8

3. b. +46

4. c. $-3 \times 2 = -6$

5. b. +96

6. c. -3

7. d. -60

8. c. 0

9. c. Negative $\times$ Negative = Positive

10. c. Associative

11. b. $0 \div 5 = 0$

12. c. $-7 \times (-2)$

13. c. -110

14. b. -, +

II.

15. Negative

16. Negative

17. +15

18. Positive integer

19. +12

III.

20. Commutative

21. Negative

22. Negative integers

23. -17

24. 0

25. -7

26. +9

IV.

27.

a)	3. Closure Property
b)	1. Commutative Property
c)	4. Associative Property
d)	2. Distributive Property

V.

28. False

29. False

30. True

31. True

32. False

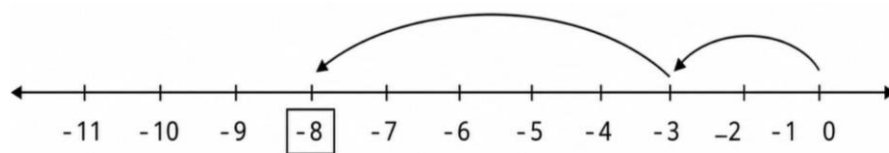
33. True

VI.

34. $-20 < -5 < 5 < 30 < 80$

35. -40, -10, +10, +40

36.



37. a) $-15 + (+19)$

$= +4$

b) $-8 - (-10)$

$= -8 + (+10)$

$= +2$

38. a) $(-5) \times (-1)$

$= 5$

b) -7×15

$= -105$

39. Initial position of the submarine = -120 m

Distance it raises = +45 m

∴ Present position of the submarine

$$= -120 + (+45)$$

$$= -75 \text{ m}$$

40. Initial temperature on the thermometer = 5°C

Change in temperature = -11°C

∴ New temperature

$$= 5^{\circ}\text{C} + (-11^{\circ}\text{C})$$

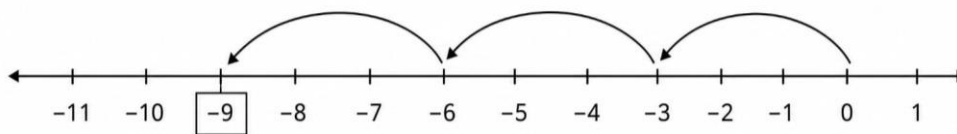
$$= -6^{\circ}\text{C}$$

41. $42 \times (-18) \times (-6)$

$$= -756 \times (-6)$$

$$= +4536$$

42.



$$\therefore 3 \times (-3) = -9$$

43. Position of one place = +65 m

Position of another place = -28 m

∴ Difference in height of two places

$$= +65 - (-28)$$

$$= +65 + 28$$

$$= 93 \text{ m}$$

44. Two integers = -2, 2

Their difference

$$= -2 - 2$$

$$= -4$$

45. Temperature of the city in the first day = -5°C

Change in temperature each day (decrease) = -7°C

$\therefore$ Change in temperature after 3 days

$$= -7 \times 3$$

$$= -21^{\circ}$$

46. The distance the submarine goes down per minute = -12 m

$\therefore$ Total distance it goes down in 5 minutes

$$= -12 \times 5$$

$$= -60\text{ m}$$

$\therefore$ After 5 minutes, the submarine is 60 m below the sea level.

47. The amount lost by the shopkeeper on each toy sold = $-\text{₹}8$

$\therefore$ Total loss incurred by him on selling 6 toys

$$= -\text{₹}8 \times 6$$

$$= -\text{₹}48$$

48. $-8 \times 3 = -24$

$$6 \times (-4) = -24$$

49. Negative integer = -8

Positive integer = $+3$

$\therefore$ Their difference

$$= -8 - (+3)$$

$$= -11$$

50. Not possible because the sum of any two negative integers is always negative.

VII.

51. Let the integers be $-1, 2, -3$

LHS

$$-1 \times (2 \times (-3))$$

$$= -1 \times (-6)$$

$$= +6$$

$\therefore$ LHS = RHS

RHS

$$(-1 \times 2) \times (-3)$$

$$= -2 \times (-3)$$

$$= +6$$

$$\therefore -1 \times (2 \times (-3)) = (-1 \times 2) \times (-3)$$

$\therefore$ Multiplication of integers follows the Associative Property.

52. The amount of water in a tank = 700 l

The amount of water leaking per hour = 8 l

$$\therefore \text{Total amount of water leaking in 10 hours} = (-8) \times 10 = -80 \text{ l}$$

$$\therefore \text{Amount of water remaining after 10 hours in the tank} = 700 \text{ l} + (-80 \text{ l}) = 620 \text{ l}$$

$$53. (-5) \times (-2) \times (+5) \times (-8)$$

$$= +10 \times (+5) \times (-8)$$

$$= 50 \times (-8)$$

$$= -400$$

54. The integer whose product with -1 is:

a) +2

$$x \times (-1) = +2$$

$$x = +2 \div (-1)$$

$$x = -2$$

b) -54

$$x \times (-1) = -54$$

$$x = -54 \div (-1)$$

$$x = 54$$

55. Properties of Multiplication

1. Commutative Property

$$\text{Eg: } -3 \times 2 = 2 \times (-3) = -6$$

2. Associative Property

$$\text{Eg: } [-2 \times (+3)] \times 4 = -2 \times (+3 \times 4)$$

$$= -24 = -24$$

3. Distributive Property

$$\text{i.e., } 5 \times (-4 + 2) = 5 \times (-4) + 5 \times 2$$

$$-10 = -10$$

56. Rules of Division of Integers

1. When a positive integer is divided by another positive integer, the quotient is positive.

Example: $12 \div 3 = 4$

2. When a negative integer is divided by another negative integer, the quotient is positive.

Example: $(-12) \div (-3) = 4$

3. When a positive integer is divided by a negative integer, the quotient is negative.

Example: $+12 \div (-3) = -4$

57. Beginning temperature of the Science Lab = $+40^{\circ}\text{C}$

Temperature dropping per hour = -6°C

$\therefore$ Total temperature drop in 8 hours

$$= -6 \times 8$$

$$= -48^{\circ}\text{C}$$

$\therefore$ Temperature after 8 hours

$$= +40 + (-48)$$

$$= -8^{\circ}\text{C}$$

$$58. \quad 1) (-8) \div (2) = -4$$

$$2) (8) \div (-2) = -4$$

$$3) (-16) \div (4) = -4$$

59. In a company,

Profit on first day = $+\text{₹}12,000$

Loss on second day = $-\text{₹}8,000$

$\therefore$ Net profit in two days

$$= 12,000 + (-8,000)$$

$$= \text{₹}4,000 \text{ profit}$$

$$60. \quad 54 \times (-14) \div 27$$

$$= -756 \div 27$$

$$= -28$$

$$61. \quad (25 \times (-13)) + (-25 \times 27)$$

$$= 25 \times (-13) + 25 \times (-27)$$

$$= 25 \times [(-13) + (-27)] \quad (\text{Distributive Property})$$

$$= 25 \times (-40)$$

$$= -1000$$

VIII.

62. Let the integers be -2, 3, -4

LHS

RHS

$$-2 \times (3 + (-4))$$

$$(-2 \times 3) + (-2 \times (-4))$$

$$= -2 \times (-1)$$

$$= -6 + 8$$

$$= 2$$

$$= 2$$

$$\therefore \text{LHS} = \text{RHS}$$

$\therefore$ Integers follow the Distributive Property of Multiplication over Addition.

63. Marks awarded for every right answer = +4

Total correct answers given by the participant = 14

$\therefore$ Marks obtained for correct answers

$$= 14 \times (+4)$$

$$= +56$$

Marks deducted for every wrong answer = -2

No. of wrong answers given = 9

$\therefore$ Marks obtained for wrong answers

$$= 9 \times (-2)$$

$$= -18$$

$\therefore$ Total marks obtained by the participant

$$= +56 + (-18)$$

$$= +38$$

64. Let the integers be 4, +3, (-5), (-8)

The expression:

$$4 \times (+3 + (-5)) - (-8)$$

$$= 4 \times (-2) + 8$$

$$= -8 + 8$$

$$= 0$$

65. Amount gained by the shopkeeper when each notebook is sold = ₹25

$\therefore$ Amount gained when 40 notebooks are sold

$$= ₹25 \times 40$$

$$= ₹1000$$

Amount lost for each damaged book = ₹10

∴ Amount lost when 15 damaged books are sold

$$= ₹10 \times 15$$

$$= ₹150$$

$$= ₹(-150)$$

∴ Net profit

$$= ₹1000 + (-150)$$

$$= ₹850$$

66. Cost of rice per kg = ₹40

Weight of rice remaining per kg = 100 g

∴ Weight of rice remaining when 3 kg is sold = 0.3kg

∴ Shopkeeper makes profit = $0.3 \times 40 = ₹12$

67. Let the two integers be x & y.

Their sum is

$$x + y = -13$$

Their product is

$$xy = 36$$

Factors of 36 are:

$$1 \times 36$$

$$2 \times 18$$

$$3 \times 12$$

$$4 \times 9$$

$$6 \times 6$$

Since the product is positive and the sum is negative, the two integers must be negative.

Sum of the factors:

$$-4 + (-9) = -13$$

∴ The integers are -4 and -9.

68. a) If

$$90 - 35 + 16 - 11 + 4 = 64$$

$$-90 + 35 - 16 + 11 - 4$$

$$= -(90 - 35 + 16 - 11 + 4)$$

$$=-(64)$$

$$= -64$$

$$\text{b) If } 123 \times 546 = 67158$$

$$1) -123 \times 546$$

$$= -67158$$

$$2. -123 \times (-546)$$

$$= +67158$$

IX.

69.

-4	-3	-2
+2	0	-11
-7	-6	+4

70.

-6	+3	-9
-2	-9	-1
-4	-6	-2

X.

$$71. [20] + [9] \times [4] = 56$$

$$= 20 + 36$$

$$= 56$$

$$\therefore 20 + (-9) \times (-4)$$

$$= 20 + 36$$

$$= 56$$

72.

$$\text{a) } -14 + (+14) + 1$$

$$= 0 + 1$$

$$= 1$$

$$\text{b) } -81 \div 9$$

$$= -9$$

$$c) -5 + (-7) - 8$$

$$= -12 - 8$$

$$= -20$$

$$d) -25 \times 2$$

$$= -50$$

$$\therefore -50 < -20 < -9 < 1$$

73. The tiles company earns profit by selling each box of designer tiles = ₹15

It incurs loss by selling each damaged tile = ₹7

$\therefore$ Total loss incurred by the company by selling 540 damaged tiles

$$= 540 \times (-7)$$

$$= -3780$$

$\therefore$ No. of designer tile boxes it should sell to neither make loss nor profit

$$= 3780 \div 15$$

$$= 252$$

$\therefore$ Company should sell 252 designer tile boxes.

74. Starting with -32

$$-32 \rightarrow -16 \rightarrow -8 \rightarrow -4 \rightarrow -2 \rightarrow -1$$

-1 is odd.

So,

$$-3 \times (-1) + 1 = 4 \rightarrow 2 \rightarrow 1$$

1 is odd.

$$1 \times (-3) + 1 = -2$$

$$-2 \rightarrow -1$$

$\therefore$ The sequence is:

$$-32 \rightarrow -16 \rightarrow -8 \rightarrow -4 \rightarrow -2 \rightarrow -1 \rightarrow 4 \rightarrow 2 \rightarrow 1 \rightarrow -2 \rightarrow -1 \rightarrow 4 \rightarrow 2$$

Chapter – 03 - Finding Common Ground

I.

1. c. 1, 2, 4

2. d. The prime factors $2 \times 3 \times 3 \times 5$

3. b. 3

4. b. 11×11

5. c. 24

6. a. 1

7. b. 1

8. c. 7

9. a. 15

10. c. 6

11. b. $a \times b$

12. d. 10, 20, 30, 40, 50

13. a. 60

14. b. 1.

15. d. 6

16. c. 3

17. c. $\text{HCF} \times \text{LCM} = \text{Product of the two numbers}$

18. c. Greater than both numbers

19. a. 360

20. c. 18

II.

21.15

22. 13×7

23.19

24. Product of the two numbers

25.360

26. Prime numbers

III.

27. a) 2

b) $1 \times 3 \times 6$

c) Product of the two numbers

d) 6

e) 15

28. Numbers that have only two factors 1 and the number itself are called prime numbers Examples: 2, 3, 5, 7, 11

29. The greatest of the common factors of two or more numbers is called highest common factor HCF

30. Numbers that have more than two factors are called composite numbers one is neither Prime nor composite

Examples : 4 ,6, 8 ,9, 10.....

31. The smallest among the common multiples of two or more numbers is called the least common multiple LCM of those numbers

32. $HCF \times LCM = \text{Product of the two numbers}$

33. We have to find HCF of 48 and 72

$$48 = 2 \times 2 \times 2 \times 2 \times 3$$

$$72 = 2 \times 2 \times 2 \times 3 \times 3$$

$$HCF = 2 \times 2 \times 2 \times 3 = 24$$

The maximum capacity of each bag = 24 k. g

34. we have to find HCF of 36 and 48

$$36 = 2 \times 2 \times 3 \times 3$$

$$48 = 2 \times 2 \times 2 \times 2 \times 3$$

$$HCF \text{ of } 36 \text{ and } 48 = 2 \times 2 \times 3 = 12$$

Maximum possible length of each piece = 12 metre

35. . we have to find HCF of 72 and 96

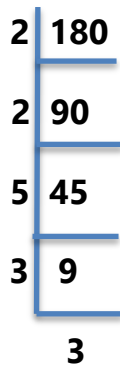
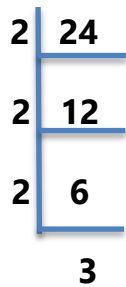
$$72 = 2 \times 2 \times 2 \times 3 \times 3$$

$$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$$

$$\therefore HCF \text{ of } 72 \text{ and } 96 = 24$$

The maximum number of students possible in each group = 24

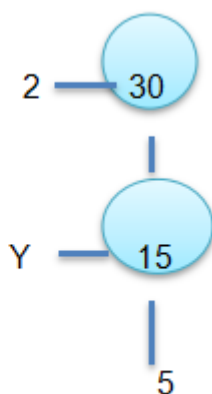
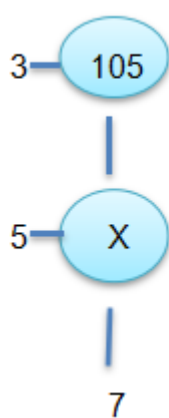
36.



$$24 = 2 \times 2 \times 2 \times 3 \quad 180 = 2 \times 2 \times 3 \times 3 \times 5$$

$$\text{HCF of } 24 \text{ \& } 180 = 2 \times 2 \times 3 = 12$$

37.



$$3 \times X = 105 \quad Y \times 5 = 15$$

$$X = 35 \quad Y = 3$$

38. $.90 = 1, 2, 3, 5, 6, 9, 10, 15, 18, 30, 45, 90$

39. $45 = 3 \times 3 \times 5$

The prime factors of $45 = 3, 5$

40. $360 = 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 18, 20, 24, 30, 36, 45, 60, 72, 90, 120, 180, 360$

41. The factors of 81 are 1, 3, 9, 27, 81
The factors of 243 are 1, 3, 9, 27, 81, 243

The common factors of 81 & 243 are 1, 3, 9, 27, 81
HCF=81

42. HCF=6

Fig2) LCM=12

The prime factors of 24 & 30 are The multiples of 4 & 6

$$24 = 2 \times 2 \times 2 \times 3 \quad 30 = 2 \times 3 \times 5$$

$$\text{HCF} = 6$$

$$4 = 2 \times 2$$

$$6 = 2 \times 3$$

$$\text{LCM OF } 4 \text{ \& } 6 = 2 \times 2 \times 3 = 12$$

43. LCM OF 21&35

$$21=3 \times 7 \quad 35=5 \times 7$$

$$\text{LCM}=3 \times 5 \times 7 = 105$$

44. HCF OF 12, 15 and 30

$$12=2 \times 2 \times 3$$

$$15=3 \times 5$$

$$30=2 \times 3 \times 5$$

$$\text{HCF}=3$$

45. LCM OF 105, 95 and 65

$$105=3 \times 5 \times 7$$

$$95=5 \times 19$$

$$65=5 \times 13$$

$$\text{LCM} = 3 \times 5 \times 7 \times 13 \times 19 = 25935$$

$$46. 18 \times 10 = (2 \times 3 \times 3) \times 2 \times 5$$

$$18 \times 15 = (2 \times 3 \times 3) \times 3 \times 5$$

$$\text{HCF} = 18 \times 5 = 90$$

47. 50	300, 150
3	6, 3
	2, 1

The Largest number that divides both 300 and 150 is 50.

48. HCF X LCM = The product of two numbers

$$26 \times \text{LCM} = 52 \times 182$$

$$\text{LCM} = 52 \times 182 / 26$$

$$\text{LCM} = 2 \times 182 = 364$$

49. $\frac{1}{2} + \frac{2}{3} = 1 \times 3 + 2 \times 2 / 6 = 3 + 4 / 6 = 7 / 6$ The sum we get easily by finding LCM

50. The LCM of two numbers $\frac{1}{3}$ and $\frac{2}{5}$.

3	3, 5
5	1, 5
1	1

$$\text{LCM} = 3 \times 5 = 15.$$

51. Convert length and breadth in cm:

- The length of a rectangular room = $18\text{m } 72\text{cm} = 1872\text{cm}$
- The breadth of a rectangular room = $13\text{m } 20\text{cm} = 1320\text{cm}$

HCF of 1872 and 1320

$$1872 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 13$$

$$1320 = 2 \times 2 \times 2 \times 3 \times 5 \times 11$$

$$\text{HCF} = 2 \times 2 \times 2 \times 3 = 24\text{cm}$$

The length of the edge of each tiles = 24cm.

The minimum number of tiles required =

$$= 1872/24 \times 1320/24 = 78 \times 55 = 4290$$

$$52. 48 = 2 \times 2 \times 2 \times 2 \times 3$$

$$42 = 2 \times 3 \times 7$$

$$60 = 2 \times 3 \times 2 \times 5$$

$$\text{HCF of } 42 \text{ and } 60 = 2 \times 3 = 6$$

The minimum number of books distributed equally among the students = 6.

53. We have to find LCM of 30 and 45

$$30 = 2 \times 5 \times 3 \quad 45 = 3 \times 3 \times 5$$

$$\{\text{LCM}\} = 3 \times 5 \times 2 \times 3 = 90$$

The both trains blew the horn at 90 minutes i.e, 1 hour 30 minutes

54.

- The leap of a dog = 9 feet
- The leap of a Rabbit = 7 feet

For every leap dog will acquire = $9 - 7 = 2$ feet

The distance of a Rabbit = 150 feet

$$\text{Total leap} = 150/2 = 75$$

$\therefore$ Dog catches the rabbit at a distance of 75 leaps

55. LCM OF 9 and 12

$$9 = 3 \times 3$$

$$12 = 3 \times 2 \times 2$$

$$\text{Therefore LCM} = 3 \times 3 \times 2 \times 2 = 36$$

The bell of two temples toll together at 36 minutes

56. Find LCM of 35, 56 and 91

$$35 = 5 \times 7$$

$$56 = 2 \times 2 \times 2 \times 7 \quad 91 = 7 \times 13$$

$$\text{LCM} = 2 \times 2 \times 2 \times 5 \times 7 \times 13 = 3640$$

$$\text{REQUIRED NUMBER} = 3640 + 7 = 3647.$$

VERIFICATION

- $3647 \div 35 \rightarrow \text{REMAINDER } 7$
- $3647 \div 56 \rightarrow \text{REMAINDER } 7$
- $3647 \div 91 \rightarrow \text{REMAINDER } 7$

57. When 228 is divided by the required number, the remainder is 3

$$228 - 3 = 225$$

$\therefore$ 225 is completely divided by the required number

Similarly

When 305 is divided by the required number, the remainder is 5

$$305 - 5 = 300$$

$\therefore$ 300 is completely divided by the required number. Therefore the required number is the HCF OF (225, 300) = 75.

$\therefore$ The required number IS 75.

58. a) 18, 81, 108

$$18 = 2 \times 3 \times 3, \quad 81 = 3 \times 3 \times 3 \times 3, \quad 108 = 2 \times 2 \times 3 \times 3 \times 3$$

$$\text{HCF} = 3 \times 3 = 9$$

b) 15, 25, 125

$$15 = 5 \times 3$$

$$25 = 5 \times 5$$

$$125 = 5 \times 5 \times 5$$

$$\text{HCF} = 5$$

$$59. 72 = 6 \times 12 \text{ and } 144 = 8 \times 18$$

The factors of 72 and 144 are

$$72 = 2 \times 2 \times 2 \times 3 \times 3 \quad 144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$$

No, they have many common factors other than 1.

60. a) 18 and 45

$$18 = 2 \times 3 \times 3$$

$$45 = 5 \times 3 \times 3 \quad \text{HCF} = 9$$

HCF $\times$ LCM = Product of the two numbers

$$9 \times 90 = 18 \times 45$$

$$810 = 810$$

b) 16 and 80

$$16 = 2 \times 2 \times 2 \times 2$$

$$80 = 2 \times 2 \times 2 \times 2 \times 5$$

$$\text{HCF} = 16$$

$$\text{LCM} = 80$$

$$\{\text{HCF}\} \times \{\text{LCM}\} = 16 \times 80$$

$$1280 = 1280$$

61.

NUMBERS	FACTORS	MULTIPLES
1) 10, 20	10 = 1, 2, 5, 10 20 = 1, 2, 4, 5, 10, 20	10 = 10, 20, 30, 40, 20 = 20, 40, 60, 80,
2) 12, 32	12 = 1, 2, 3, 4, 6, 12 32 = 1, 2, 4, 8, 16, 32	12 = 12, 24, 36, 48, 32 = 32, 64, 96, 128,
3) 15, 25	15 = 1, 3, 5, 15 25 = 1, 5, 25	15 = 15, 30, 45, 60, 25 = 25, 50, 75, 100,
4) 18, 48	18 = 1, 2, 3, 6, 9, 18 48 = 1, 2, 4, 6, 8, 12,	18 = 18, 36, 54, 72, 48 = 48, 96, 144, 192,

62.

NUMBERS	HCF	LCM
2, 3, 5	1	30
6, 12, 18	6	36
15, 30, 45	15	90
4, 16, 80	4	80
11, 33, 44	11	132

63. In a school 8th, 9th and 10th students are 144, 180 and 216 respectively. The maximum number of equal students that can be placed in each Group

$$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \quad 180 = 2 \times 2 \times 3 \times 3 \times 5$$

$$216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$$

$$\text{Common factors} = 2 \times 2 \times 3 \times 2 = 4 \times 9 = 36$$

∴ In each group there are 36 students..

$$64. 150 - 6 = 144$$

$$187 - 7 = 180$$

$$203 - 11 = 192$$

The HCF OF 144, 180 and 192 is

$$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \quad 180 = 2 \times 2 \times 3 \times 3 \times 5 \quad 192 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$$

$$\text{HCF} = 2 \times 2 \times 3 = 12$$

∴ THE REQUIRED BIG NUMBER IS 12.

65. Deepa takes 36 minutes to make one complete round around a circular sports field

.Roopa takes 15 minutes to make one complete round around a circular sports field.

We need to find LCM OF

$$36 = 2 \times 2 \times 3 \times 3 \quad 15 = 3 \times 5$$

$$\text{LCM} = 3 \times 2 \times 2 \times 3 \times 5 = 180 \text{ MINUTES}$$

If, Deepa and Roopa start at the same time, they will meet again at the some point after 180 minutes.

66. Prime factorization by Division method

a. 64

b. 104

c. 320

d. 125

$$\begin{array}{r} \text{a. } 2 \overline{) 64} \\ 2 \overline{) 32} \\ 2 \overline{) 16} \\ 2 \overline{) 8} \\ 2 \overline{) 4} \\ 2 \end{array}$$

$$\begin{array}{r} \text{b. } 2 \overline{) 104} \\ 2 \overline{) 52} \\ 2 \overline{) 26} \\ 13 \end{array}$$

$$\begin{array}{r} \text{c. } 2 \overline{) 320} \\ 2 \overline{) 160} \\ 2 \overline{) 80} \\ 2 \overline{) 40} \\ 2 \overline{) 20} \\ 2 \overline{) 10} \\ 5 \end{array}$$

$$\begin{array}{r} \text{d. } 5 \overline{) 125} \\ 5 \overline{) 25} \\ 5 \overline{) 5} \\ 1 \end{array}$$

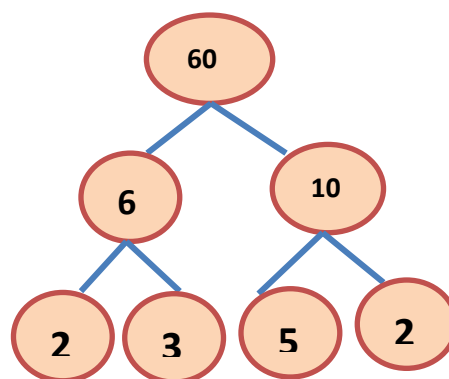
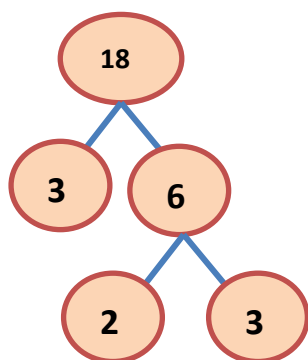
a. $64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

b. 104: $104 = 2 \times 2 \times 2 \times 13$

c. 320: $320 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 5$

d. 125: $125 = 5 \times 5 \times 5$

67.



68.

- The HCF OF 6 and 18 = 6
- The HCF OF 7 and 21 = 7
- The HCF OF 8 and 24 = 8
- The HCF OF 9 and 27 = 9

When one number is a factor of another, we get pairs of numbers that follow a specific mathematical property. In mathematics, this characteristic can be generalized as the Law of Factors and Multiples or the Rule of Divisibility

69. a. The LCM of 3 and 24 = 24

The LCM of 5 and 20 = 20

The LCM of 7 and 35 = 35

- a. The rule for such numbers can be explained using algebra.
- b. When n is a number, a positive integer can be multiplied by n to write a multiple of the number n . For example: if we take n and $5n$, the L.C.M. (Least Common Multiple) of n and $5n$ will be $5n$.
- c. Algebra can be used to explain the rules of such numbers. When n is a number, a positive integer can be multiplied by n to write a multiple of the number n . For example: if we take n and $5n$, the LCM of n and $5n$ will be $5n$
- d. 2) If two numbers have only 1 as their common factor, then they are co-prime numbers.

70. a. Two consecutive even numbers:

Example: Factors of 12 and 14:

$$12 = 2 \times 2 \times 3$$

$$14 = 2 \times 7$$

HCF of 8 and 10 = 2.

Therefore, every even number is divisible by 2. Hence, there is no other common factor greater than 2.

b) Two consecutive odd numbers:

Example: Factors of 3 and 5:

$$3 = 1, 3$$

$$5 = 1, 5$$

HCF = 1.

HCF of 7 and 9 = 1.

$\therefore$ The HCF of any two consecutive odd numbers is always 1.

$$71. 270 = 2 \times 3 \times 3 \times 3 \times 5 \quad 50 = 2 \times 5 \times 5 \quad \text{HCF} = 2 \times 5 = 10$$

If 270 and 50 are doubled then we get 540 and 100

$$540 = 2 \times 2 \times 3 \times 3 \times 3 \times 5 \quad 100 = 2 \times 2 \times 5 \times 5 \quad \text{HCF} = 2 \times 2 \times 5 = 20$$

When two numbers are doubled, both numbers gain an additional factor of 2.

$\therefore$ Their HCF is also doubled.

72. The number of cattle must be divisible by 3, 5, and 7. The total number of cattle must be less than 200.

Since 3, 5, and 7 are prime numbers, their LCM (Least Common Multiple) is:

$$\text{LCM} = 3 \times 5 \times 7 = 105$$

The number of cattle must be a multiple of 105 (105, 210, 315, ...) Since the total must be less than 200, there were 105 cattle.

Chapter – 04 - Another peek beyond the point

I.

1. b. $\frac{3}{10}$

2. c . 5 Tenths

3. b. 0.43

4. a.100

5. c. 12.3

6. b. 3

7.c.1000g

8. d. 0.09

9 .b. 0.07, 0.707, 0.7

10. a. 0.57

11. b. 2

12. d. 1,0,1

13.a. $\frac{1}{10}$

14. c. 230.2

II.

15. 2

16. 0.123

17. ₹62

18. sum

19. smaller

20. one

21.0.39

22. 3

23. 2.375

24. 3

25.142857

26. 366

27. 400

28. long division

29.1

30. 365.2422

31. Tenths

32. 24.22

III

33.

a) 10

b) 0.4

c) 0.8

d) $2+0.4+0.05+0.006$

e) $\frac{1}{10}$

f) 142857

g) 5500m

h) $\frac{3}{10}$

i) 0.5

j) 53.64

IV.

34. 0.7

35. $\frac{45}{100}$

36. 5 tenths = 0.5

37. 35 hundredths

38. $1.5 \times 6 = 9.0$

39. $0.06 \div 5 = 0.012$

40. $\frac{1}{7} = 0.\overline{142857}$

41. $1 \div 100 = 0.01$ m

42. 1 revolution = 365 days

$4 \times 365 = 1460$ days

43. $100 \div 4 = 25$

V.

$$\begin{aligned} 44.a) \frac{847}{10000} &= \frac{800}{10000} + \frac{40}{10000} + \frac{7}{10000} \\ &= \frac{8}{100} + \frac{4}{1000} + \frac{7}{10000} \end{aligned}$$

Decimal form: $\frac{847}{10000} = 0.0847$

$$\text{b) } \frac{123}{10} = \frac{100}{10} + \frac{20}{10} + \frac{3}{10}$$

$$= 10 + 2 + \frac{3}{10}$$

$$\text{Decimal form: } \frac{123}{10} = 12.3$$

45. speed of the car 12.5 km per litre

Quantity of petrol=7.5litres

$$\therefore \text{ distance covered } = 12.5 \times 7.5 = 93.75$$

46. $2.5 \times 0.4 = 1.0$ Since 1 is a natural number,

Yes, the product is 1, which is a natural number.

$$47. 27.34 \times 6 = 164.04$$

$$\text{b) } 4.23 \times 3.7$$

$$4.23 \times 3.7 = 15.651$$

$$48. \text{ a. } 18 \times 1.2$$

$$18 \times 1.2 = 21.6$$

$$\text{b. } 0.18 \times 0.12$$

$$0.18 \times 0.12 = 0.0216$$

$$49. \text{ a. } 7 \times 0.6$$

$$7 \times 0.6 = 4.2$$

$$\text{(b) } 0.07 \times 0.06$$

$$0.07 \times 0.06 = 0.0042$$

Since, $0.0042 < 1$,

$$50. \text{ a) } \frac{2}{5}$$

$$\frac{2}{5} = 0.4$$

$$\text{b) } \frac{5}{8}$$

$$\frac{5}{8} = 0.625$$

51. a) 15.6×1.2

$15.6 \times 1.2 = 18.72$

b) $18.72 \div 15.6$

$18.72 \div 15.6 = 1.2$

52. Tejus needs 1.65 m of cloth for a shirt

cloth require for 3 shirts $= 1.65 \times 3 = 4.95$

53. Quantity of flour given $= 13.5$ kg

No. of students $= 15$

Quantity of flour each student gets $= 13.5 \div 15 = 0.9$

54. Length of wooden block $= 4$ m

No. of pieces $= 5$

Length of each piece $= 4 \div 5 = 0.8$

55. Quantity of milk consumed by a family $= 1.85$ litres

For 30 days the quantity of milk required $= 1.85 \times 30 = 55.5$ litres

VI.

56. Yes, the product of a decimal and a natural number can be a natural number.

Example: $2.5 \times 4 = 10$

Since 10 is a natural number, the product is a natural number.

57. Greater than both numbers

When both decimals are greater than 1.

Example: $1.5 \times 1.2 = 1.8$

Here, 1.8 is greater than both 1.5 and 1.2.

Less than both numbers

When both decimals are less than 1.

Example: $0.5 \times 0.4 = 0.20$

Here, 0.20 is less than both 0.5 and 0.4.

58. No. It depends on the value of the divisor.

Dividend	Divisor	Quotient
10	0.5	20
10	0.2	50
10	1.5	6.67
10	2.5	4

Hence, If the divisor is less than 1, the quotient is greater than the dividend.

If the divisor is greater than 1, the quotient is less than the dividend.

59. a) $18 \div 5$

$$\frac{18}{5} = \frac{180}{50} = 3.6$$

b) $4827 \div 8$

$$4827 \div 8 = 603.375$$

c) $1217 \div 2$

$$1217 \div 2 = 608.5$$

60. The price of 1 kg of oranges is ₹56.50
the price of 2.250 kg of oranges

$$56.50 \times 2.250 = 56.5 \times 2.25$$

$$\text{Price} = ₹127.125$$

$$\approx ₹127.13$$

Yes Can we write 56.50 as 56.5 and 2.250 as 2.25

Trailing zeros after the decimal point do not change the value.

$$56.50 = 56.5$$

$$2.250 = 2.25$$

Therefore, the product remains the same.

61.

Quantity	Fraction (kg)	Decimal (kg)
50 g	$\frac{50}{1000} = \frac{1}{20}\text{kg}$	0.05 kg
100g	$\frac{100}{1000} = \frac{1}{10}\text{kg}$	0.10 kg
25g	$\frac{25}{1000} = \frac{1}{40}\text{kg}$	0.025 kg
250g	$\frac{250}{1000} = \frac{1}{4}\text{kg}$	0.25 kg

62. Two shops sell the same notebook.

Shop A

$$\text{Price per notebook} = ₹24.50$$

Shop B

$$10 \text{ notebooks cost } ₹245$$

Price per notebook:

$$245 \div 10 = 24.5$$

$$= ₹24.50$$

Comparison

Shop A price = ₹24.50 per notebook

Shop B price = ₹24.50 per notebook

Both shops offer the same price. There is no difference in cost.

VII. 63.

Decimal	$\times 10$	$\times 100$	$\times 1000$
5.7	57	570	5700
23.02	230.2	2302	23020
0.306	3.06	30.6	306
24.67	246.7	2467	24670

64.

Decimal	$\div 10$	$\div 100$	$\div 1000$
18.7	1.87	0.187	0.0187
21.1	2.11	0.211	0.0211
2.146	0.2146	0.02146	0.002146
0.0058	0.00058	0.000058	0.0000058

65. a. $132 \div 4$

$$132 \div 4 = 33$$

b. $13.2 \div 4$

$$13.2 \div 4 = 3.3$$

c. $0.0126 \div 8$

$$0.0126 \div 8 = 0.001575$$

d. $0.126 \div 8$

$$0.126 \div 8 = 0.01575$$

66. a. $24.86 \div 1.2$

$$24.86 \div 1.2 = 20.7167$$

$$20.7167 \text{ (approx.)}$$

b. $5.728 \div 1.52$

$$5.728 \div 1.52 = 3.7684$$

$$3.7684 \text{ (approx.)}$$

67. a. $75.6 \div 3.6$

$$75.6 \div 3.6 = 21$$

b. $7.56 \div 0.36$

$$7.56 \div 0.36 = 21$$

c. $756 \div 0.36$

$$756 \div 0.36 = 2100$$

d. $75.6 \div 360$

$$75.6 \div 360 = 0.21$$

68. a. 82.0×5.4

$$= 442.8$$

or

$$54.0 \times 8.2$$

$$= 442.8$$

b. $45.8 \times 0.2 = 9.16$

c. $20.4 \times 8.5 = 173.4$

d. $40.8 \times 2.5 = 102.0$

$$20.5 \times 4.8 = 98.4$$

$$98.4 < 100$$

69. Cost of rice and sugar

a. Cost of 1 kg rice = ₹ 58.75

Cost of 3 kg rice = $58.75 \times 3.5 = ₹205.625$

(b) Cost of sugar

$46.80 \times 2.25 = ₹105.30$

(c) Total amount paid

$205.625 + 105.30 = ₹310.925$

$= ₹310.93$

70. Profit on 50 notebooks

Cost price per notebook = ₹23.60

Selling price per notebook = ₹30.00

Profit per notebook

$30 - 23.6 = ₹6.4$

Profit on 50 notebooks

$6.4 \times 50 = ₹320$

$= ₹320$

71. A car covers 234.45 km using 12.6 litres of petrol

The distance travelled per litre = $234.45 \div 12.6 = 18.6071$

Now perform long division:

$$\begin{array}{r}
 18.6071... \\
 \hline
 126 \overline{) 2344.5000} \\
 \underline{2268} \quad (126 \times 18) \\
 76.5000 \\
 \underline{0} \quad (126 \times 0) \\
 765.000 \\
 \underline{756} \quad (126 \times 6) \\
 9.000 \\
 \underline{0} \quad (126 \times 0) \\
 90.000 \\
 \underline{0} \quad (126 \times 0) \\
 900.000 \\
 \underline{882} \quad (126 \times 7) \\
 18.000 \\
 \underline{0} \quad (126 \times 0) \\
 180.000 \\
 \underline{126} \quad (126 \times 1) \\
 54.000
 \end{array}$$

Thus,

$$234.45 \div 12.6 = 18.607142857 \dots$$

$$\text{Rounded to 4 decimal places: } 234.45 \div 12.6 = 18.6071$$

Verification:

$$12.6 \times 18.607142857 \approx 234.45$$

So the answer is 18.607142857... (Repeating).

72. Given:

a. $4.5 \times 0.9 = 4.05$

b. $4.5 \times 1.1 = 4.95$

c. $4.5 \times 0.75 = 3.375$

d. $4.5 \times 0.5 = 2.25$

Since 4.5 is common in all products, the product will be greatest when it is multiplied by the largest factor.

$$1.1 > 0.9 > 0.75 > 0.5$$

Therefore, the greatest product is:

b. 4.5×1.1

73. The thickness of one book is 2.4 cm. A shelf is 150 cm long.

a. $150 \div 2.4$

Convert divisor into a whole number:

$$1500 \div 24 = 62.5$$

Since only whole books can be arranged,

b. Space occupied by 62 books:

$$62 \times 2.4 = 148.8 \text{ cm}$$

Remaining space:

$$150 - 148.8 = 1.2 \text{ cm}$$

$$\boxed{1.2 \text{ cm}}$$

Number of books = 62

Remaining space = 1.2 cm

74. Total amount collected:

₹12,875.50

Number of students: 175

Additional contribution per student: ₹12.50

a. $12875.50 \div 175$

Long division:

$$12875.50 \div 175 = 73.5742857 \dots$$

Rounded to two decimal places:

$$\boxed{\text{₹}73.57}$$

b. What is the new total fund collected?

Additional amount collected:

$$175 \times 12.50 = \text{₹}2187.50$$

New total fund:

$$12875.50 + 2187.50$$

$$= \text{₹}15063.00$$

$$\boxed{\text{₹}15,063.00}$$

a. Initial contribution per student = ₹73.57 (approx.)

b. New total fund collected = ₹15,063.00

Chapter – 05 - Connecting the Dots

I.

1.c. Dots

2.c. 4

3.d. 5

4. a. maximum-minimum

5. B. Statistics

II. 6. Mean is obtained by dividing the sum of the values of the data by the number of values.

7. Arranging data and choosing the middle number is called Median.

8. Outliers are values that differ significantly from the rest of the values in the data.

9. Data is represented through pictures to understand them more clearly. This is called Data Visualization.

10. The difference between maximum value and minimum value is called Range.

III.

11. a. Niharika scored high marks in Mathematics.

b. Neha scored low marks in Kannada subject.

12. $145+148+136+150+154+138+140+142 = 1153$

$$\begin{aligned}\text{Mean} &= \frac{\text{Sum of all the values in the data}}{\text{Number of values in the data}} \\ &= \frac{1153}{8} \\ &= 144.125\end{aligned}$$

13. Runs scored by Dhanraj in 10 overs of cricket is 5, 4, 3, 4, 6, 5, 2, 4, 6, 1

1, 2, 3, 4, 4, 4 5, 5, 6, 6

$$\text{Median} = \frac{4+4}{2} = \frac{8}{2} = 4$$

14. a. More groceries were purchased in July

b. They purchased less than 2000 in April

15. a. Kavya's result is 67%.

b. Divya's result is more.

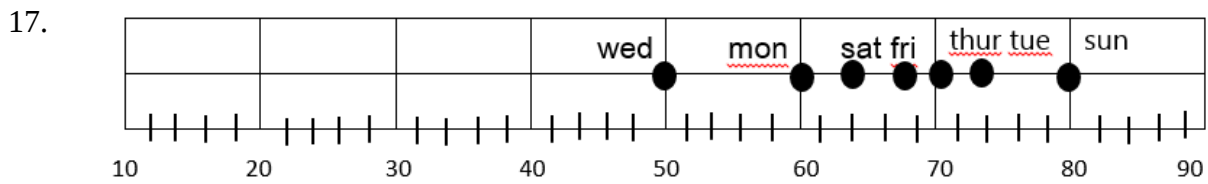
IV.16. Anitha = $20+22+18+25+24=109$

Saritha = $18+15+17+19+20=89$

$$\text{Anitha's Mean} = \frac{109}{5} = 21.8\%$$

$$\text{Saritha's Mean} = \frac{89}{5} = 17.8\%$$

Here Anitha scored more average marks .



18. Scores of Ravi= 75, 76, 77, 78, 79, 80

Scores of Shyama = 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78

Range of Shyama's score = Maximum - minimum

$$= 78 - 68$$

$$= 10$$

19. 12, 18, 24, 28, 34, 37, 44, 46, 49, 54, 58, 64, 74, 78

$$\text{Median} = \frac{44+46}{2} = \frac{90}{2} = 45$$

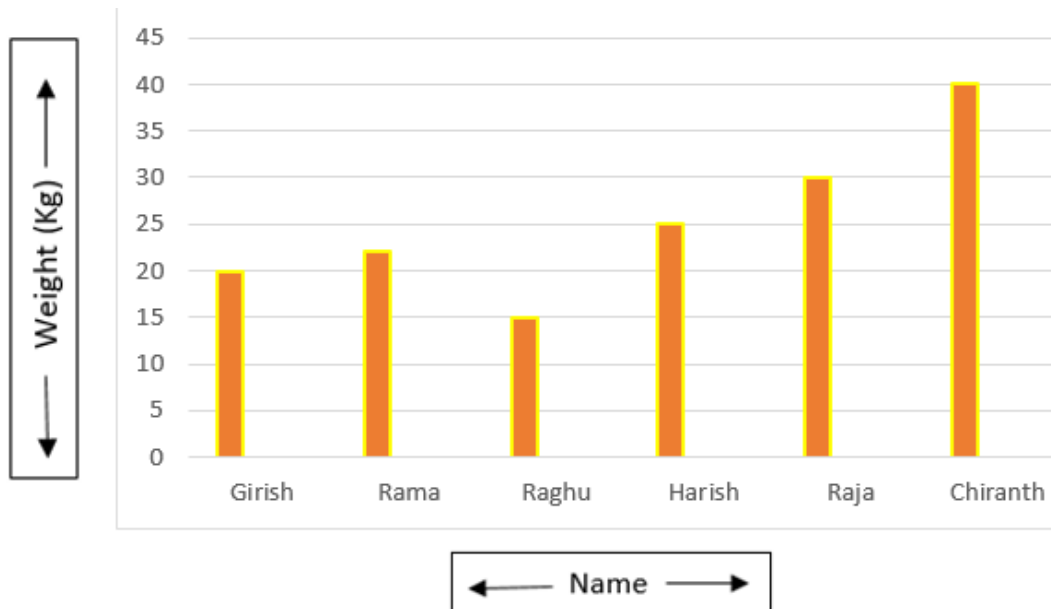
$$\text{Mean} = \frac{12+18+24+28+34+37+44+46+49+54+58+64+74+78}{14} = 44.2\%$$

$$\text{Mean} = \frac{620}{14} = 44.2\%$$

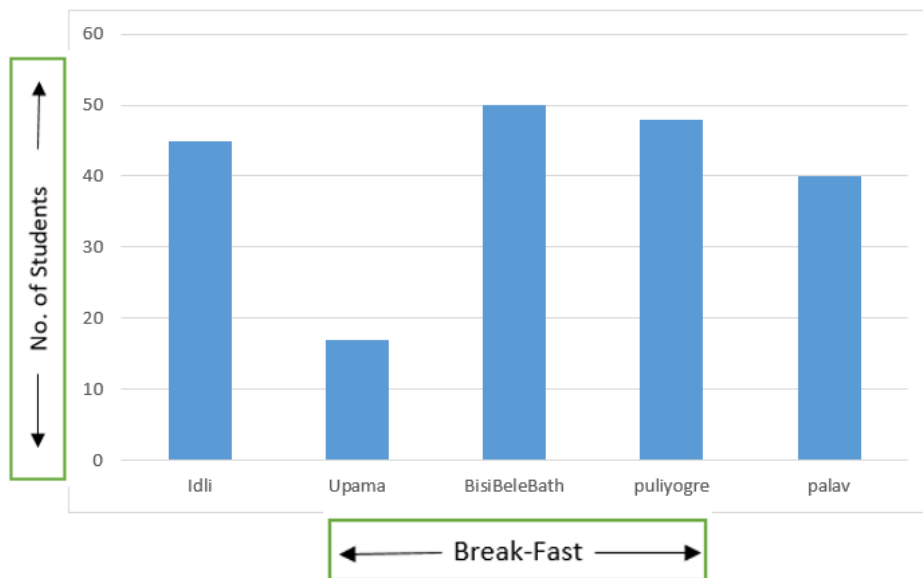
20. To clearly separate data from two places, we use different colors. We call this a grouped bar graph.

Since each group has two bars, we also call it a Double Bar Graph.

V. 21.



22.



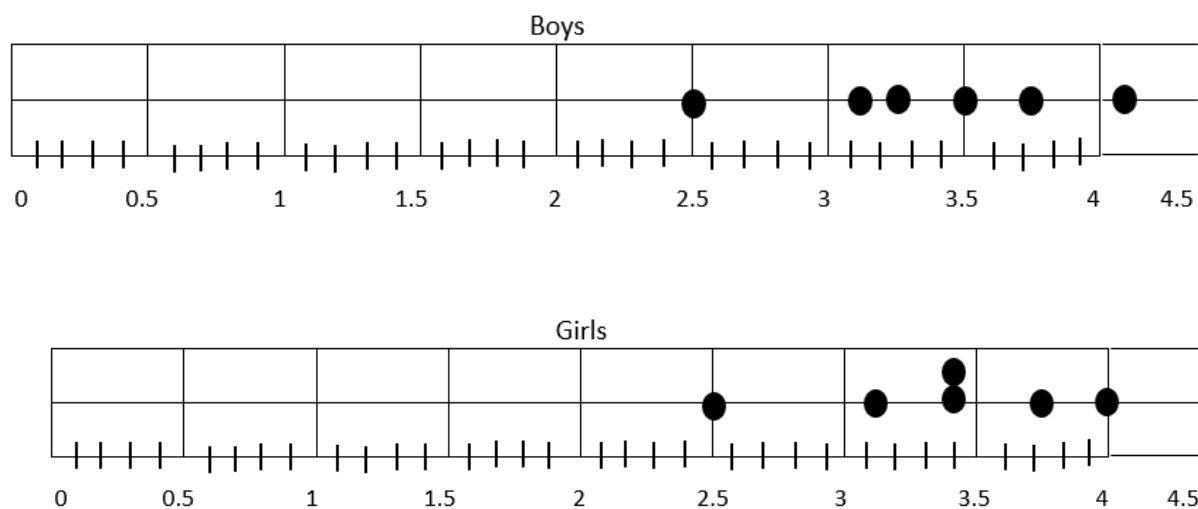
23. a. Maximum students have failed in the year 1993-94.

B .In the year1991-92 200 students have failed.

c. X-axis = 1year=1.5 cm

Y-axis = 50 Students= 1cm

24.



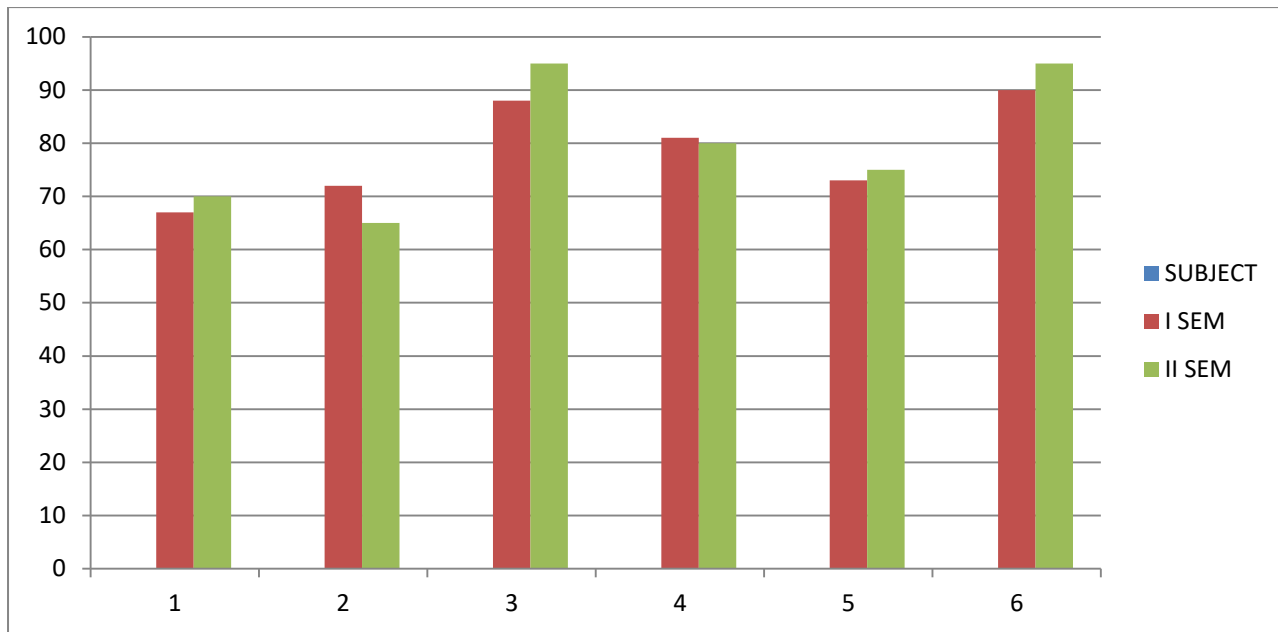
25. a. Mean of player A is 12.5

b. Average of 3 games

c. Average of 3 games is 9%

d. A player is a best Player.

VI. 26.



27. a. Mobile users are more in Davangere district

b. TV users are fewer in Dharwad district

c. In Shivamogga, 600 people use mobile and 520 people use TV

d. There are 100 mobile users in Mangalore

e. X-axis = 1cm=1 Bar

Y-axis = 2 cm = 200 people

28. a. True

b. False

c. False

d. True

29. $10^\circ, 15^\circ, 35^\circ, 40^\circ, 45^\circ, 55^\circ, 15^\circ, 60^\circ$

$$\text{Median} = \frac{40^\circ + 45^\circ}{2}$$

$$= \frac{85^\circ}{2} = 42.5^\circ$$

$$\text{Mean} = \frac{310^\circ}{8} = 38.75$$

Maximum Value = 60°

30. The students themselves create the Double Graph.

Chapter – 06 - Construction & Tiling

I-

1. B) Ruler and compass only
2. A) It acts as a line of symmetry
3. C) More than half the length of x y
4. B) Above and below the line segment
5. C) A calibrated rope or cord
6. C) 8 CM
7. C) All sides and angles are equal
8. C) A rectangle
9. D. 30^0 and 30^0
10. B) 50^0
11. A) 30^0
12. B) Ensuring the corresponding angles are equal
13. A) Supplementary angles
14. B) Unmark ruler and compass
15. B) 6 sides
16. C) 360^0
17. C) Set square
18. C) 6
19. A) 3
20. C) You must use all 7 pieces without overlapping .

II-

21. 90
22. TILES
23. mxn
24. REGULAR
25. EQUAL
26. 5
27. EQUIDISTANT
28. PARALLEL

29. TRANSVERSAL

30. REGULAR POLYGON

III-

31. False

32. True

33. False

34. True

35. True

36. False

37. True

38. True

39. True

40. True

IV.

41. ray that divides an angle into two equal smaller angles is called angle bisector.

42. A pattern of one or more shapes that cover a plane completely without any gaps or overlap is called Tessellation.

43. A line that divides a line segment into two equal parts and intersect it at a 90° right angle?

44. The line that passes through the centres of the circles or arcs, acting as the perfect line of symmetry for the shape.

V.

45. Number of tiles = $\frac{\text{Total area of the floor}}{\text{Area of one tile}}$

46. A Mathematical puzzles made of 7 geometric pieces that can form different figures is called TANGRAM

47. 45°

48. Midpoint.

49. 180° (They are supplementary).

50. (a) (2 X 5) grid

It has two rows and 6 columns.

(b) (7 x 3) grid

It has 7 rows and three columns.

VI.

51. Steps to construct 90° angle are:

- First ,mark a point “O” on the line
- Make two points X and Y at equal distance from O using compass.
- Draw arcs from X and Y above and below the line with equal radius.
- Thus the intersection points define a line passing through O which is the require 90° angle.

52. Regular hexagons can tile the plane without gaps because all three 120° interior angles of regular hexagon meet at a point to make 360° , allowing the hexagons to fit together perfectly.

53. Steps to construct a perpendicular bisector of a line segment

- Mark the line segment XY
- With X as a centre and a radius greater than half of XY ,draw arcs above and below the line.
- With Y as the centre and the same radius draw arcs to intersect the previous arcs.
- Join the points of intersection with a straightedge or ruler.

54. Solution:

Steps of construction:

1. Draw a line segment AB and take a point O on it.
 2. Draw $\angle BOC = 90^\circ$ by previous method.
- Thus, $\angle AOC$ is also 90°
3. Bisect $\angle AOC$. Let OD be the bisector of $\angle AOC$.
- Therefore, $\angle COD = 45^\circ$

Thus, $\angle BOD$ is the required angle of 135° .

$$\angle BOD = \angle BOC + \angle COD = 90^\circ + 45^\circ = 135^\circ$$

55. Because the centres A and B are chosen such that $AX = AY$

and $BX = BY$.using triangle congruence(SSS), it is proved that

- The intersection point O of AB and XY is the midpoint ,and
- $\angle AOX = 90^\circ$
- hence $AB \perp XY$

56. Step to construct

- a) Draw a line segment $AB = 5 \text{ cm}$.
- b) Open the compass to 5 cm with centre A draw an arc.
- c) with the same radius and centre B, draw another Arc intersecting the first Arc call this intersection point C
- d) join AC and BC the resulting triangle ABC is equilateral

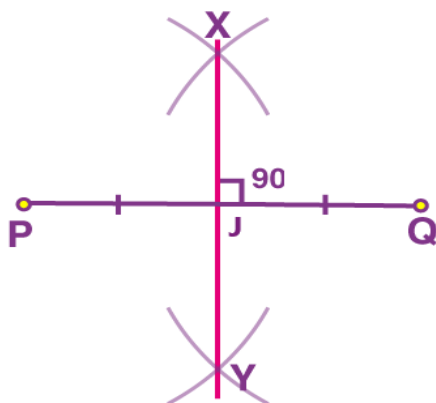
57. In this construction, we shall use the 3-4-5 principle that if the sides of a triangle are in the ratio 3 : 4 : 5, then the angle opposite to the longest side is 90° .

In the figure, the sides AB, BC, and CA are in the ratio 3 : 4 : 5 and the angle B, opposite to the longest side AC, is equal to 90° .

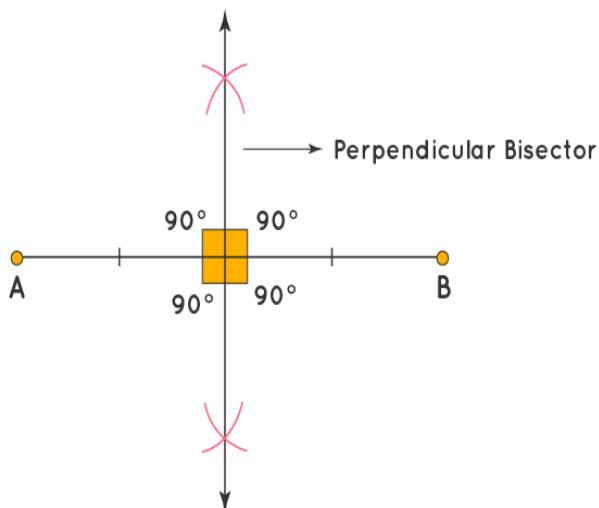
58. Soln:

- Draw a base line segment BC Of length 6 cm.
- At point B, use a compass to draw an arc with a radius of 10 cm (representing AB + AC).
- At point C, draw another arc with the same radius of 10 cm.
- The intersection of these two arcs marks the position of vertex.
- Join A to B and A to C to complete the triangle

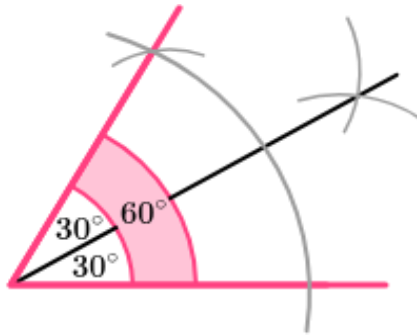
59



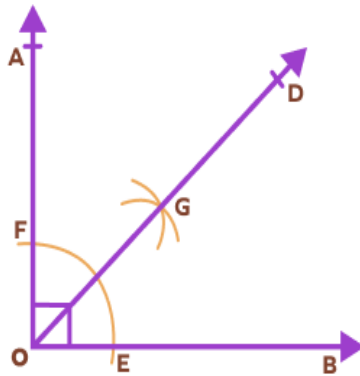
60)



61.



62)



63. SOLN: A regular pentagon has interior angles of 108° . When you try to fit pentagons around a single point,

3 pentagons give $3 \times 108^\circ = 324^\circ$ (not 360°)

4 pentagons give $4 \times 108^\circ = 432^\circ$ (more than 360°).

Since 108 does not divide 360 evenly, pentagons leave gaps or overlap and cannot tessellate.

64. SOLN: Yes, A 4×6 grid has 24 unit squares.

Each 2×1 tile covers 2 unit squares.

$24 \div 2 = 12$ tiles needed.

Use 12 horizontal tiles, covering 2 columns per row.

65. No, a 5×7 grid cannot be tiled with 2×1 tiles.

The grid has $5 \times 7 = 35$ unit squares, which is an odd number.

Each 2×1 tile covers exactly 2 unit squares.

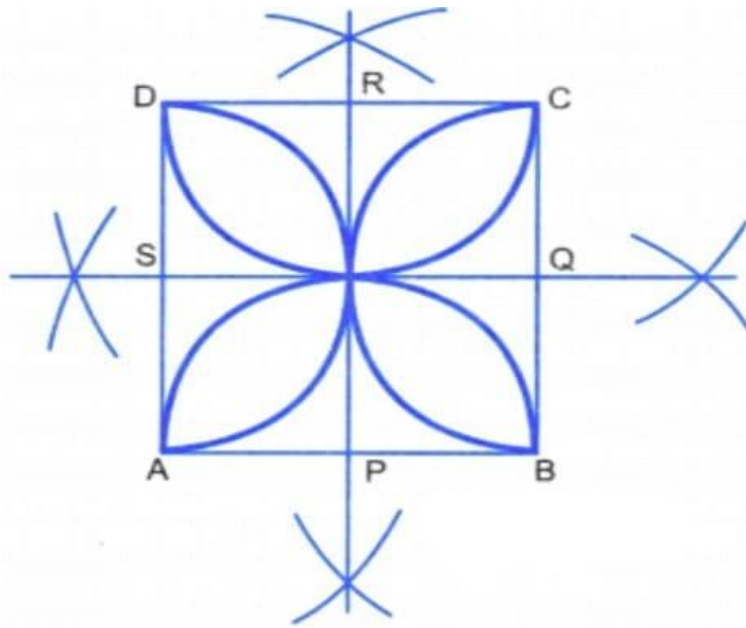
To tile the grid, we would need $35 \div 2 = 17.5$ tiles, which is not a whole number.

Therefore, it is impossible to tile a 5×7 grid with 2×1 tiles.

VII-

66)Solution:

Let ABCD be a square. We draw perpendicular bisectors of the sides AB and BC as shown in the figure



Let the perpendicular bisectors intersect the square at the points P, Q, R, and S.

With centres at P, Q, R, and S, draw semicircles in the square with radius equal to AP.

67)Soln: Convert the floor dimensions from meters to centimetres:

Length=4m=400 Cm

Breadth=3m=300 Cm

the Area of the floor=400 CM X 300 CM=1,20,000 cm²

the Area of one square tile=20 CM X20 CM= 400 cm²

NUMBER OF TILE =AREA OF FLOOR/AREA OF ONE TILE

=120000/400

=300 TILES

68)Solution:Convert dimensions to cm:

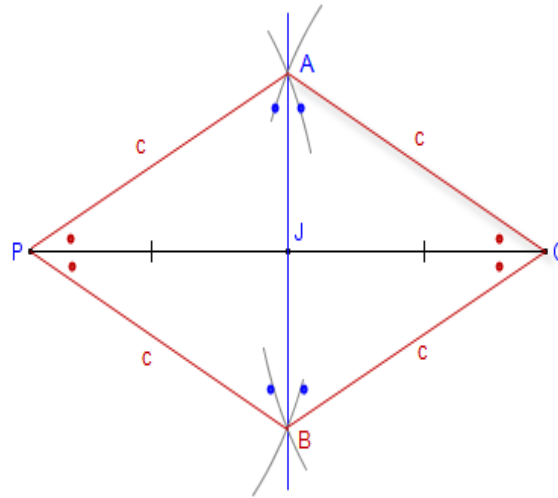
20 m = 2000 cm, 15 m = 1500 cm.

Area of park = 2000 cm × 1500 cm = 3,000,000 cm².

Area of one tile = 25 cm × 25 cm = 625 cm².

Number of tiles = 3,000,000 / 625 = 4800 tiles.

69) soln: A perpendicular bisector is a line that cuts a line segment into two equal parts at 90° .



70) Solution: By using the angle bisector method, we can bisect any given angle.

Using a ruler and compass, we know the method of making a 90° angle on a line.

We have $90/2 = 45^\circ$ and $45/2 = 22.5^\circ$.

$\therefore$ By using an angle bisector, we can make angles of 45° and 22.5° .

Also, $90^\circ + 45^\circ = 135^\circ$

$$90^\circ + 22.5^\circ$$

$$= 112.5^\circ$$

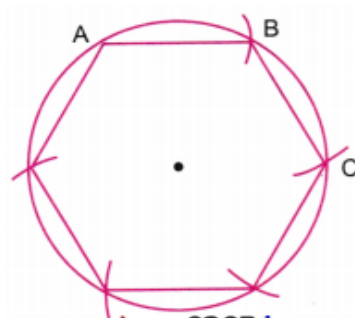
$$45^\circ + 22.5^\circ$$

$$= 67.5^\circ$$

$\therefore$ We can also construct angles 135° , 112.5° , and 67.5° using the angle bisector.

$\therefore$ By using angle bisector, we cannot construct angle of 65.5°

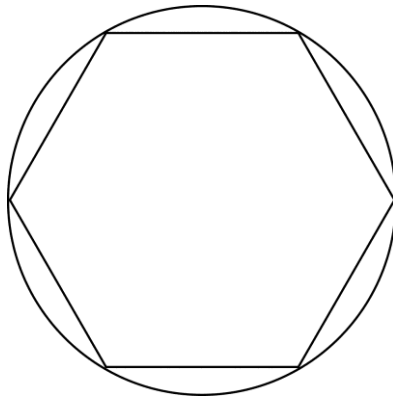
71) SOLN: Draw a circle. Take any point A on the circumference and draw an arc with centre at A and radius that to the circles and intersecting the circle at B.



With the centre at B and the same radius, draw an arc intersecting the circle at C.

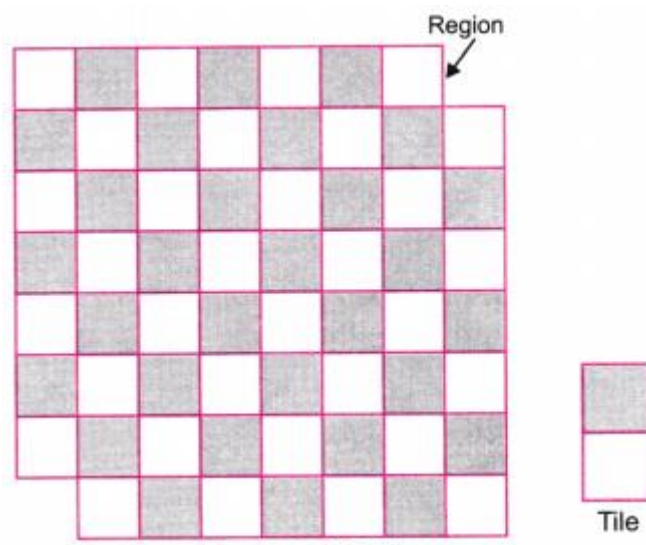
Repeat this process and get points of intersection D, E, and F.

Join AB, BC, CD, DE, EF, and FA.



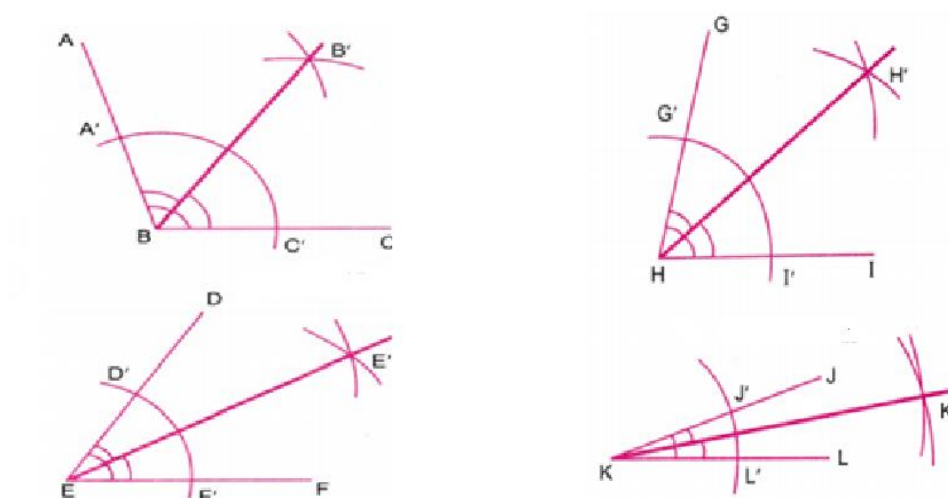
Erase the arcs and letters to get the required figure as shown above

72) The black-and-white region of the given region is shown in the figure. This region is to be tiled by tiles of the form shown in the figure.

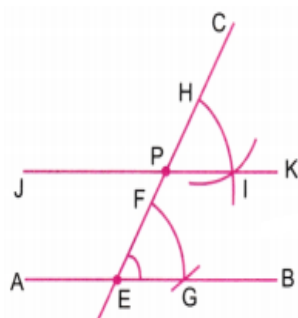


VIII 73.

We draw 4 different angles, $\angle ABC$, $\angle DEF$, $\angle GHI$, and $\angle JKL$, as shown below



74. Let AB be a given line; we shall draw a line parallel to the line AB.
 Draw a line CD intersecting the line AB.
 Choose a point P on the line CD.
 We shall draw a line parallel to AB and passing through P.



With centres at E and P, draw arcs of equal radius.
 Measure FG using a compass.
 Transfer this length on the arc from H to get HI = FG.
 Join P and I and extend this line on both sides.
 Here, CD is a transversal, and the corresponding angles $\angle PEB$ and $\angle CPK$ are equal.
 $\therefore$ The lines AB and JK are parallel lines.
 Similarly, we can draw three other pairs of parallel lines.

75) Convert units to cm

Floor length = 4 m = 400 cm

Floor breadth = 3m= 300 cm.

Area of the floor = length x breadth = 400 cm x 300 cm = 1,20,000cm.

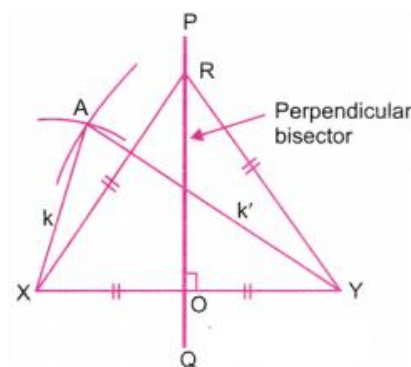
Area of one square tile = side x side = 25 cm x 25 cm = 625 cm.

$$\text{Number of tiles} = \frac{\text{Area of floor}}{\text{Area of one tile}} = \frac{1,20,000}{625} = 192 \text{ tiles}$$

the total cost = 192 X ₹15 per tile = ₹ 2,880.

76. Draw a line segment XY.

With centres at X and Y, draw arcs of unequal radii, say k and k'.
 Let the arcs intersect at the point A.



IX. 77. Draw a line segment XY .

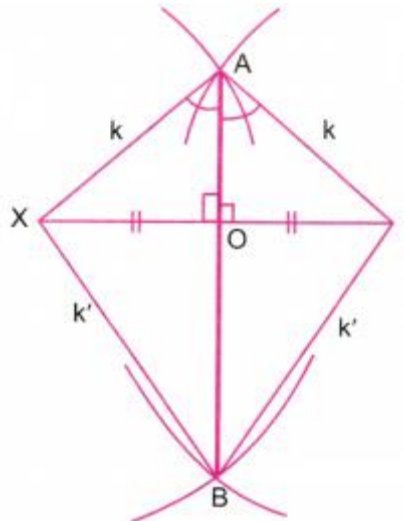
Choose distances k and k' which are slightly greater than half of the distance XY .

With centres at X and Y , draw arcs of radius ' k ' below XY . With centres at X and Y , draw arcs of radius ' k' ' below XY .

Let the arcs above XY intersect at A , and the arcs below XY intersect at B .

Join A and B . Let AB intersect XY at O .

Join AX , AY , BX , and BY .



$\triangle ABX$ and $\triangle ABY$ are congruent because $AX = AY = k$, $BX = BY = k'$, and AB is common.

$\therefore \angle XAO = \angle YAO$

$\triangle AOX$ and $\triangle AOY$ are congruent because $AX = AY = k$, $\angle XAO = \angle YAO$, and OA is common.

$\therefore OX = OY$ and $\angle AOX = \angle AOY$

Also, $\angle AOX + \angle AOY = 180^\circ$

$\therefore 2\angle AOX = 180^\circ$ or $\angle AOX = 90^\circ$

$\therefore OX = OY$ and $\angle AOX = \angle AOY = 90^\circ$.

$\therefore AB$ is the perpendicular bisector of the line XY .

Here, A and B are points that are of the same distance from X and Y .

Thus, any point that is of the same distance from X and Y lies on the perpendicular bisector.

78. Let $\angle XOY$ be any angle. With centre at O , draw an arc intersecting the lines OX and OY at A and B respectively.

With centres at A and B , draw arcs of the same radius so that the arcs intersect at a point, say C .

Join AC , BC , and OC . Extend CO to D .

We have $OA = OB$ and $AC = BC$.

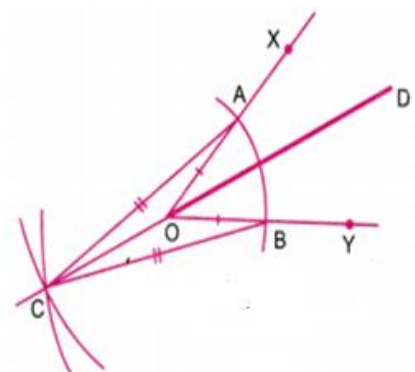
In $\triangle OAC$ and $\triangle OBC$, we have $OA = OB$, $AC = BC$, and OC is common.

$\therefore \triangle OAC \cong \triangle OBC$ (Using SSS rule)

$\therefore \angle AOC = \angle BOC$

$\therefore 180^\circ - \angle AOC = 180^\circ - \angle BOC$

$\therefore \angle AOD = \angle BOD$

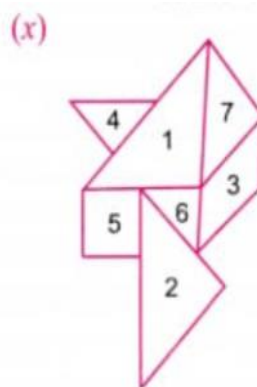
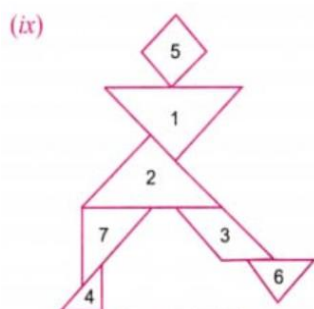
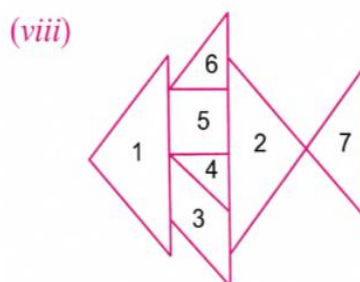
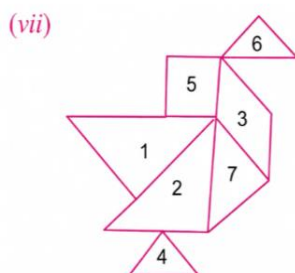
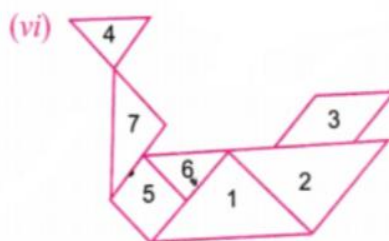
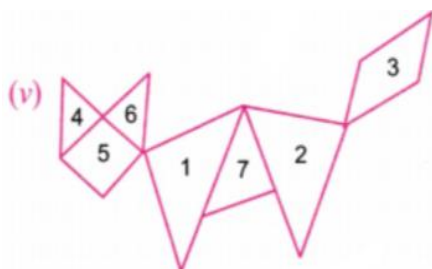
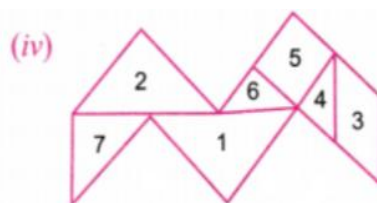
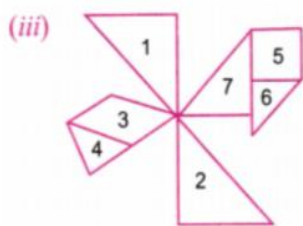
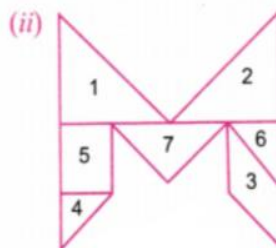
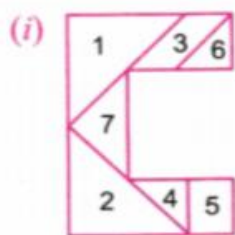


∴ Line OD is the bisector of the angle $\angle XOY$.

∴ Line OC is the bisector of the angle $\angle XOY$.

79) Soln: To solve this problem, we prepare 10 sets of 7 tans obtained from a tangram-based shape given below:

obtained from a tangram-based shape



Chapter – 07 - Finding the Unknown

I.

1. A. One

2. c. Equation

3. b. Differnt

4. b. =

5. b. Solve

II. 6.

a. A

b. m

c. b

d. p

e. t

III. 7. $2y = 60$

$$y = \frac{60}{2}$$

$$y = 30$$

8. $3n = 10 + n$

$$3n - n = 10$$

$$2n = 10$$

$$n = \frac{10}{2}$$

$$n = 5$$

9. $4l = 16$

$$l = \frac{16}{4}$$

$$l = 4$$

10. $k + 8 = 12 - k$

$$k + k = 12 - 8$$

$$2k = 4$$

$$k = \frac{4}{2}$$

$$k = 2$$

11. $13 - z = 8$

$$13 - 8 = z$$

$$5 = z$$

IV. 12. 5

13.  = 3

14.  = 4

15.  = 8

16.  = 6

V. 17. $x + y$

18. $m - 7 = 3$

19. $2m = 7$

20. $2x = 30$

21. $5x = 20$

22. $19 - m = 16$

23. $10a = 70$

24. $\frac{b}{5} = 6$

25. $\frac{1}{5}x = 20$

26. $9x = 18$

VI. 27. Sum of p and 4 is 15

28. Sum of x and 9 is 8

29. 6 times p is equal to 24

30. When p is divided by 2 and 2 is added, the result is 8.

31. When m is divided by 5, we get 3.

32. 3 times l is 42

33. When 4 is subtracted from y, the result is 2

34. Two-fifths of x equals 6

35. When 10 is subtracted from 6 times y, the result is 60

36. Sum of 10 times x and 6 times x is 50.

VII.

37. $5n + 5 = 20$ (n = 3)

$5(3) + 5 = 20$

$15 + 5 = 20$

$$20 = 20$$

$$38. 6p - 4 = 32 \quad (p = 6)$$

$$6(6) - 4 = 32$$

$$36 - 4 = 32$$

$$32 = 32$$

$$39. 9d + 10 = 100 \quad (d = 10)$$

$$9(10) + 10 = 100$$

$$90 + 10 = 100$$

$$40. 3m + 9 = 27 \quad (m = 6)$$

$$3(6) + 9 = 27$$

$$18 + 9 = 27$$

$$27 = 27$$

$$41. 12t + 5 = 65 \quad (t = 5)$$

$$12(5) + 5 = 65$$

$$60 + 5 = 65$$

$$65 = 65$$

VIII.

42. Let the number be m

$$m + 6 = 10$$

$$m = 10 - 6$$

$$m = 4$$

43. Let the number be y

$$15 - y = 8$$

$$15 - 8 = y$$

$$7 = y$$

44. Let the number be p

$$9p = 72$$

$$p = \frac{72}{9}$$

$$p = 8$$

45. Let the number be t

$$\frac{49}{t} = 7$$

$$7t=49$$

$$t=\frac{49}{7}$$

$$t=7$$

46. Let the unknown number be b

$$55 - b=45$$

$$55-45 =b$$

$$10=b$$

IX. 47.

$$\begin{array}{ccccccc} 17 & +3 & 20 & \times 4 & 80 & -5 & =75 \\ \longrightarrow & & \longrightarrow & & \longrightarrow & & \end{array}$$

48.

$$\begin{array}{ccccccc} 9 & +3 & 12 & \times 4 & 48 & -5 & =43 \\ \longrightarrow & & \longrightarrow & & \longrightarrow & & \end{array}$$

49.

$$\begin{array}{ccccccc} 10 & +3 & 13 & \times 4 & 52 & -5 & =47 \\ \longrightarrow & & \longrightarrow & & \longrightarrow & & \end{array}$$

50.

$$\begin{array}{ccccccc} 15 & +3 & 18 & \times 4 & 72 & -5 & =67 \\ \longrightarrow & & \longrightarrow & & \longrightarrow & & \end{array}$$

51.

$$\begin{array}{ccccccc} 18 & +3 & 21 & \times 4 & 84 & -5 & =79 \\ \longrightarrow & & \longrightarrow & & \longrightarrow & & \end{array}$$

$$X.52. 8k+2=8(3)+2=26$$

$$53. 4k+1=13$$

$$4k=13-1$$

$$4k=12$$

$$k=\frac{12}{4}$$

$$k=3$$

$$54. 9k+6$$

$$=9(3)+6$$

$$=27+6$$

$$=33$$

$$55. 5k+9$$

$$=5(3)+9$$

$$=15+9$$

$$=24$$

$$56. 6k \times 9$$

$$=6(3) \times 9$$

$$=18 \times 9$$

$$=162$$

$$\text{XI. } 57. \text{I'm } x$$

$$x+5=60-10$$

$$x=50-5$$

$$x=45$$

$$58. \text{The Largest 3-digit number is 999}$$

$$999+1=x$$

$$1000=x \text{ The smallest 4-digit number}$$

$$59. y=3$$

$$\text{i. } 6y=18$$

$$y=\frac{18}{6}$$

$$y=3$$

$$\text{ii. } 5y=15$$

$$y=\frac{15}{5}$$

$$y=3$$

$$\text{iii. } 2y=6$$

$$y=\frac{6}{2}$$

$$y=3$$

$$60. m=3$$

$$\text{i. } 5m+8=0$$

$$5(3)+8=0$$

$$15+8=0$$

$$38$$

$$\text{ii. } 12m+2=0$$

$$12(3)+2=0$$

$$36+2=38$$

$$\text{iii. } 10m+5=0$$

$$10(3)+5=0$$

$$30+5=35$$

61. Let angles of a triangle be $x, x-10, x+10$

The sum of three angles = 180°

$$x+x-10+x+10= 180^\circ$$

$$3x=180^\circ$$

$$x=\frac{180^\circ}{3}$$

$$x=60^\circ$$

The angles are $x=60^\circ$, $x-10^\circ=60^\circ-10^\circ=50^\circ$, $x+10=60^\circ+10^\circ=70^\circ$

XII.

$$62. 3u-7=2u+3$$

$$3u-2u=3+7$$

$$U= 10$$

$$63. 3x+4=2x+8$$

$$3x-2x=8-4$$

$$X=4$$

Solution: $3(4)+4=2(4)+8$

$$12+4= 8+8$$

$$16=16$$

$$\text{LHS= RHS}$$

$$64. 4(m+6)-8=2m-4$$

$$4m+24-8=2m-4$$

$$4m+16=2m-4$$

$$4m-2m=-4-16$$

$$2m=-20$$

$$m=\frac{-20}{2}$$

$$m=-10$$

$$\text{Solution: } 4[(-10)+6] - 8 = 2(-10) - 4$$

$$4[-4] - 8 = -20 - 4$$

$$-16 - 8 = -24$$

$$-24 = -24$$

$$65. 6y + 7 = 4y + 21$$

$$6y - 4y = 21 - 7$$

$$2y = 14$$

$$y = \frac{14}{2}$$

$$y = 7$$

$$66. 3z + 3 = 4z + 5$$

$$-5 + 3 = 4z - 3z$$

$$-2 = z$$

$$\text{Solution: } 3z + 3 = 4z + 5$$

$$3(-2) + 3 = 4(-2) + 5$$

$$-6 + 3 = -8 + 5$$

$$-3 = -3$$

$$\text{LHS} = \text{RHS}$$

XIII.67.a. Let number be a

$$\text{b. } a - 3$$

$$\text{c. } a - 3, a \times 4$$

$$\text{d. } a - 3 = a \times 4 + 8$$

$$a - 3 = 4a + 8$$

$$-3 - 8 = 4a - a$$

$$-11 = 3a$$

$$a = \frac{11}{3}$$