ಕರ್ನಾಟಕ ಸರ್ಕಾರ

ಜಿಲ್ಲಾಡಳಿತ, ಜಿಲ್ಲಾ ಪಂಚಾಯಿತಿ ಮತ್ತು
ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ, ಚಿಕ್ಕಬಳ್ಳಾಪುರ ಜಿಲ್ಲೆ – 562101

2020–21 ನೇ ಸಾಲಿನ ಶೈಕ್ಷಣಿಕ ವರ್ಷದಲ್ಲಿ ಜಿಲ್ಲೆಯ
ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ವಿದ್ಯಾರ್ಥಿಗಳ ಉತ್ತಮ ಫಲಿತಾಂಶ ಪ್ರಗತಿಗಾಗಿ
ನಿಧಾನಗತಿ ಕಲಿಕೆಯ ಶಾಲಾ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ

ಅಭ್ಯಾಸ ಕೈಪಿಡಿ

Subject :
Mathematics
(English Medium)

ಸಹಕಾರ – ಸಮನ್ವಯ

ಜಿಲ್ಲಾ ಶೈಕ್ಷಣಿಕ ಸಲಹೆಗಾರರ ತಂಡ, ಜಿಲ್ಲಾ ಪ್ರೌಢಶಾಲಾ ಮುಖ್ಯ ಶಿಕ್ಷಕರ ವೃಂದ,
ಪ್ರೌಢಶಾಲಾ ಶಿಕ್ಷಕರ ವೃಂದ ಮತ್ತು ವಿಷಯ ಸಂಪನ್ಮೂಲ ಶಿಕ್ಷಕರ ವೃಂದ,
ಎ.ಸಿ.ಸಿ. ಟ್ರಸ್ಟ್, ಎ.ಸಿ.ಸಿ. ಲಿಮಿಟೆಡ್, ತೊಂಡೆಬಾವಿ ಸಿಮೆಂಟ್ ವರ್ಕ್ಸ್, ತೊಂಡೆಬಾವಿ.

Printed at :

N.M. YAJAMAN & SONS

Unit-I : # 1, P.S.K. Lane, 2nd Cross, Akkipet, Bengaluru-53.
Unit-II : #49/2, 14th Cross, Tent Road, Sunkadakatte, Bengaluru-91.
Mob : 9845175236

ಮುನ್ನುಡಿ

ಆತ್ಮೀಯ ವಿದ್ಯಾರ್ಥಿಗಳೇ,

"ಒಳ್ಳೆಯ ಶಿಕ್ಷಣವು ಉತ್ತಮ ಭವಿಷ್ಯಕ್ಕೆ ಬುನಾದಿಯಾಗಿರುತ್ತದೆ" "A Good education is a foundation for a better future" ಎಂಬಂತೆ ತಮ್ಮ ಉಜ್ವಲ ಭವಿಷ್ಯವನ್ನು ರೂಪಿಸಿಕೊಳ್ಳಲು 10ನೇ ತರಗತಿಯು ಅತ್ಯಂತ ಪ್ರಮುಖ ಮೈಲಿಗಲ್ಲಾಗಿದೆ. ಆದ್ದರಿಂದ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರೀಕ್ಷೆಯು ನಿಮ್ಮ ಜೀವನದ ಮುಖ್ಯ ಘಟ್ಟವಾಗಿದ್ದು, ಪ್ರಸ್ತುತ ಶೈಕ್ಷಣಿಕ ವರ್ಷದ (2020–21ರ) ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪಬ್ಲಿಕ್ ಪರೀಕ್ಷೆಯು 21, ಜೂನ್ ನಿಂದ ಪ್ರಾರಂಭವಾಗಲಿದೆ. ಕಳೆದ ಸಾಲಿನಲ್ಲಿ ಚಿಕ್ಕಬಳ್ಳಾಪುರ ಜಿಲ್ಲೆಯ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಫಲಿತಾಂಶವು ಶೇ. 92.37ರಷ್ಟನ್ನು ಹೊಂದಿ ಎ+ ಶ್ರೇಣಿಯೊಂದಿಗೆ ಅತ್ಯುತ್ತಮ ಸಾಧನೆಯಾಗಿದೆ. ಇದಕ್ಕೆ ಕಾರಣೀಬೂತರಾದ ಸಮಸ್ತರಿಗೂ ಜಿಲ್ಲಾಡಳಿತ, ಜಿಲ್ಲಾ ಪಂಚಾಯತ್ ಮತ್ತು ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ ವತಿಯಿಂದ ತುಂಬು ಹೃದಯದ ಧನ್ಯವಾದಗಳನ್ನು ಅರ್ಪಿಸುತ್ತದೆ. ಪ್ರಸ್ತುತ ವರ್ಷದಲ್ಲಿಯೂ ಸಹ ಇದೇ ರೀತಿಯ ಅತ್ಯುತ್ತಮ ಫಲಿತಾಂಶವನ್ನು ಗಳಿಸುವುದು ನಿಮ್ಮೆಲ್ಲರ ಗುರಿಯಾಗಬೇಕಿದೆ.

ನಿಮಗೆ ಗುಣಾತ್ಮಕ ಶಿಕ್ಷಣವನ್ನು ಕಲ್ಪಿಸಲು ನಿಮ್ಮ ಪೋಷಕರು, ಶಾಲೆ, ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ, ಜಿಲ್ಲಾಡಳಿತ ಮತ್ತು ಜಿಲ್ಲಾ ಪಂಚಾಯತ್ ವಿಶೇಷ ಕಾಳಜಿಯೊಂದಿಗೆ ಹಲವಾರು ಶೈಕ್ಷಣಿಕ ಚಟುವಟಿಕೆಗಳನ್ನು ರೂಪಿಸಿದೆ. ಈಗಾಗಲೇ ನಿಮ್ಮ ಶಿಕ್ಷಕರು ನಿಗಧಿಪಡಿಸಿರುವ ಪಠ್ಯ ಬೋಧನೆಯನ್ನು ಪೂರ್ಣಗೊಳಿಸಿರುತ್ತಾರೆ ಮತ್ತು ನೀವು ಅದನ್ನು ಕಲಿತಿರುತ್ತೀರಿ. ಈಗ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರೀಕ್ಷೆಗೆ 80 ದಿನಗಳು ಉಳಿದಿದ್ದು, ನೀವು ನಿರ್ದಿಷ್ಟ ಗುರಿಯೊಂದಿಗೆ ಅಭ್ಯಾಸ ಮಾಡಿ ಪರೀಕ್ಷೆಯನ್ನು ಬರೆಯಬೇಕಿದೆ. ಪರೀಕ್ಷೆಗೆ ಯೋಜಿತ ರೀತಿಯಲ್ಲಿ ಸನ್ನದ್ಧರಾಗಲು ಜಿಲ್ಲೆಯ ಸಂಪನ್ಮೂಲ ಶಿಕ್ಷಕರ ಸಹಾಯದೊಂದಿಗೆ ಆರು ವಿಷಯಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ **"ಅಭ್ಯಾಸ ಕೈಪಿಡಿ"**ಯನ್ನು ರಚಿಸಲಾಗಿದೆ. ಈ ಅಭ್ಯಾಸ ಕೈಪಿಡಿಯು ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ವಿನ್ಯಾಸ ಮತ್ತು ಬಹು ನಿರೀಕ್ಷಿತ ಪ್ರಶ್ನೋತ್ತರಗಳ ಆಧಾರದಂತೆ ರೂಪಿಸಲಾಗಿದೆ.

ನಿಗಧಿಪಡಿಸಿರುವ ಪಠ್ಯಕ್ರಮದಂತೆ ಪಾಠವಾರು ಒಂದು ಅಂಕ, ಎರಡೂ ಅಂಕ, ಮೂರು ಅಂಕ, ನಾಲ್ಕು ಅಂಕಗಳ ಪ್ರಶ್ನೋತ್ತರಗಳನ್ನು (ಪರೀಕ್ಷಾ ದೃಷ್ಟಿಯಿಂದ ಪ್ರಮುಖವಾದ) ನೀಡಲಾಗಿದೆ. ಪಾಠವಾರು ಪ್ರಶ್ನೋತ್ತರಗಳನ್ನು ಕಲಿಯಲು ಸಹಾಯಕಾರಿಯಾಗುವಂತೆ ರೂಪಿಸಿದೆ.

ಕಲಿತಿರುವ ಪಾಠಗಳನ್ನು ಅಭ್ಯಾಸ ಮಾಡಿದ ನಂತರ ಕಲಿಕೆಯನ್ನು ಖಾತ್ರಪಡಿಸಿಕೊಳ್ಳಲು ಘಟಕ ಪರೀಕ್ಷೆಗಳನ್ನು ನೀಡಲಾಗಿದೆ.

ಅಂದರೆ ಈ ಅಭ್ಯಾಸ ಕೈಪಿಡಿಗಳನ್ನು ಪರೀಕ್ಷಾ ದೃಷ್ಟಿಯಿಂದ ತಯಾರಿಸಿದ್ದು, ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ವಿನ್ಯಾಸ ಮತ್ತು ಪಾಠವಾರು ಅಂಕಗಳ ಹಂಚಿಕೆಯಂತೆ ರಚಿಸಿರುವುದರಿಂದ ನೀವು ಯೋಜಿತ ರೀತಿಯಲ್ಲಿ ಪರೀಕ್ಷೆಯನ್ನು ಎದುರಿಸಲು ಅತ್ಯಂತ ಉಪಯುಕ್ತವಾಗಿದೆ.

ಈ ಅಭ್ಯಾಸ ಕೈಪಿಡಿಯನ್ನು ನಿರಂತರವಾಗಿ ಅಭ್ಯಾಸ ಮಾಡಿ ಪುನರಾವರ್ತನೆ ಮಾಡುವುದರಿಂದ ಪ್ರತಿಯೊಬ್ಬ ವಿದ್ಯಾರ್ಥಿಯೂ ಆತ್ಮವಿಶ್ವಾಸ ಹೊಂದಿ ನಿರ್ಭಯವಾಗಿ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರೀಕ್ಷೆಯನ್ನು ಬರೆಯಲು ಸಶಕ್ತರಾಗುವುದು ಖಂಡಿತ ಎಂದು ಆಶಿಸಿದೆ.

ಈ ಅಭ್ಯಾಸ ಕೈಪಿಡಿ ಪ್ರಕಟಿಸಲು ಮುಖ್ಯ ಕಾರಣೀಭೂತರಾದ ಚಿಕ್ಕಬಳ್ಳಾಪುರ ಜಿಲ್ಲೆಯ ಮಾನ್ಯ ಜಿಲ್ಲಾ ಉಸ್ತುವರಿ ಸಚಿವರಿಗೆ, ಜಿಲ್ಲೆಯ ಎಲ್ಲಾ ಶಾಸಕರಿಗೆ ಮಾನ್ಯ ಜಿಲ್ಲಾ ಪಂಚಾಯತ್ ಅಧ್ಯಕ್ಷರು, ಉಪಾಧ್ಯಕ್ಷರು, ಸ್ಥಾಯಿ ಸಮಿತಿ ಅಧ್ಯಕ್ಷರು ಮತ್ತು ಎಲ್ಲಾ ಸದಸ್ಯರಿಗೆ ಹಾಗೂ ಜಿಲ್ಲಾಧಿಕಾರಿಗಳು, ಮಾನ್ಯ ಮುಖ್ಯ ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಧಿಕಾರಿಗಳು, ಜಿಲ್ಲಾ ಪಂಚಾಯತ್ ಚಿಕ್ಕಬಳ್ಳಾಪುರ ಹಾಗೂ ಎ.ಸಿ.ಸಿ. ಕಂಪನಿ, ತೊಂಡೇಭಾವಿ, ಗೌರಿಬಿದನೂರು ತಾಲ್ಲೂಕು ರವರಿಗೂ ಗೌರವ ಪೂರ್ವಕ ವಂದನೆಗಳು. ನಿಧಾನ ಕಲಿಕೆಯ ವಿದ್ಯಾರ್ಥಿಗಳ ಏಳಿಗೆಗಾಗಿ ಮತ್ತು ಜಿಲ್ಲಾ ಗುಣಾತ್ಮಕ ಫಲಿತಾಂಶದ ಪ್ರಗತಿಗಾಗಿ ಅತ್ಯಂತ ಆಸಕ್ತಿಯಿಂದ ಈ ಅಭ್ಯಾಸ ಕೈಪಿಡಿಯನ್ನು ರಚಿಸಿದ ಜಿಲ್ಲೆಯ ಸಂಪನ್ಮೂಲ ಶಿಕ್ಷಕರ ತಂಡಕ್ಕೂ, ಮಕ್ಕಳ ಉತ್ತಮ ಕಲಿಕೆಗೆ ಸಹಾಯಕರಾಗಿರುವ ಜಿಲ್ಲಾಯ ಎಲ್ಲಾ ವಿಷಯ ಶಿಕ್ಷಕರಿಗೂ ಮತ್ತು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೂ ಜಿಲ್ಲೆಯ ಶೈಕ್ಷಮಿಕ ಸಲಹೆಗಾರರ ತಂಡವು ಧನ್ಯವಾದಗಳನ್ನು ಅರ್ಪಿಸುತ್ತದೆ.

ಜಿಲ್ಲಾಡಳಿತ, ಜಿಲ್ಲಾಪಂಚಾಯತ್
ಮತ್ತು ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ
ಚಿಕ್ಕಬಳ್ಳಾಪುರ ಜಿಲ್ಲೆ.

ಸಹಕಾರ ಮತ್ತು ಮಾರ್ಗದರ್ಶಕರು

1) **ಶ್ರೀ ಕೆ.ಎಂ. ಜಯರಾಮರೆಡ್ಡಿ,** ಉಪನಿರ್ದೇಶಕರು, (ಆಡಳಿ) ಸಾ.ಶಿ.ಇ. ಚಿಕ್ಕಬಳ್ಳಾಪುರ

2) **ಶ್ರೀ ಎಸ್. ರಘುನಾಥರೆಡ್ಡಿ,** ಉಪನಿರ್ದೇಶಕರು, (ಅಭಿವೃದ್ಧಿ) ಸಾ.ಶಿ.ಇ. ಚಿಕ್ಕಬಳ್ಳಾಪುರ

3) **ಶ್ರೀ ಶಿವಲಿಂಗಯ್ಯ,** ಶಿಕ್ಷಣಾಧಿಕಾರಿಗಳು, ಉಪನಿರ್ದೇಶಕರ ಕಛೇರಿ, ಚಿಕ್ಕಬಳ್ಳಾಪುರ

4) **ಶ್ರೀ ಬಿ. ವಿ. ಶಿವಪ್ರಕಾಶ್,** ವಿಷಯ ಪರಿವೀಕ್ಷಕರು, ಉಪನಿರ್ದೇಶಕರ ಕಛೇರಿ, ಚಿಕ್ಕಬಳ್ಳಾಪುರ

ಜಿಲ್ಲಾ ವಿಷಯವಾರು ಸಂಪನ್ಮೂಲ ಶಿಕ್ಷಕರ ಪಟ್ಟಿ

ಶಿಕ್ಷಕರ ಹೆಸರು	ಶಾಲೆಯ ಹೆಸರು ಮತ್ತು ವಿಳಾಸ	ಮೊಬೈಲ್ ಸಂಖ್ಯೆ
1 ಅನಿಲ್‌ಕುಮಾರ್	ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ ಕೋರ್ಲಪರ್ತಿ, ಚಿಂತಾಮಣಿ ತಾಲ್ಲೂಕು	9964319741
2 ಅರುಣ್ ಕುಮಾರ್	ಎಂ.ಡಿ.ಆರ್.ಎಸ್. ಪೆರೇಸಂದ್ರ, ಚಿಕ್ಕಬಳ್ಳಾಪುರ ತಾಲ್ಲೂಕು	9880892266
3 ಭಾಸ್ಕರ್	ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ ಮಂಚೇನಹಳ್ಳಿ, ಗೌರಿಬಿದನೂರು ತಾಲ್ಲೂಕು	9900898606
4 ಶ್ರೀನಿವಾಸಪ್ಪ .ಇ	ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ ಅಲಕಾಪುರ, ಗೌರಿಬಿದನೂರು ತಾಲ್ಲೂಕು	8183952211
5 ಜಿ.ಸಿ.ನಾಗರಾಜ	ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ ಗೆದರೆ ಗೌರಿಬಿದನೂರು ತಾಲ್ಲೂಕು	9880584401
6 ಕೋಮಲ	ಸರ್ಕಾರಿ ಬಾಲಕರ ಪ್ರೌಢಶಾಲೆ ಗುಡಿಬಂಡೆ	9742395829
7 ಕುಮಾರ್ .ಎನ್ .ಆರ್	ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ ಬಿಳ್ಳೂರು, ಬಾಗೇಪಲ್ಲಿ ತಾಲ್ಲೂಕು	9740977987
8 ಮುನಿನಾರಾಯಣಸ್ವಾಮಿ	ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ ವಾಪಸಂದ್ರ, ಚಿಕ್ಕಬಳ್ಳಾಪುರ ತಾಲ್ಲೂಕು	9886966594
9 ನಾರಾಯಣಸ್ವಾಮಿ .ಪಿ .ಎನ್	ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ ಘಂಟಂವಾರಿಪಲ್ಲಿ ಬಾಗೇಪಲ್ಲಿ ತಾಲ್ಲೂಕು	9611573219
10 ಶ್ರೀಧರ	ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ ತುಮ್ಮನಹಳ್ಳಿ, ಶಿಡ್ಲಘಟ್ಟ ತಾಲ್ಲೂಕು	9591579122
11 ಶಿವಕುಮಾರ್ .ಎಂ	ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ ಚೀಮಂಗಲ, ಶಿಡ್ಲಘಟ್ಟ ತಾಲ್ಲೂಕು	9449702666
12 ಸುರೇಂದ್ರ ಬಾಬು .ಎಸ್. ಆರ್	ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ ಮಾರ್ಗಾನಕುಂಟೆ, ಬಾಗೇಪಲ್ಲಿ ತಾಲ್ಲೂಕು	8861250888

CONTENTS

Important Formulas

1) Formula to find out the nth term of an A.P.

$$a_n = a + (n - 1)\, d.$$

2) Formula to find out the Sum of n terms of an A.P.

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

3) Formula to find out roots of Quadratic Equation $X = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

4) The general formula of Quadratic Equation in terms of Roots is

$$p(x) = x^2 - (\alpha + \beta)\, x + \alpha\beta$$

5) Distance Formula (1) $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ (2) $d = \sqrt{x^2 + y^2}$

6) Selection Formula $(x,\ y) = \left(\dfrac{m_1x_2 + m_2x_1}{m_1 + m_2},\ \dfrac{m_1y_2 + m_2y_1}{m_1 + m_2}\right)$

7) Mid-point Formula $(x,\ y) = \left(\dfrac{x_1 + x_2}{2},\ \dfrac{y_1 + y_2}{2}\right)$

8) Area of triangle formula $\triangle = \dfrac{1}{2}\left[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\right]$

9) Mean $\overline{X} = \dfrac{\Sigma f_1 x_1}{\Sigma f_1}$

10) Median $\overline{X} = 1 + \left[\dfrac{\frac{n}{2} - cf}{f_m}\right] \times h$

11) Mode $\overline{X} = 1 + \left[\dfrac{f_1 - f_0}{2f_1 - f_0 - f_2}\right] \times h$

12) Area of a sector = $\dfrac{\theta}{360^0} \times \pi r^2$

13) Length of an arc of a circle = $\dfrac{\theta}{360^0} \times 2\pi r$

Values of Trigonometric ratios

u	0^0	30^0	45^0	60^0	90^0
Sin	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
Cos	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
Tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	ND
Cot	ND	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
Sec	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	ND
Cosec	ND	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1

Solid Name	LSA or CSA	TSA	VOLUME
Cylinder	$2\pi rh$	$2\pi r\ (r + h)$	$\pi r^2 h$
Cone	$\pi r l$	$\pi r\ (r + l)$	$\frac{1}{3}\pi r^2 h$
Frustum of a cone	$\pi l\ (r_1 + r_2)$	$\pi l\ (r_1 + r_2) + \pi\ (r_1^2 + r_2^2)$	$\frac{1}{3}\pi h\left(r_1^2 + r_2^2 + r_1 r_2\right)$
Sphere	$4\pi r^2$	$4\pi r^2$	$\frac{4}{3}\pi r^3$
Hemi sphere	$2\pi r^2$	$3\pi r^2$	$\frac{2}{3}\pi r^3$

UNIT - 1

ARITHMATIC PROGRESSION

1. **Formula to find out n^{th} term of an A P .....**
   $a_n = a + (n - 1)\, d$

2. **Formula to find out the sum of n terms of an A P .....**

   $$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

3. **Formula to find out the sum of n terms of an A P when first term & last terms are given :**

   $$S_n = \frac{n}{2}\left[a + a_n\right]$$

4. **Formula to find out n^{th} term from the last number is .....**
   $a_n = l - (n - 1)d$

5. **n^{th} term of an A P is an = 3n – 2. What is its 9th term?**
   25

6. **n^{th} term of an A P is an = 2n + 1. What is its Common difference?**
   2

7. **How many two digit numbers are divisible by 3?**
   12, 15, 18, ... 99
   Here a = 12; d = 15 – 12 = 3; $a_n = 99$
   $a_n = a + (n - 1)\, d$
   $99 = 12 + (n - 1)\, 3$
   $99 - 12 = (n - 1)\, 3$
   $87 = (n - 1)\, 3$
   $(n - 1) = 87$

   $$\frac{(n-1)\cancel{3}}{\cancel{3}} = \frac{87}{3}$$

   $(n - 1) = 29$
   $n = 29 + 1 = 30$
   30 two digits numbers are divisible by 3

8. **Find the sum of 5 + 8 + 11 + ... upto 10 terms using Formula.**
   a = 5; d = 8 – 5 = 3; n = 10; $S_{10} = ?$

   $$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

$$S_{10} = \frac{10}{2}\left[2(5) + (10-1)3\right]$$

$S_{10} = 5\ [10 + (9)3]$
$S_{10} = 5\ [10 + 27]$
$S_{10} = 5[37]$
$S_{10} = 185$

9. Find the sum of 5 + 10 + 15 + ... upto 20 terms using Formula

$a = 5;\quad d = 10 - 5 = 5;\quad n = 20;\quad S_{20} = ?$

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

$$S_{20} = \frac{20}{2}\left[2(5) + (20-1)5\right]$$

$S_{20} = 10\ [10 + (19)5]$
$S_{20} = 10\ [10 + 95]$
$S_{20} = 5[105]$
$S_{20} = 1050$

10. The first and last terms of an A P consisting of 21 terms is 4 and 64 Respectively. Find the sum of all terms.

$a = 4;\quad l = 64;\quad n = 21$

$$S_n = \frac{n}{2}\left[a + a_n\right]$$

$$= \frac{21}{2}\left[4 + 64\right]$$

$$= \frac{21}{2}\left[68\right]$$

$= 21(34)$
$= 714$

11. 6th term of an A P is one greater than twice the third term. The sum of 4th and 5th terms is five times the second term. Find the Tenth term of the A P.

$a_6 = 2a_3 + 1$
$a + 5d = 2(a + 2d) + 1$
$a + 5d = 2a + 4d + 1$
$a - 2a + 5d - 4d = 1$
$-a + d = 1$
$d = a + 1$ .....(1)
$a_4 + a_5 = 5a_2$
$a + 3d + a + 4d = 5\ (a + d)$

$2a + 7d = 5a + 5d$
$7d - 5d = 5a - 2a$
$2d = 3a$ .....(2)
$2(a + 1) = 3a$
$2a + 2 = 3a$
$3a - 2a = 2$
$a = 2$
put $a = 2$ in Eq (2)
$2d = 3a$
$2d = 3(2)$
$d = 3$
Then 10th term of AP is
$a_n = a + (n - 1) d$
$a_{10} = 2 + (10 - 1) 3$
$a_{10} = 2 + (9) 3$
$a_{10} = 2 + 27$
$a_{10} = 29$

PRACTICE PAPER

I. Fill in the Blanks

1. Formula to find out the nth term of an A P is .....
2. Formula to find out the sum of n terms of an A P is .....
3. Formula to find out the sum of n terms of an A P when first and last terms are given is .....

II. Choose the correct answer for the following questions from the options given below

4. 3, 13, 23, 33 ..... the Common difference of this A P is .....
   a) 8 b) 9
   c) 10 d) 11
5. Which of the following A P has first term 26 and difference –7 .....
   a) 26, 19, 13, 7 b) 26, 18, 11, 4
   c) 16, 19, 12, 5 d) 26, 18, 12, 5
6. Common difference of an AP whose nth term is $a_n = 3 - 5n$
   a) –5 b) 5
   c) 3 d) 8

III. Answer the following questions

7. Find the 14th term of an A P 10, –15, –20, ...

8. How many two digit numbers are divisible by 5
9. Find the sum of : 4 + 12 + 20 + ... + 100.
10. Find the sum of all odd numbers between 0 to 100.
11. How many terms of the A P 1, 4, 7 ..... makes the sum 51.
12. Find the sum of A P 6 + 8 + 10 + ... upto 10 terms.
13. The first and last terms of an A P consisiting of 21 terms is 4 and 64 respectively. Find the sum of all terms.

UNIT - 2

TRIANGLES

THEOREMS

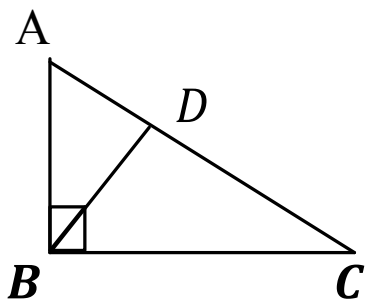
Pythagoras Theorem

STATEMENT : 'In a right triangle, the square of the hypotenuse is equal to the sum of the square of the other two sides'

DATA : In Δ ABC, $\angle ABC = 90^0$

TO PROVE : $AC^2 + AB^2 = BC^2$

CONSTRUCTION : Draw BD $\perp$ AC



PROOF: In Δ ABC and Δ ADB

$\angle ABC = \angle ADB = 90^0$ (Data and Construction)

$\angle BAC = \angle DAB$ (Common Angle)

Hence Δ ABC ~ Δ ADB

$$\frac{AB}{AC} = \frac{AD}{AB}$$

$AB^2 = AC \times AD$

In Δ ABC and Δ CDB

$\angle ABC = \angle CDB = 90^0$ (Data and Construction)

$\angle BCA = \angle DCB$ (Common angle)

Hence Δ ABC ~ Δ CDB

$$\frac{BC}{AC} = \frac{DC}{BC}$$

$BC^2 = AC \times DC$

On Adding both equations

$AB^2 + BC^2 = AC(AD + DC)$

$= AC \times AC$

$AB^2 + BC^2 = AC^2$

Thale's Theorem :

STATEMENT : "If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio."

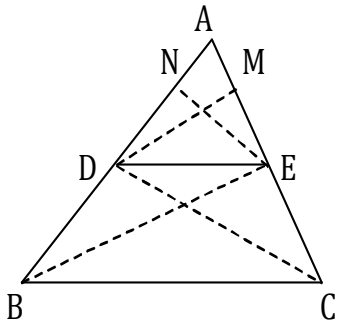
DATA : In Δ ABC, DE $\parallel$ BC

TO PROVE : $\frac{AD}{BD} = \frac{AE}{EC}$

CONSTRUCTION : Draw DM $\perp$ AC and EN $\perp$ AB. Join BE and CD

PROOF :

$$\frac{\text{Area }(\Delta ADE)}{\text{Area }(\Delta BDE)} = \frac{\frac{1}{2} \times AD \times \cancel{EN}}{\frac{1}{2} \times BD \times \cancel{EN}} = \frac{AD}{BD}$$



$$\frac{\text{Area }(\Delta AED)}{\text{Area }(\Delta CDE)} = \frac{\frac{1}{2} \times AE \times \cancel{DM}}{\frac{1}{2} \times EC \times \cancel{DM}} = \frac{AE}{EC}$$

But Area of Δ BDE = Area Δ DEC (They are on same base and parallel)

Hence $\frac{AD}{BD} = \frac{AE}{EC}$

Areas and Sides Proportionality Theorem

STATEMENT : "The ratio of the Areas of similar triangles is equal to the square of the ratio of their corresponding sides."

DATA : Δ ABC ~ Δ DEF, $\frac{AB}{DE} = \frac{BC}{EF}$

TO PROVE : $\frac{\text{Area } \Delta ABC}{\text{Area } \Delta DEF} = \frac{AB^2}{DE^2} = \frac{BC^2}{EF^2} = \frac{CA^2}{FD^2}$

CONSTRUCTION : Draw AM $\perp$ BC and DN $\perp$ EF

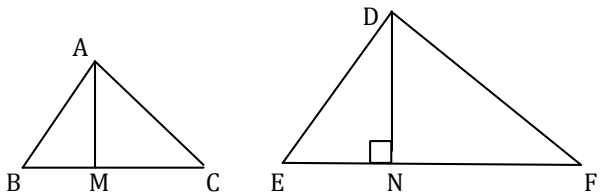
PROOF:

In Δ AMB and Δ DNE

$\angle AMB = \angle DNE$ (Construction)

$\angle ABM = \angle DEN$ (Data)

Hence Δ AMB ~ Δ DNE (AA criteria)



Therefore, $\frac{AM}{DN} = \frac{AB}{DE}$ but $\frac{AB}{DE} = \frac{BC}{EF}$ $\therefore \frac{AM}{DN} = \frac{AC}{EF}$

$$\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \frac{\frac{1}{2} \times BC \times AM}{\frac{1}{2} \times EF \times DN}$$

$$\frac{\text{Area } \Delta ABC}{\text{Area } \Delta DEF} = \frac{BC}{EF} \times \frac{AM}{DN}$$

$$= \frac{BC}{EF} \times \frac{BC}{EF}$$

$$= \frac{BC^2}{EF^2}$$

1. **The areas of two similar triangles ABC and MNO are 49 cm² and 81 cm² respectively. If AB = 10.5 cm, find MN**

$$\frac{\text{Aera of } \Delta ABC}{\text{Area of } \Delta MNO} = \frac{AB^2}{MN^2}$$

$$\frac{49}{81} = \frac{10.5^2}{MN^2} \Rightarrow \sqrt{\frac{49}{81}} = \frac{10.5}{MN} \Rightarrow \frac{7}{9} = \frac{10.5}{MN}$$

MN = 9 × 1.5

MN = 13.5 cm

2. **The areas of two similar triangles PQR and LMN are 64 cm² and 121 cm² respectively. If QR = 13.5 cm, find MN**

$$\frac{\text{Area of } \Delta PQR}{\text{Area of } \Delta LMN} = \frac{QR^2}{MN^2}$$

$$\frac{64}{121} = \frac{13.5^2}{MN^2} \Rightarrow \sqrt{\frac{64}{121}} = \frac{13.5}{MN} \Rightarrow \frac{8}{11} = \frac{13.5}{MN}$$

$$MN = \frac{148.5}{8}$$

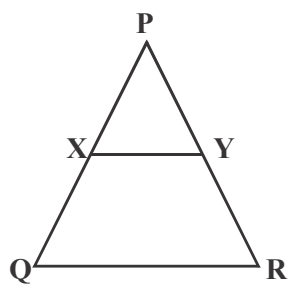
MN = 18.5 cm

3. **In the figure XY || QR, if PX = 5 cm and YR = 16 cm. Find XQ.**

$$XY \parallel QR, \quad \frac{PX}{QX} = \frac{PY}{YR}$$

$$\frac{5}{QX} = \frac{10}{16}$$

$$QX = \frac{5 \times 16}{10}$$



$QX = \frac{80}{10}$

QX = 8 cm

4. In the fig. LM || CB and LN || CD, Prove that $\frac{AM}{AB} = \frac{AN}{AD}$

LM || CB

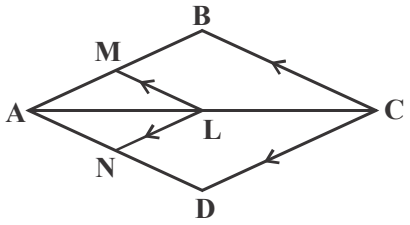
$\frac{AM}{AB} = \frac{AL}{AC}$ .....(1)

LN || CD

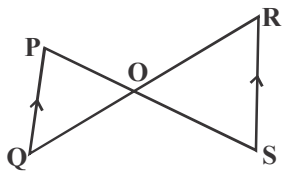
$\frac{AL}{AC} = \frac{AN}{AD}$ .....(2)

(1) and (2)

$\frac{AM}{AB} = \frac{AN}{AD}$



5. In the figure ΔPOQ ~ ΔSOR and PQ : RS = 1 : 2. Find OP : OS.



1 : 2

UNIT - 3

PAIR OF LINEAR EQUATIONS WITH TWO VARIABLES

Remember : For two linear equations

$$a_1x + b_1y + c_1 = 0 \quad \text{and} \quad a_2x + b_1y + c_2 = 0$$

Sl. No	Ratio Relation	In Graph	Solutions	Consistency
1	$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$	Intersect	Unique Solution	Consisten lines
2	$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$	Coincide each other	Infinite solution	Inconsistent
3	$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$	Parallel lines	No Solution	Inconsistent line

Complete the table as Directed

Sl. No	Equations	Co-efficients	Satisfying Criteria	Curve on Graph	Solution	Consistency
1	2x+3y–9=0 4x+6y–18=0	$a_1 = 2$ $a_2 = 4$ $b_1 = 3$ $b_2 = 6$ $c_1 = -9$ $c_2 = -18$	$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$	Coincide each other	Infinite solution	Inconsistent
2	5x–4y+8=0 7x+6y–9=0					
3	9x+3y+12=0 18x+6y+24=0					
4	6x–3y+10=0 2x–y+9=0					

Solve the following equations :

1. 3x + 4y = 10
2x – 2y = 2

3x + 4y = 10 ..... (1)
2x – 2y = 2 ..... (2)
Multiply Eq (1) by 2 and Eq (2) by 4
6x + 8y = 20
8x – 8y = 8
14x = 28

$x = \frac{28}{14}$

x = 2
Put x = 2 in Eq (1)
3(2) + 4y = 10
6 + 4y = 10
4y = 10 – 6
4y = 4

$y = \frac{4}{4}$

y = 1

2. $x + y = 5$
$2x - 3y = 5$

3. $2x + 3y = 11$
$2x - 4y = -24$

4. $\mathbf{2x + y - 6 = 0}$
$\mathbf{2x - y + 2 = 0}$

5. The numerator of a fraction is 3 less than its denominator. If the fraction obtained on adding 2 to both numerator and denominator to the original fraction, then it becomes $\mathbf{\frac{29}{20}}$**. Find the Fraction.**

Fraction = $\frac{x-3}{x}$

When 2 added to numerator and denominator : $\frac{x-3+2}{x+2} = \frac{x-1}{x+2}$

$$\frac{x-3}{x} + \frac{x-1}{x+2} = \frac{29}{20}$$

$$\frac{2x^2 - 2x - 6}{x^2 + 2x} = \frac{29}{20}$$

$40x^2 - 40x - 120 = 29x^2 + 58x$

$11x^2 - 98x - 120 = 0$

$\Rightarrow\ 11x^2 - 110\,x + 12x - 120 = 0$

$\Rightarrow\ (11x + 12)\,(x - 10) = 0$

$\Rightarrow\ x - 10 = 0$

$\Rightarrow\ x = 10$

Fraction = $\frac{x-3}{x} = \frac{10-3}{10} = \frac{7}{10}$

6. If 2 is added to both numerator and denominator it becomes $\frac{9}{11}$. If 3 is added to the same fraction, it becomes $\frac{5}{6}$. Find out the fraction.

7. A two digit number is equal to four times the sum of its digits and three times the product of its digits as well. Find the number.

Unit place digit = y

10th place digit = x

number = 10x + y

According to data

$10x + y = 4(x + y)$

$10x + y - 4x - 4y = 0$

$6x - 3y = 0$

$3y = 6x$

$y = 2x$

No = 3 × product of digits

$10x + y = 3xy$

$10x + 2x = 3x(2x)$

$12x = 6x^2$

$6x^2 - 12x = 0$

$x = 0$ or $x = 2$

$Y = 2x$

$Y = 2 \times 2$

$Y = 4$

Then $10x + y = 10\ (2) + 4$

$= 20 + 4$

$= 24$

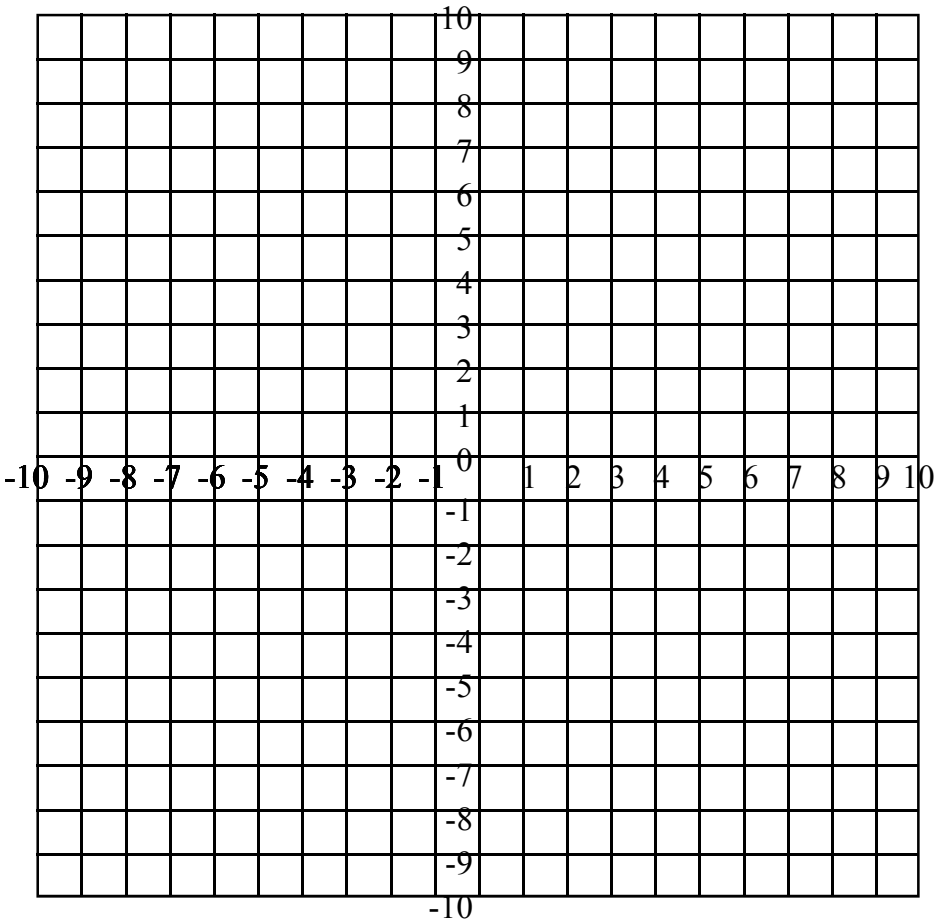
8. The sum of a two digit number and the number obtained by exchanging its digits is 66. If the difference between the digits is 2, Find the number.

SOLUTION BY GRAPH METHOD

1) $2x + y = 6$
$2x - y = 2$

$2x + y = 6 \Rightarrow y = 6 - 2x$			
x	0	1	2
$y = 6 - 2x$	$y = 6 - 2(0)$ $y = 6 - 0$ $y = 6$	$y = 6 - 2(1)$ $y = 6 - 2$ $y = 4$	$y = 6 - 2(2)$ $y = 6 - 4$ $y = 2$
y	6	4	2

$2x - y = 2 \Rightarrow y = 2x - 2$			
x	0	1	2
$y = 2x - 2$	$y = 2(0) - 2$ $y = 0 - 2$ $y = -2$	$y = 2(1) - 2$ $y = 2 - 2$ $y = 0$	$y = 2(2) - 2$ $y = 4 - 2$ $y = 2$
y	–2	0	2



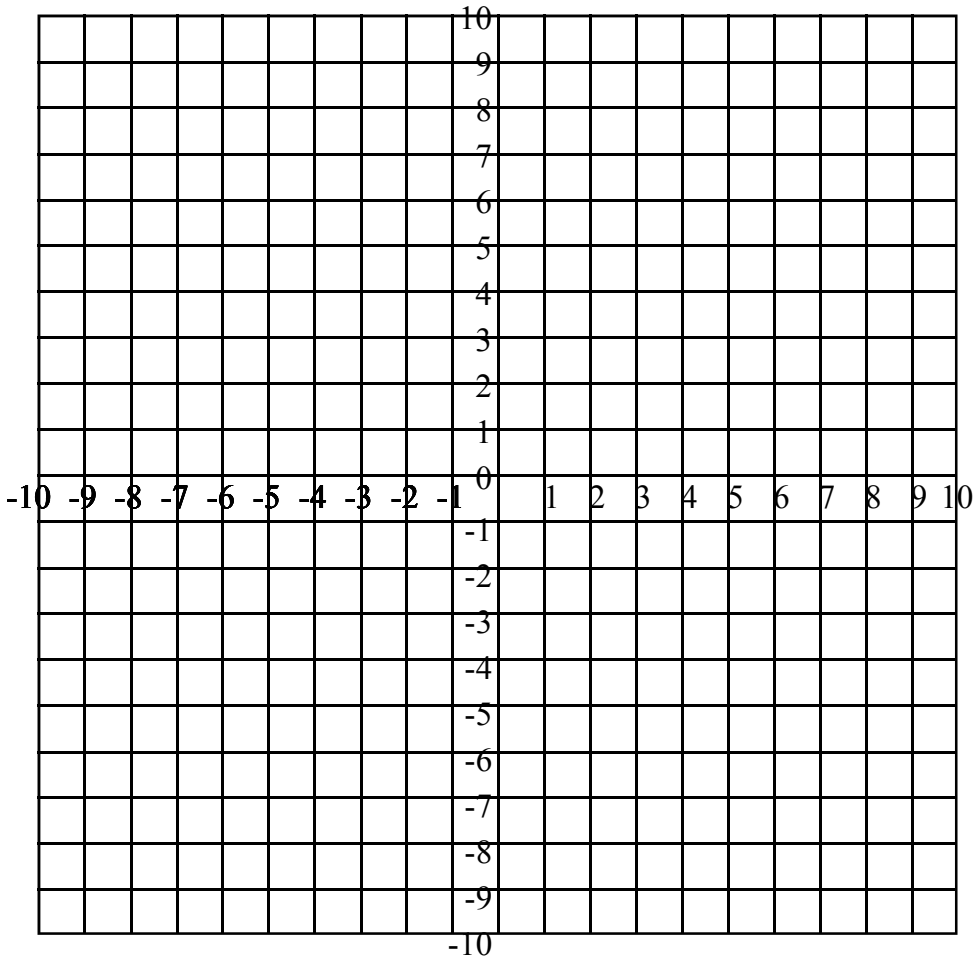
Solution : $x = 2$, $y = 2$

2) $x + y = 3$

$3x - 2y = 4$

x	0	1	2
y			

x	0	1	2
y			



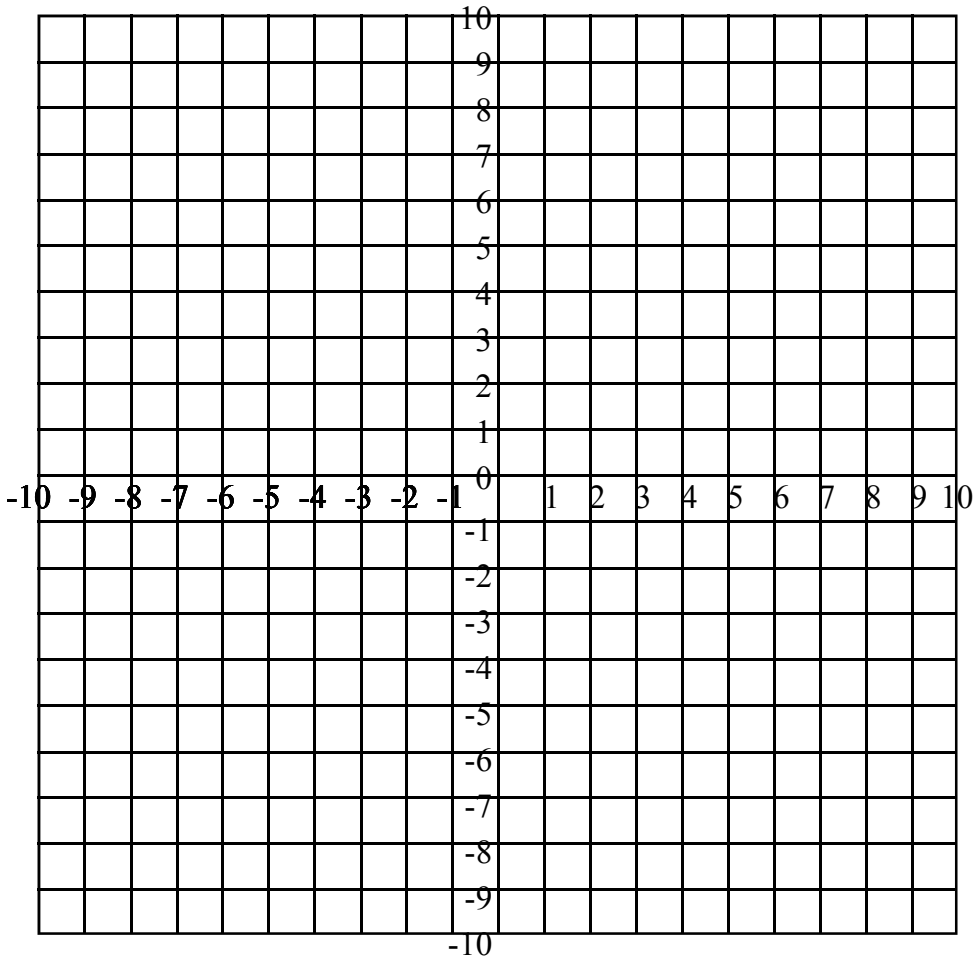
Solution :

3) $x + y = 4$

$2x - 3y = 3$

x	0	1	2
y			

x	0	1	2
y			

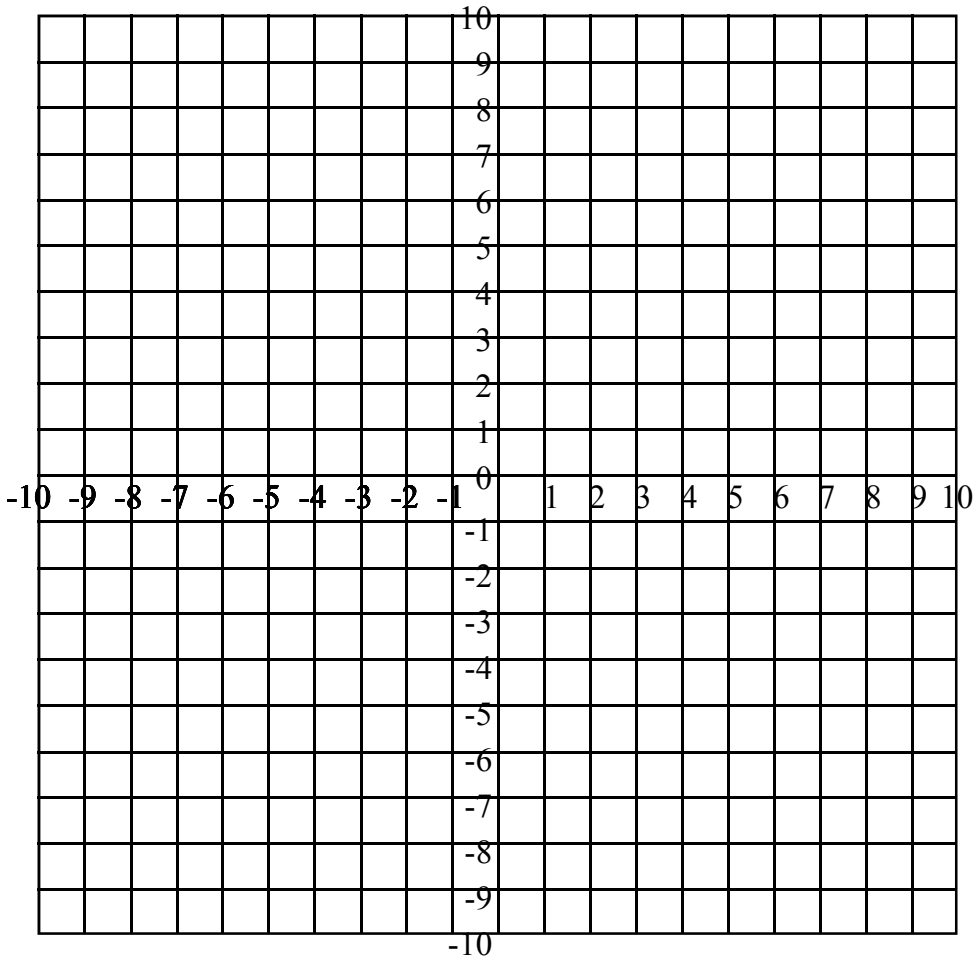


Solution :

4) $x + y = 3$
$2x + 5y = 12$

x	0	1	2
y			

x	0	1	2
y			



Solution :

PRACTICE PAPER

I. Fill in the Blanks : **4 x 1 = 4**

1. In equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, $\frac{a_1}{a_2} = \frac{b_1}{b_2}$, then :
   a) No Solution for equation b) Unique Solution for equation
   c) 3 Solutions d) Infinite Solutions
2. $4x + Py + 8 = 0$; $4x + 4y + 2 = 0$. In these linear equations, what is the value of P?
   a) 1 b) 4
   c) 0 d) 2
3. $x + y = 10$, $x - y = 4$ Solution of these equations is : .....
   a) $x = 7$, $y = 3$ b) $x = 7$, $y = 7$
   c) $x = 6$, $y = 4$ d) $x = 4$, $y = 6$
4. $x + 2y = 3$ and $2x + 4y = 7$ Naature of Curves of these pair of linear equation is .....
   a) Intersects b) Parallel
   c) Coincides d) None of the above.

II. Solve : **3 x 1 = 3**

5. The cost of 5 pencils and 7 pens is 50 Rs. Write an equation representing this statement.
6. If $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ the plots will be .....
7. How many solutions does an intersecting lines have?

III. Solve : **3 x 2 = 6**

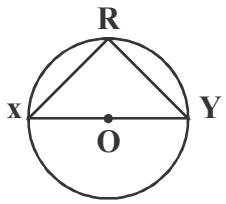
8. Solve : $2x + y = 11$, $x + y = 8$
9. Solve : $x + y = 5$, $2x - 3y = 5$
10. Find the value of k, if the equations have infinite solutions.
    $kx + 3y + (3-k) = 0$
    $12x + ky - k = 0$
11. If 2 is added to a fraction, it will become $\frac{9}{11}$. If 3 is added to the same fraction, it will be $\frac{5}{6}$. Find the fraction.
12. Solve using Graph :
    $2x + y = 5$ & $x + y = 4$

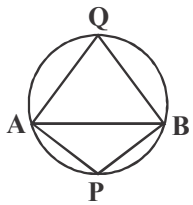
UNIT - 4

CIRCLES

Important points

- A line passing through the circle is called SECANT
- A line touching the circle at one point externally is called TANGENT
- Maximum number of tangents that can be drawn to one point of a circle is ONE only
- The point where tangent touches the circle is called POINT OF CONTACT
- Tangent drawn to a circle is always RIGHT ANGLED to the Radius at the point of contact.
- TWO tangents can be drawn to a circle from an external Point.
- Tangents drawn to a circle from an external point are EQUAL
- In the fig $\angle XRY = 90^0$
- $\angle AQB$ = ACUTE ANGLE
- $\angle APB$ = OBTUSE ANGLE





1. In the fig, if PQ = 12 cm, OP = 5 cm then OQ = _____ cm.

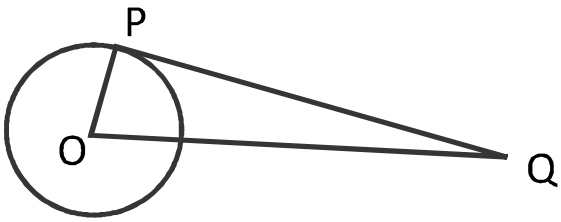
$OQ^2 = PQ^2 + OP^2$

$OQ = \sqrt{12^2 + 5^2}$

$OQ = \sqrt{144 + 25}$

$OQ = \sqrt{169}$

OQ = 13 cm



SOME PARTS OF CIRCLE

XY - Chord

P - Point of Contact

$\angle POS + \angle PRS = 180^0$

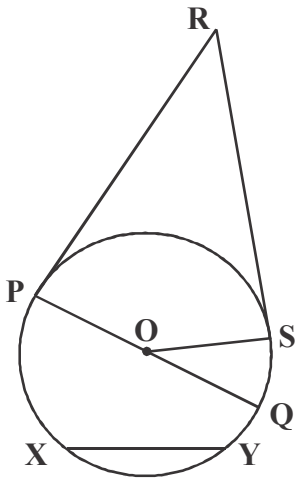
O - Centre of Circle

OQ = OP = OS = Radii

$\angle OPR = \angle OSR = 90^0$

RS = PR - Tangents from a external point R

PQ - Diameter

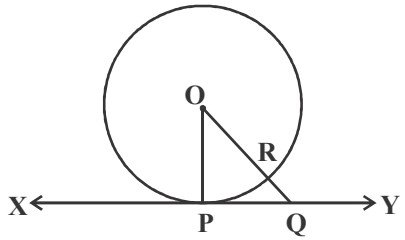


Theorem - 1

Statement : Tangent drawn to a circle is always RIGHT ANGLED to the Radius at the point of contact.

Data : XY is Tangent touching the circle at P.

OP is the Radius



To Prove : OP ⊥ XY

Construction : Mark Q any where on XT. Join O

Proof :

In the Figure OR < OQ

But OR = OP (Radii of Circle)

∴ OP < OQ

Hence for any point Q anywhere on XY

OP < OQ (Line joining the shortest distance is always Right Angled.

∴ OP is the shortest distance between O & P

Therefore OP ⊥ XY

Theorem - 2

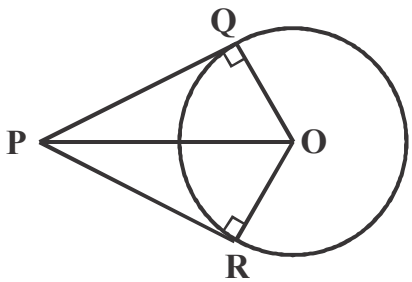
Statement : Tangents drawn to a circle from an external point are equal.

Data : PQ and PR are the tangents of the circle.

To Prove : PQ = PR

Construction : Join OQ, OR and OP

Proof :



In ΔPQO and ΔPRO

OQ = OR (Radii)

OP = OP (Common side)

$\angle PQO = \angle PRO = 90^0$

Hence ΔPQO = ΔPRO (SAS)

Therefore PQ = PR

1. **Circumference of a circle is 15 cm more than the diameter of the circle. Find the Radius of the circle.**

   Circumference = 2r + 15

   2πr = 2r + 15

   2πr – 2r = 15

$2 \times \frac{22}{7} r - 2r = 15$ (multiply by 7)

2 x 22r – 14r = 105

30r = 105

$r = \frac{105}{30} = 3.5$ cm

2. In the fig. Prove that $\angle AOP = \angle BOP$

In ΔAOP and ΔBOP

$\angle OAP = \angle OBP = 90^0$ [∴ OA ⊥ AP, OB ⊥ BP]

OP = OP [Common side]

OA = OB [Radius]

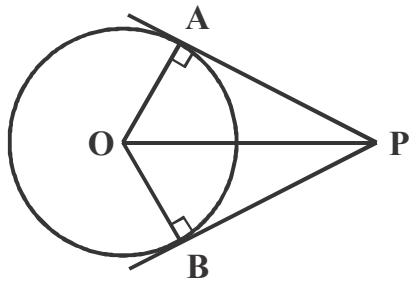
According to RHS theorem

ΔAOP ≅ ΔBOP

Therefore 1) AB = BP

2) $\angle AOP = \angle BOP$

3) $\angle OPA = \angle OPB$

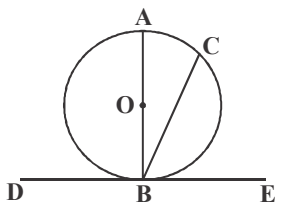


PRACTICE PAPER

1. Maximum number of tangents that can be drawn to a circle from an external point is .....

   a) 1 b) 2
   c) 3 d) 4

2. In the fig. BC is,

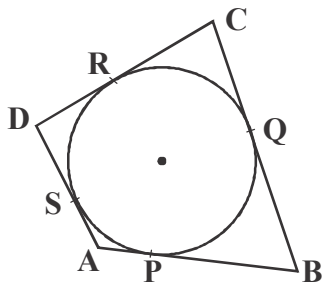


   a) Radius b) Chord
   c) Diameter d) Tangent

3. If the length of a tangent drawn to a circle from a point 5 cm away from the centre is 4 cm, its Diameter is .....

   a) 3 cm b) 6 cm
   c) 8 cm d) 10 cm

4. Length of the tangent drawn to a circle of radius 3 cm from a point 5 cm away from the centre is .....
   a) 4 cm b) 5 cm
   c) 3 cm d) 2 cm
5. If Chord AB makes an angle of 50^0 at the centre of a circle, What is the angle between the Tangents at A and B drawn from an External Point.
   a) 40^0 b) 100^0
   c) 130^0 d) 120^0
6. Prove that the Perpendicular drawn to the tangent at the point of Contact Passes through the centre.
7. Two Concentric cricles of 5 cm and 3 cm are drawn such that the Chord to Bigger circle externally touching the inner circle. Find the length of the Chord.
8. In the Fig. Prove that AB + CD = AD + BC.

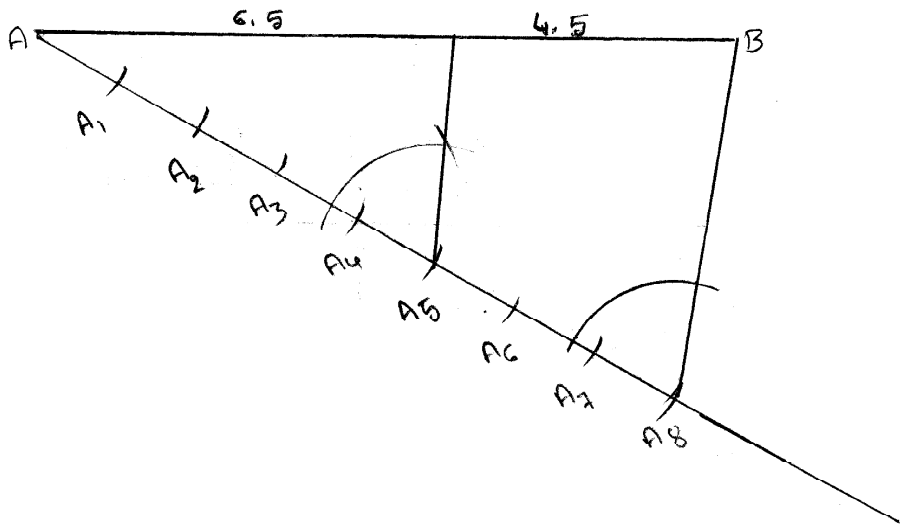


9. Prove that Parallelogram circumscribing in a circle is a Rhombus.

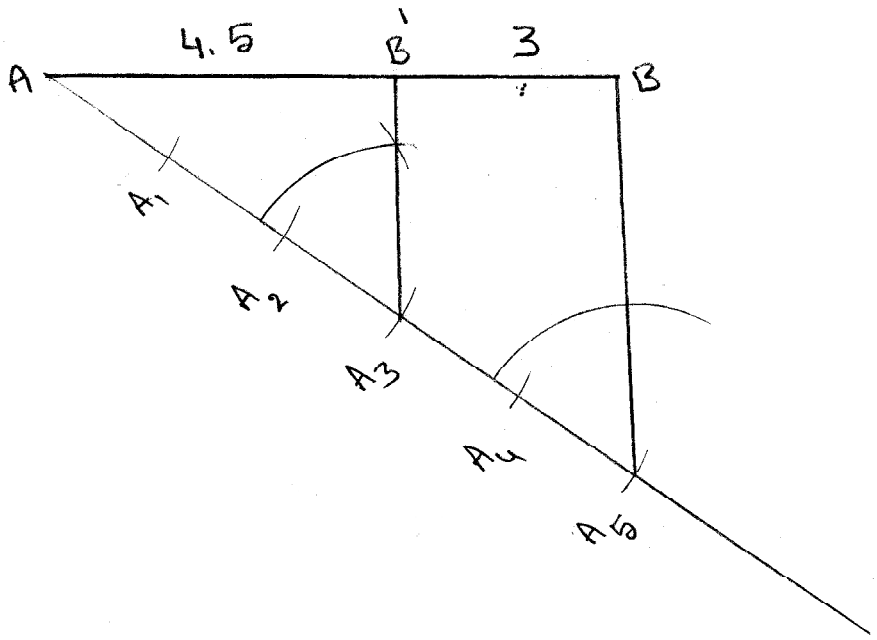
Unit - 5

CONSTRUCTION

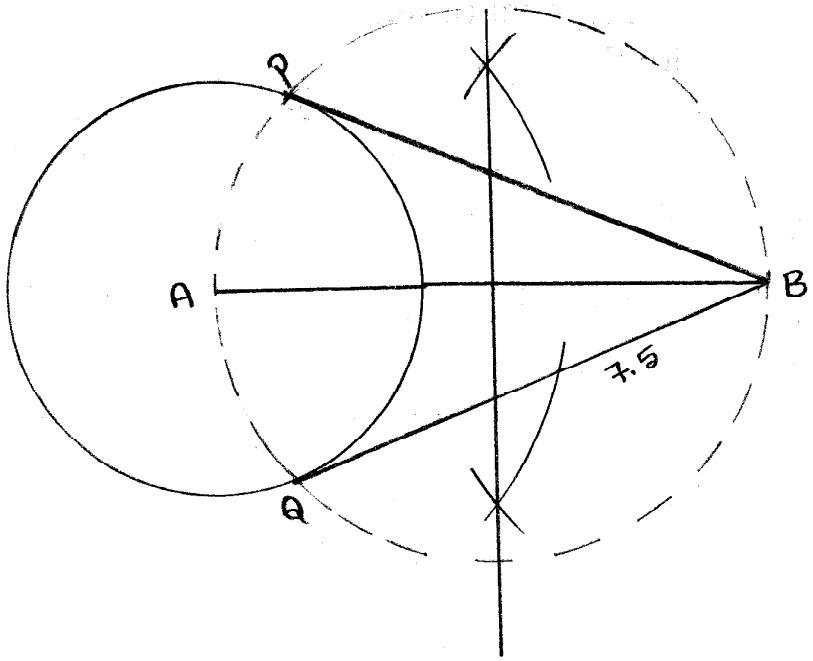
1. Draw a line segment of length 11 cm and divide it in the ratio 5:3. Measure the two parts.



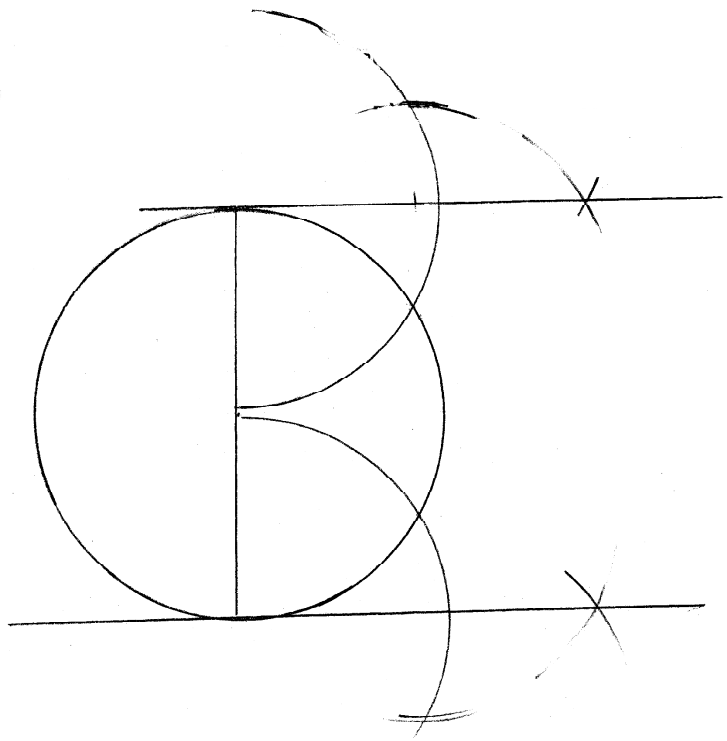
2) Draw a line segment of length 7.6 cm and divide it in the ratio 3:2 measure the two parts.



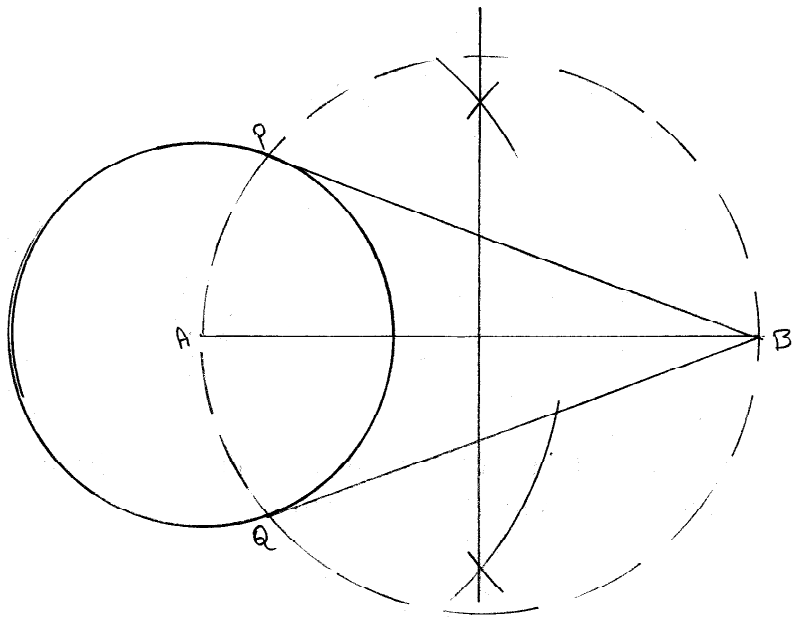
3) Draw a circle of radius 3cm from a point away from its circle, construct a pair of tangent to the circle and measure their length.



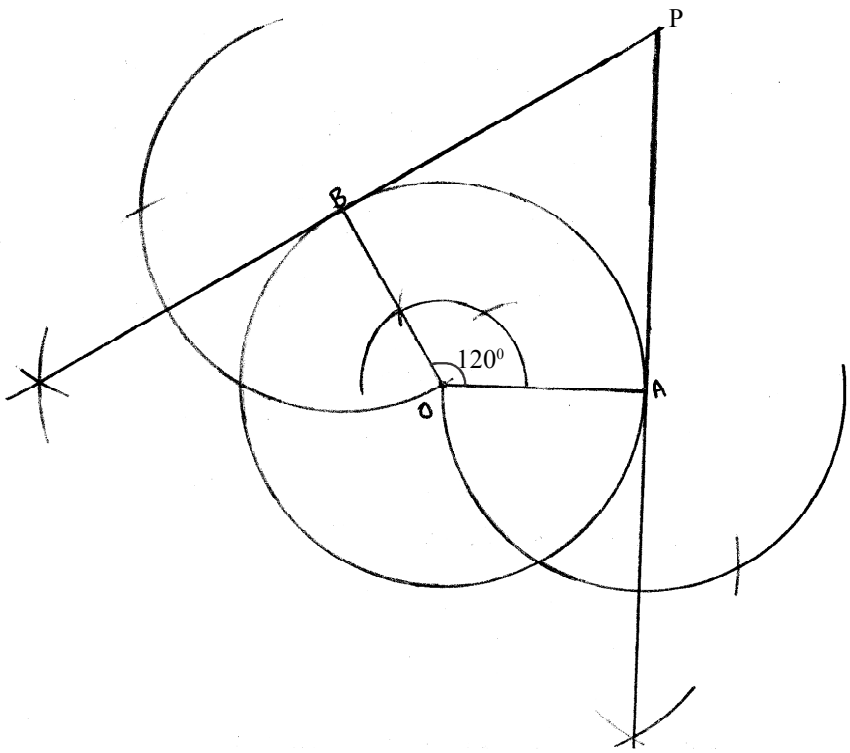
4) Draw a circle of radius 4cm, marks a diameter construct a pair of tangents on either sides.



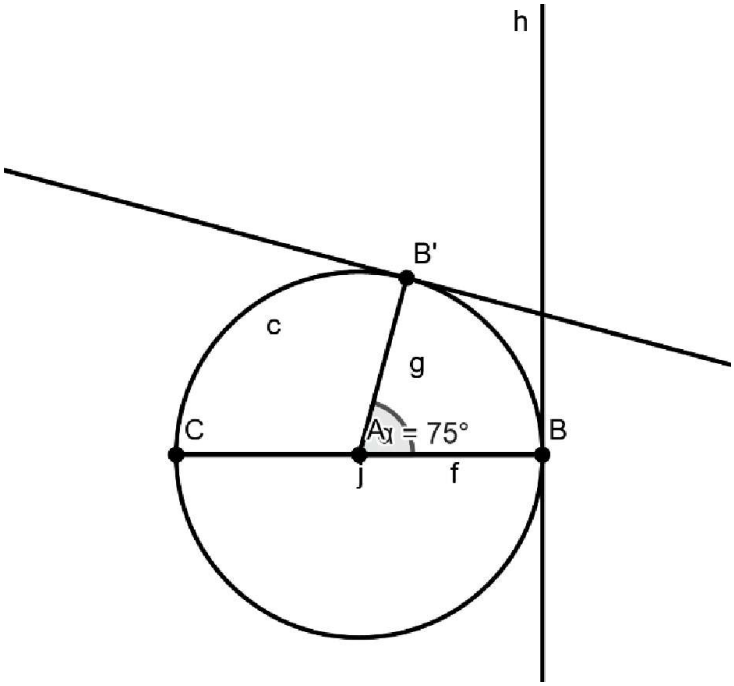
5) Draw a circle of radius 4 cm draw a diameter 7 cm from a point of 10 cm away from its centre. Construct the pair of tangents to the circle and measure the length.



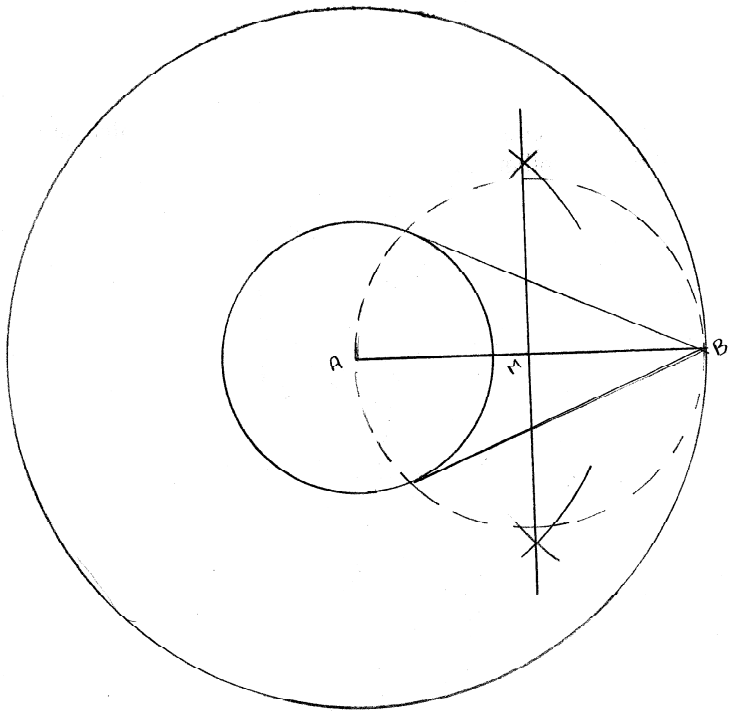
6) Draw a pair of tangents to a circle of radius 3.5 cm which are inclined to each other at an angle 60^0.



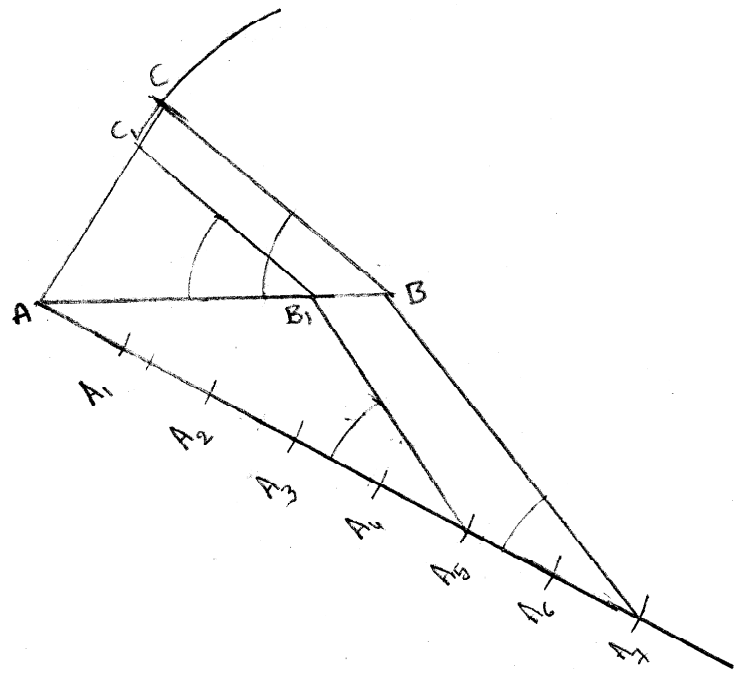
7) Draw a pair of tangents to a circle of diameter 6 cm which are angle between their radii are 75^0.



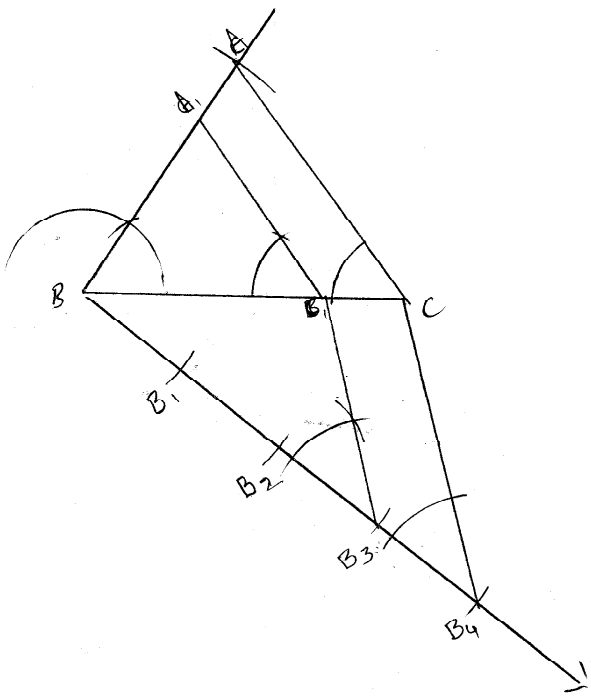
8) construct a triangle to a circle of radius 3 cm from a point on the concentric circle of radius 8 cm and measure the length. Also verify the measurement by actual calculation.



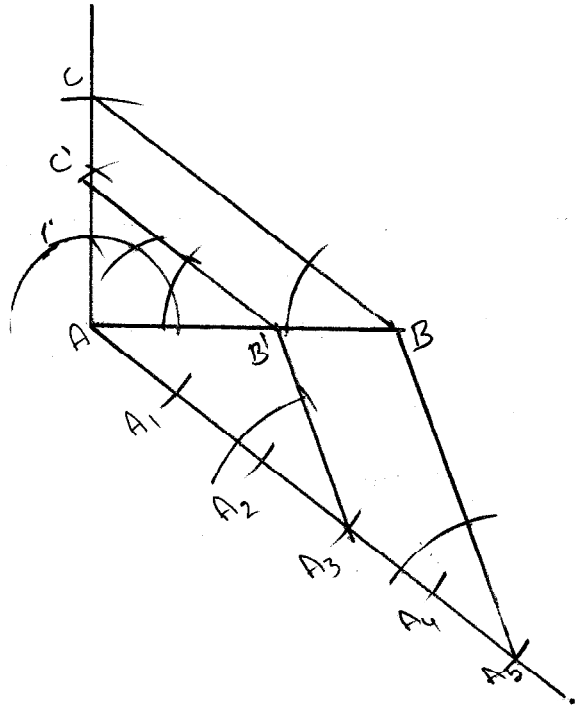
9) Construct a triangle of side 5 cm, 6 cm and 7 cm and then another triangle whose side are 5/7 of the corresponding side of the first triangle.



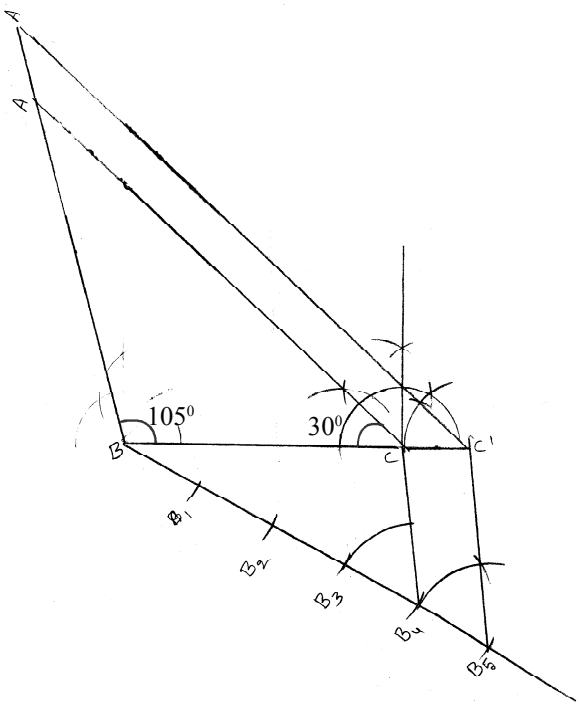
10) Draw a triangle ABC with side BC = 6 cm; AB = 5 cm and $\angle ABC = 60^0$. Then construct a triangle whose side are 3/4 of the corresponding sides of triangle ABC.



11) Draw a right triangle in which the sides (other than hypotenuse) are of length 4 cm and 3 cm. Then construct another triangle whose side are 3/5 times the corresponding sides of the given triangle.



12) Draw a triangle ABC with sides BC = 7 cm; $\angle B = 105^0$; $\angle A = 45^0$. Then construct a triangle whose side are 5/4 of the corresponding sides of triangle ABC.



PRACTICE PAPER

Marks : 25

I. 1 Mark Questions : 1 x 1 = 1

1. Draw a line segment of length 8 cm and divide it in the ratio 5 : 3. Measure the two parts.

II. 2 Marks Questions : 2 x 6 = 12

2. Draw a line segment of length 8.6 cm and divide it in the ratio 3 : 2. Measure the two parts.
3. Draw a circle of radius 3.5 cm. From a point 4.5 cm away from its circle, construct the pair of tangents to the circle and measure the length.
4. Draw a circle of diameter 7 cm, marks a diameter, construct a pair of tangents on either sides.
5. Draw a circle of diameter 7 cm. From a point 11 cm away from it centre, construct the pair of tangents to the circle and measure the length.
6. Draw a pair of tangents to a circle of radius 4 cm which are inclined to each other at an angle of 60^0.
7. Draw a pair of tangents to a circle of diameter 6 cm which are angle between their radii are 75^0.

III. 3 Marks Questions : 3 x 4 = 12

8. Construct a triangle with sides 5 cm, 6 cm, 7 cm and then another triangle whose sides are 4/3 of the corresponding sides of the first triangle.
9. Draw a triangle PQR with side QR = 6 cm, PQ = 5 cm and PQR = 60^0. Then construct a triangle whose sides are 5/3 of the corresponding sides of the triangle PQR.
10. Draw a right angle triangle in which the sides (other than hypotenuse) are the length 8 cm and 6 cm. Then construct another triangle whose sides are 3/5 times the corresponding sides of the given triangle.
11. Draw a triangle XYZ with sides YZ = 7 cm, Y = 45^0, X = 105^0. Then, construct a triangle whose sides are 3/4 of the corresponding sides of triangle XYZ.

UNIT - 6

COORDINATE GEOMETRY

1. **Formula to find out the distance between two points :** $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

2. **Section Formula : P (x, y) =** $\left[\frac{m_1x_2 + m_2x_1}{m_1 + m_2} \; \frac{m_1y_2 + m_2y_1}{m_1 + m_2}\right]$

3. **Mid Point Formula : P (x, y) =** $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

4. **Area of Triangle =** $\frac{1}{2}\left[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\right]$

Solve the following :

1. **Find the distance Origin and Points (6, 8)**

   Origin = (0, 0)

   $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

   $= \sqrt{(6-0)^2 + (8-0)^2}$

   $= \sqrt{6^2 + 8^2}$

   $= \sqrt{36 + 64}$

   $= \sqrt{100}$

   d = 10

2. **Find the distance between the points (–3, –2) and (3, 5)**

   $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

   $= \sqrt{(3-(-3))^2 + (5-2)^2}$

   $= \sqrt{(6)^2 + (3)^2}$

   $= \sqrt{36 + 9}$

   $= \sqrt{45}$

   $= \sqrt{9}.\sqrt{5}$

   d = $3\sqrt{5}$

3. Find the ratio in which the point p(–3, 0) divides the line A(–5, –4) and B(–2, 3).

$$\therefore -3 = \frac{m_1x_2 + m_2x_1}{m_1 + m_2}$$

$$\Rightarrow -3 = \frac{m_1(-2) + m_2(-5)}{m_1 + m_2}$$

$$\Rightarrow -3 = \frac{-2m_1 - 5m_2}{m_1 + m_2}$$

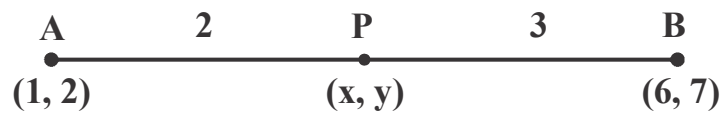
$$\Rightarrow -3m_1 - 3m_2 = -2m_1 - 5m_2$$

$$\Rightarrow -3m_1 + 2m_1 = -5m_2 + 3m_2$$

$$\Rightarrow -m_1 = -2m_2 \Rightarrow 2m_2 = m_1$$

$$\Rightarrow \frac{m_1}{m_2} = \frac{2}{1} \Rightarrow m_1 : m_2 = 2:1$$

4. Find the coordinates of the point P, which divides the line A (1, 2) and B (6, 7) in the ratio 2 : 3



AP : PB = 2 : 3

Using section formula,

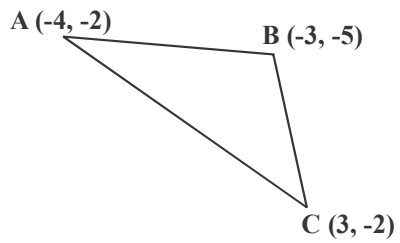
$$x = \frac{m_1x_2 + m_2x_1}{m_1 + m_2} \qquad y = \frac{m_1y_2 + m_2y_1}{m_1 + m_2}$$

$$x = \frac{2(6) + 3(1)}{2 + 3} \qquad y = \frac{2(7) + 3(2)}{2 + 3}$$

$$\Rightarrow x = \frac{12 + 3}{5} = 3 \qquad \Rightarrow y = \frac{14 + 6}{5} = 4$$

$\therefore$ P (x, y) = (3, 4)

5. Find the area of triangle ABC in the given Figure.



$$A = \frac{1}{2}\left[x_1(y_2 - y_3) + x_2(y_2 - y_1) + x_3(y_1 - y_2)\right]$$

$$= \frac{1}{2}\left[-4(-5-(-2)) + (-3)(-2-(-2)) + 3(-2-(-5))\right]$$

$$= \frac{1}{2}\left[-4(-3) - 3(0) + 3(3)\right]$$

$$= \frac{1}{2}[12+9]$$

$$= \frac{1}{2}[21]$$

= 10.5 Sq Units

6. Check whether the points (–4, –2), (2, 3) , (3, –2) are collinear or not

$$A = \frac{1}{2}\left[x_1(y_2 - y_3) + x_2(y_2 - y_1) + x_3(y_1 - y_2)\right]$$

$$= \frac{1}{2}\left[-4(3-(-2)) + 2(-2(-2)) + 3(-2-3)\right]$$

$$= \frac{1}{2}\left[-4(5) - 2(0) + 3(-5)\right]$$

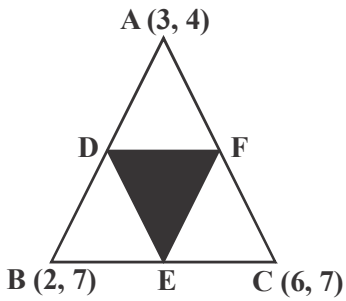
$$= \frac{1}{2}[-20 - 0 - 15]$$

$$= \frac{1}{2}[-35]$$

$= -17.5$

"as area of triangle is not Zero, the points are not Collinear".

7. Find the area of the triangle formed by joining the mid points of a triangle of vertices (3, 4) (2, 7) and (6, 7)



Mid Point of AB = $\frac{x_2 + x_1}{2} \quad \frac{y_2 + y_1}{2}$

$$\frac{3+2}{2} \quad \frac{4+7}{2}$$

$$D = \frac{5}{2}, \frac{11}{2}$$

Mid Point of BC = $\frac{x_2 + x_1}{2} \quad \frac{y_2 + y_1}{2}$

$$\frac{2+6}{2} \quad \frac{7+7}{2}$$

$$E = \frac{8}{2}, \frac{14}{2} = (4, 7)$$

Mid Point of AC = $\frac{x_2 + x_1}{2} \quad \frac{y_2 + y_1}{2}$

$$\frac{3+6}{2} \quad \frac{4+7}{2}$$

$$F = \frac{9}{2}, \frac{11}{2}$$

$$\text{Area of } \Delta DEF = \frac{1}{2}\left[x_1(y_2 - y_3) + x_2(y_2 - y_1) + x_3(y_1 - y_2)\right]$$

$$= \frac{1}{2}\left[\frac{5}{2}\left(7 - \frac{11}{2}\right) + 4\left(\frac{11}{2} - \frac{11}{2}\right) + \frac{9}{2}\left(\frac{11}{2} - 7\right)\right]$$

$$= \frac{1}{2}\left[\frac{5}{2}\left(\frac{3}{2}\right) + 4(0) + \frac{9}{2}\left(-\frac{3}{2}\right)\right]$$

$$= \frac{1}{2}\left[\frac{15}{4} - \frac{27}{4}\right]$$

$$= \frac{1}{2}\left[-\frac{12}{4}\right]$$

$$= \frac{1}{2} \times -3$$

$$A = \frac{-3}{2} \text{ Sq. unit}$$

PRACTICE PAPER

1. Find the Coordinates of point P which divides the line joining (–1, 7) and (4, –3) in the ratio 2 : 3.
2. Find the distance between the points (2, 3), (4, –1).
3. Verify whether the points (5, –2), (6, 4) and (7, –2) forms an Isosceles triangle or not.
4. In what ratio does the line joining the points (–3, 10) and (6, –8) is divided by the point (–1, 6).
5. Find the area of triangle whose vertices are : P (–1.5, 3), Q (6, –2) and R (–3, 4)
6. Find the area of a quadrilaterals whose vertices are (–4, –2), (–3, –5), (3, –2) and (2, 3) respectively.
7. Check whether (7, –2), (5, 1), (3, 5) are Collinear or not.

Unit - 7

QUADRATIC EQUATIONS

I.

1) Formula to find out the roots of equation $ax^2 + bx + c = 0$ is :

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

2) Formula to find out discriminant value of $ax^2 + bx + c = 0$ is :

$\Delta = b^2 - 4ac$

3) $2 - 3x^2 = -5x$: Write the equation in standard form and write the values of a, b, c .

$3x^2 - 5x - 2 = 0$

$a = 3;\quad b = -5;\quad c = -2$

4) Nature of Roots :

Sl. No	Criteria	Nature of roots
1	$\Delta = 0$	Real and Equal
2	$\Delta > 0$	Real and Distinct
3	$\Delta < 0$	No Roots

II. Solve the given quadratic equations by formula method.

1) $3x^2 - 5x + 2 = 0$

$a = 3;\quad b = -5;\quad c = 2$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{+5 \pm \sqrt{(-5)^2 - (4 \times 3 \times 2)}}{2 \times 3}$$

$$= \frac{5 \pm \sqrt{25 - 24}}{6}$$

2) $x^2 - 7x = 12$

$x^2 - 7x - 12 = 0$

$a = 1;\quad b = -7;\quad c = -12$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-7) \pm \sqrt{(-7)^2 - (4 \times 1 \times -12)}}{2 \times 1}$$

$$= \frac{5 \pm \sqrt{1}}{6}$$

$$= \frac{5+1}{6} \text{ or } \frac{5-1}{6}$$

$$= \frac{6}{6} \text{ or } \frac{4}{6}$$

$$\therefore\ x = 1 \text{ or } x = \frac{2}{3}$$

$$= \frac{7 \pm \sqrt{49-48}}{2} = \frac{7 \pm \sqrt{1}}{2}$$

$$= \frac{7+1}{2} \text{ or } \frac{7-1}{2}$$

$$= \frac{8}{2} \text{ or } \frac{6}{2}$$

$$= x = 4 \text{ or } x = 3$$

3) $\mathbf{4x^2 + 4x + 1 = 0}$

$a = 4;\quad b = 4;\quad c = 1$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-4 \pm \sqrt{4^2 - (4 \times 4 \times 1)}}{2 \times 4}$$

$$= \frac{-4 \pm \sqrt{16-16}}{8}$$

$$= \frac{-4 \pm \sqrt{0}}{8}$$

$$= \frac{-4}{8}$$

$$= \frac{-1}{2}$$

4) $\mathbf{5x^2 - 2x - 3 = 0}$

$a = 5;\quad b = -2;\quad c = -3$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{(-2) \pm \sqrt{(-2)^2 - (4 \times 5 \times -3)}}{2 \times 5}$$

$$= \frac{(-2) \pm \sqrt{4+60}}{10}$$

$$= \frac{(-2) \pm \sqrt{64}}{10}$$

$$= \frac{2 \pm 8}{10}$$

$$x = \frac{2+8}{10} \text{ or } x = \frac{2-8}{10}$$

$$x = \frac{10}{10} \text{ or } x = \frac{-6}{10}$$

$$x = 1 \text{ or } x = \frac{-3}{5}$$

III. Find the Nature of following :

1) $2x^2 - 6x + 3 = 0$

$ax^2 - bx + c = 0$

$a = 2;\ b = -6;\ c = 3$

$\Delta = b^2 - 4ac$

$\Delta = (-6)^2 - (4 \times 2 \times 3)$

$\Delta = 36 - 24$

$\therefore\ \Delta = 12$

$\therefore$ Distinct Roots and Real Roots.

2) $2x^2 - 3x + 5 = 0$

$ax^2 + bx + c = 0$

$a = 2;\ b = -3;\ c = 5$

$\Delta = b^2 - 4ac$

$\Delta = (-3)^2 - (4 \times 2 \times 5)$

$\Delta = 9 - 40$

$\therefore\ \Delta = -31$

$\therefore$ Imaginary Roots.

3) $x^2 + 2x + 1 = 0$

$ax^2 + bx + c = 0$

$a = 1;\ b = 2;\ c = 1$

$\Delta = b^2 - 4ac$

$\Delta = 2^2 - (4 \times 1 \times 1)$

$\Delta = 4 - 4$

$\therefore\ \Delta = 0$

$\therefore$ Equal Roots

4) $5x - 2 = 3x^2$

$ax^2 + bx + c = 0$

$-3x^2 + 5x - 2 = 0$

$\therefore\ 3x^2 - 5x - 2 = 0$

$a = 3;\ b = -5;\ c = -2$

$\Delta = b^2 - 4ac$

$\Delta = (-5)^2 - (4 \times 3 \times -2)$

$\Delta = 25 + 24$

$\therefore\ \Delta = 29$

$\therefore$ Distinct Roots and Real Roots.

IV.

1) $2x^2 - Kx + 3 = 0$ **If the equation has Real Roots, Find the value of K.**

$2x^2 - kx + 3 = 0$

$ax^2 + bx + c = 0$

$a = 2;\ b = -k;\ c = 3$

As roots are Equal

$\Delta = 0$

$b^2 - 4ac = 0$

$(-k)^2 - (4 \times 2 \times 3) = 0$

$k^2 - 24 = 0$

$k^2 = 24$

$k = \pm\sqrt{24}$

$k = \pm\sqrt{4 \times 6}$

$k = \pm 2\sqrt{6}$

2) For what value of 'm' of equation $x^2 + mx + 4 = 0$ the roots are (a) Equal (b) Distinct (c) No Roots

$x^2 + mx + 4 = 0$

$a = 1;\quad b = m;\quad c = 4$

a) When Roots are equal $\Delta = 1$

$\therefore\ b^2 - 4ac = 0$

$(m)^2 - (4 \times 1 \times 4) = 0$

$m^2 - 16 = 0$

$m^2 = 16$

$m = \pm\sqrt{16}$

$\therefore\ m = \pm 4$

b) When Roots are Distinct :

$m > \pm 4$

c) No Roots :

$m < \pm 4$

Notes :

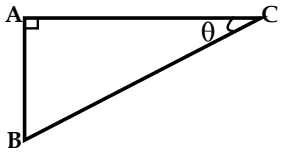
1) Discriminant value of $ax^2 + bx + c = 0$ is $\mathbf{b^2 - 4ac = 0}$
2) Standard form of quadratic equation $\mathbf{ax^2 + bx + c = 0}$
3) $ax^2 + bx + c = 0$ if $a = c$ then the roots are in Reciprocal Relation.

PRACTICE PAPER

1. What is the formula to find out the roots of quadratic equation.
2. What is the Formula to find out discriminant value of quadratic equation.
3. $5 + 8x^2 = -5x$: Write the equation in standard form. Find its discriminant value and write the Nature of Roots.
4. Solve using Formula : $2x^2 + 5x - 3$.
5. Solve : $3 - 5x = x^2$.
6. Find the Nature of Roots of the Equation : $3x^2 - 5x + 6 = 0$
7. $3x^2 - Kx + 4 = 0$ if the equation has Real Roots, Find the value of K.
8. For what values of m of equation $x^2 + mx + 4 = 0$, the roots are (a) Equal (b) Distinct.
9. Write the three Relation between Nature of Roots and the discriminant Value.

UNIT - 8

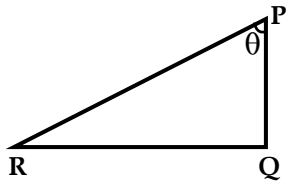
INTRODUCTION TO TRIGONOMETRY

	$\sin\theta = \frac{Opp}{Hyp} = \frac{AB}{BC}$	$\cos\theta = \frac{Adj}{Hyp} = \frac{AC}{BC}$	$\tan\theta = \frac{Opp}{Adj} = \frac{AB}{AC}$
	$\text{cosec}\,\theta = \frac{Hyp}{Opp} = \frac{BC}{AB}$	$\sec\theta = \frac{Hyp}{Adj} = \frac{BC}{AC}$	$\cot\theta = \frac{Adj}{Opp} = \frac{AC}{AB}$

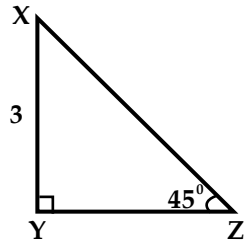
Write the relation of trigonometric ratios

1.	$\sin\theta$ and $\text{cosec}\,\theta$	(a) $\sin\theta = \frac{1}{\text{cosec}}$	(b) $\text{cosec}\,\theta = \frac{1}{\sin}$
2.	$\cos\theta$ and $\sec\theta$	(a) $\cos\theta = \frac{1}{\sec}$	(b) $\sec\theta = \frac{1}{\cos}$
3.	$\tan\theta$ and $\cot\theta$	(a) $\tan\theta = \frac{1}{\cot}$	(b) $\cot\theta = \frac{1}{\tan}$
4.	$\sin\theta$, $\cos\theta$ and $\tan\theta$	$\tan\theta = \frac{\sin}{\cos}$	
5.	$\sin\theta$, $\cos\theta$ and $\cot\theta$	$\cot\theta = \frac{\cos}{\sin}$	

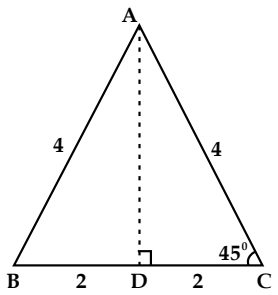
If $5\cos\theta = 3$ then, write the values of ratios

	$\sin\theta = \frac{3}{5}$	$\cos\theta = \frac{3}{5}$	$\tan\theta = \frac{4}{3}$
	$\text{cosec}\,\theta = \frac{5}{3}$	$\sec\theta = \frac{5}{3}$	$\cot\theta = \frac{3}{4}$

4) Δxyz is isosceles Right angle triangle, then complete the tabel.

	$\sin 45^0 = \frac{3}{5}$	$\cos 45^0 = \frac{4}{5}$	$\tan 45^0 = \frac{3}{4}$
	$\text{cosec } 45^0 = \frac{5}{3}$	$\sec 45^0 = \frac{5}{4}$	$\cot 45^0 = \frac{4}{3}$

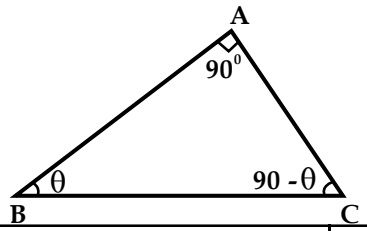
5) ΔABC is isosceles triangle, then complete the tabel.

	$\sin 30^0 = \frac{2}{4} = \frac{1}{2}$	$\cos 30^0 = \frac{2\sqrt{3}}{4} = \frac{\sqrt{3}}{2}$	$\tan 30^0 = \frac{1}{\sqrt{3}}$
	$\text{cosec } 30^0 = \frac{2}{1} = 2$	$\sec 30^0 = \frac{2}{\sqrt{3}}$	$\cot 30^0 = \sqrt{3}$
	$\sin 60^0 = \frac{2\sqrt{3}}{4} = \frac{\sqrt{3}}{2}$	$\cos 60^0 = \frac{2}{4} = \frac{1}{2}$	$\tan 60^0 = \sqrt{3}$
	$\text{cosec } 60^0 = \frac{2}{\sqrt{3}}$	$\sec 60^0 = 2$	$\cot 60^0 = \frac{1}{\sqrt{3}}$

Fill in the given table

	0	1	ND
Trigonometric ratios	$\sin 0^0$ $\cos 90^0$ $\tan 0^0$ $\cot 90^0$	$\sin 90^0$ $\cos 0^0$ $\tan 45^0$ $\cot 45^0$	$\tan 90^0$ $\cot 0^0$ $\text{cosec } 0^0$ $\sec 0^0$

Fill in the given table



$\sin\theta = \frac{AC}{BC}$	$\sin(90-\theta) =$	$\therefore \sin\theta = \cos(90-\theta)$
$\cos\theta = \frac{AB}{BC}$	$\cos(90-\theta) = \frac{AC}{BC} = \sin\theta$	$\therefore \cos\theta = \sin(90-\theta)$
$\tan\theta = \frac{AC}{AB}$	$\tan(90-\theta) = \cot\theta = \frac{AB}{AC}$	$\therefore \tan\theta = \cot(90-\theta)$
$\cot\theta = \frac{AB}{AC}$	$\cot(90-\theta) = \tan\theta = \frac{AC}{AB}$	$\therefore \cot\theta = \tan(90-\theta)$
$\text{cosec}\,\theta = \frac{BC}{AC}$	$\text{cosec}(90-\theta) = \sec\theta = \frac{BC}{AB}$	$\therefore \text{cosec}\,\theta = \sec(90-\theta)$
$\sec\theta = \frac{BC}{AB}$	$\sec(90-\theta) = \text{cosec}\,\theta = \frac{BC}{AC}$	$\therefore \sec\theta = \text{cosec}(90-\theta)$

Trigonometric Ratios

u	0^0	30^0	45^0	60^0	90^0
Sin	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
Cos	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
Tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	ND
Cot	ND	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
Sec	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	ND
Cosec	ND	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1

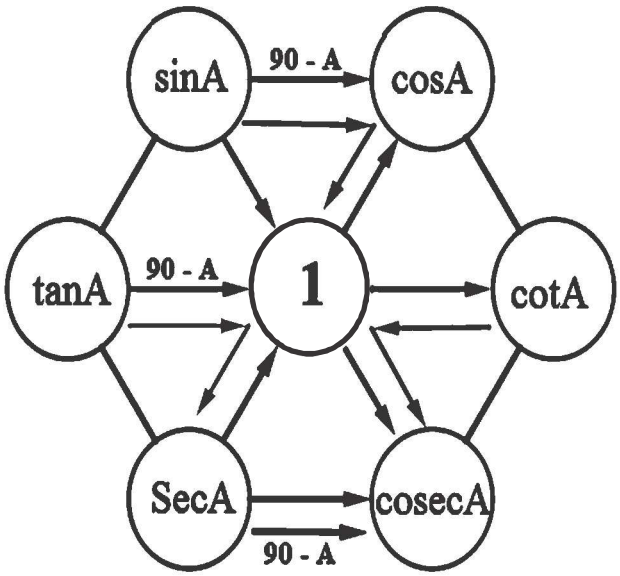
$\text{Sin}^2A + \text{Cos}^2A = 1$

$\tan^2 + 1 = \sec^2A$

$1 + \cot^2A = \text{cosec}^2A$

$$\frac{\sin A}{\cos A} = \tan A$$

$$\frac{\cos A}{\sin A} = \cot A$$



I. Solve the following :

1. Find the value of : $\dfrac{5\text{Cos}^2 60^0 + 4\text{Sec}^2 30^0 - \tan^2 45^0}{\text{Sin}^2 30^0 + \text{Cos}^2 30^0}$

$$= \frac{5\times\left(\frac{1}{2}\right)^2 + 4\left(\frac{2}{\sqrt{3}}\right)^2 - 1}{\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2}$$

$$= \frac{5\times\left(\frac{1}{4}\right) + 4\left(\frac{4}{3}\right) - 1}{\frac{1}{4} + \frac{3}{4}} = \frac{\frac{5}{4} + \frac{16}{3} - 1}{1}$$

$$= \frac{5}{4} + \frac{16}{3} - 1 = \frac{79}{12} - 1 = \frac{67}{12}$$

2. Find the value of : $\sin 60^0 \cos 30^0 + \sin 30^0 \cos 60^0$

$$= \frac{\sqrt{3}}{2}\cdot\frac{\sqrt{3}}{2} + \frac{1}{2}\cdot\frac{1}{2}$$

$$= \frac{\left(\sqrt{3}\right)^2}{4} + \frac{1}{4} = \frac{3}{4} + \frac{1}{4}$$

$$= \frac{4}{4} = 1$$

3. Find the value of : 2 $\tan^2 45^0 + \cos^2 30^0 - \sin^2 60^0$

$$= 2(1)^2 + \left(\frac{\sqrt{3}}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2$$

$$= 2 + \frac{3}{4} - \frac{3}{4}$$

$$= 2$$

4. Evaluate : $\dfrac{\tan 65^0}{\cot 25^0}$

$$= \frac{\tan\left(90 - 25^0\right)}{\cot 25^0} = \frac{\cot 25^0}{\cot 25^0} = 1$$

5. Prove that : $\tan 48^0 \tan 23^0 \tan 42^0 \tan 67^0 = 1$

$$= \tan 48^0 \times \tan 23^0 \times \frac{1}{\cot 42^0} \times \frac{1}{\cot 23^0} = 1$$

6. Find the value of : cosec 31^0 – sec 59^0

cosec 31^0 – sec 59^0

= cosec 31^0 – sec $(90 - 31^0)$

= cosec 31^0 – cosec 31^0

PRACTICE PAPER

1. If 3 Sec = 5 Find the value of all other trigonometric functions.
2. $\cos 48^0 - \sin 42^0 = ?$
3. Prove that : $\cos 38^0 \cos 52^0 - \sin 38^0 \sin 52^0 = 0$
4. $2 \tan^2 45^0 + \cos^2 30^0 - \sin^2 60^0$.
5. $\dfrac{\sin 30^0 + \tan 45^0 - \text{cosec } 60^0}{\sec 30^0 + \cos 60^0 + \cos 45^0}$
6. Tabulate the values of trigonometric functions for 0^0, 30^0, 45^0, 60^0 and 90^0.
7. Write the Inverse of all trigonometric functions.
8. State three Trigonometric Identities.

UNIT - 9

APPLICATION OF TRIGONOMETRY

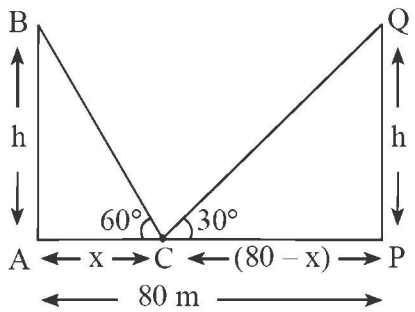
1. **Two poles of equal heights are standing opposite each other on either side of the road, which is 80m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60^0 and 30^0, respectively. Find the height of the poles and the distances of the point from the poles.**

In Right angle ΔABC, $\angle C = 60^0$.

$$\tan 60^0 = \frac{AB}{AC}$$

$$\sqrt{3} = \frac{h}{x}$$

$$h = \sqrt{3}x \quad .....(1)$$



Again in right angle ΔPQC, $\angle C = 30^0$.

$$\tan 30^0 = \frac{PQ}{PC} = \frac{h}{(80-x)}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{(80-x)}$$

$$h = \frac{(80-x)}{\sqrt{3}} \quad .....(2)$$

From (1) and (2)

$$\sqrt{3}x = \frac{80-x}{\sqrt{3}}$$

3x = 80 – x
4x = 80
x = 20 m
∴ AC = 20m
CP = 60 m
Height of Pole = $20\sqrt{3}$ m

2. **From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60^0 and the angle of depression of its foot is 450. Determine the height of the tower.**

Let AB be the height of tower
AB = (h + 7) m and PQ be the height of building

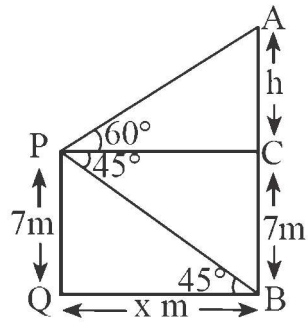
In Right angle ΔPQB, $\angle B = 45^0$

$$\tan 45^0 = \frac{PQ}{BQ}$$

$1 = \frac{PQ}{BQ}$ [PQ = 7 m]

BQ = 7 m

Again In Right angle ΔAPC, $\angle P = 60^0$



$\tan 60^0 = \frac{AC}{PC}$

$\sqrt{3} = \frac{h}{PC}$

$h = PC\sqrt{3}$ (PC = BQ = 7 m)

$h = 7\sqrt{3}$

So, height of tower = AB = 7 + h

$= 7 + 7\sqrt{3}$

$= 7\left(\sqrt{3}+1\right)m$

3. As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30^0 and 45^0. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.

Let the height of light house be AB = 75 m and

Distance between the two ships be DC = x

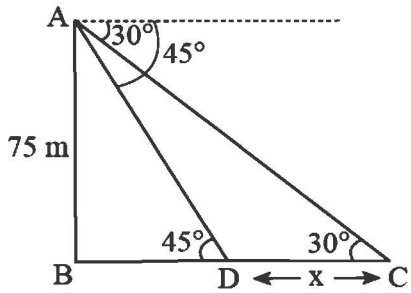
In Right angle ΔABD, $\angle D = 45^0$.

$\tan 45^0 = \frac{AB}{BD}$

$1 = \frac{75}{BD}$

BD = 75 m

In Right angle ΔABC, $\angle C = 30^0$.



$\tan 30^0 = \frac{AB}{BC}$

$\frac{1}{\sqrt{3}} = \frac{75}{BD + DC}$

$\frac{1}{\sqrt{3}} = \frac{75}{75 + x}$

$75 + x = 75\sqrt{3}$

$x = 75\sqrt{3} - 75$

$x = 75\left(\sqrt{3}-1\right)m$

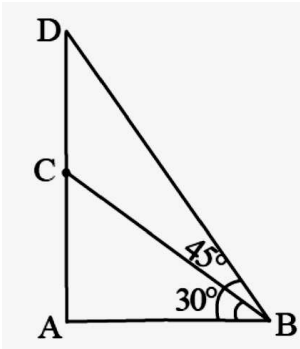
4. From a point on the ground 40 m away from the foot of a tower, the angle of elevation of the top of a tower is 30^0, the angle of elevation of the top of water tank on top of the tower is 45^0. Find (i) height of the tower (ii) depth of the tank.

i) Height of the tower

$$\tan 30^0 = \frac{AC}{AB}$$

$$\frac{1}{\sqrt{3}} = \frac{AC}{40}$$

$$AC = \frac{40}{\sqrt{3}} m$$



ii) Depth of the tank is CD

$$\tan 45^0 = \frac{AD}{AB}$$

$$1 = \frac{AD}{40}$$

AD = 40 m

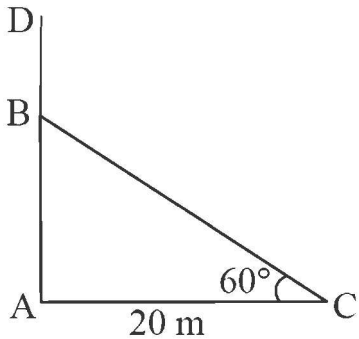
$$\therefore \ CD = AD - AC = 40 - \frac{40}{\sqrt{3}}$$

$$CD = 40\left(1 - \frac{1}{\sqrt{3}}\right) m$$

5. A tree is broken over by the wind forms a right angled triangle with the ground. If the broken parts makes an angle of 60^0, with the ground and the top of the tree is now 20 m from its base, how tall was the three.

In $\Delta ABC = \angle A = 90^0$

$$\cos 60^0 = \frac{AC}{BC} = \frac{20}{BC}$$



$$\frac{1}{2} = \frac{20}{BC}$$

BC = 40 m

$$\tan 60^0 = \frac{AB}{AC}$$

$$\sqrt{3} = \frac{AB}{20}$$

$$AB = 20\sqrt{3} m$$

Height of tree = AD = AB + BC

$$= 40 + 20\sqrt{3}$$

$$= 20\left(2 + \sqrt{3}\right) m$$

6. There is a small island in the middle of a 100 m wide river and a tall tree stands on the island. P and Q are points directly opposite to each other on two banks and in the line with the tree. If the angle of elevation of the top of the tree from P and Q are respectively 30^0 and 45^0. Find the height of the tree.

Let OA be the tree of height h metre.

In triangle POA and QOA, we have

$$\tan 30^0 = \frac{OA}{OP} \text{ and } \tan 45^0 = \frac{OA}{OQ}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{h}{OP} \text{ and } 1 = \frac{h}{OQ}$$

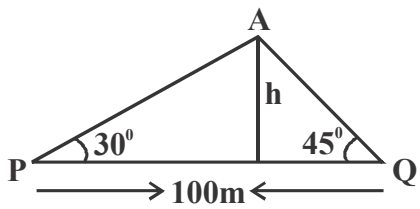
$$\Rightarrow OP = \sqrt{3}h \text{ and } OQ = h$$

$$\Rightarrow OP + OQ = \sqrt{3}h + h$$

$$\Rightarrow PQ = \left(\sqrt{3}+1\right)h$$

$$\Rightarrow 100 = \left(\sqrt{3}+1\right)h \quad [\because PQ = 100m]$$

$$\Rightarrow h = \frac{100}{\sqrt{3}+1} m$$



PRACTICE PAPER

1. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 50 m high, find the height of the building.
2. Two poles of equal heights are standing opposite each other on either side of the road, which is 80m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30°, respectively. Find the height of the poles and the distances of the point from the poles.
3. From a point 20m away from the foot of a tower, the angle of elevation of top of the tower is 30°, Find the height of the tower.
4. An electric pole is 10m high. A steel wire tied to the top of the pole is affixed at a point on the ground to keep the pole upright. If the wire makes an angle of 45° with the horizontal through the foot of the pole, find the length of the wire.

UNIT - 10

STATISTICS

Formulae to find out MENA :

Direct method : $\overline{X} = \frac{\Sigma fiXi}{\Sigma fi}$

Average Mean Method : $\overline{X} = \frac{a + \Sigma fidi}{\Sigma fi}$

Step Deviation Method : $\overline{X} = a + \left(\frac{\Sigma fiUi}{\Sigma fi} \times h \right)$

Formulae to find out the MEDIAN : $l + \left(\frac{\frac{n}{2} - cf}{f} \right) \times h$

Formulae to find out the MODE : $l + \left(\frac{fi - fo}{2f_1 - f_0 - f_2} \right) \times h$

1. Calculate the mean for the following data :

C-I	**1-5**	**6-10**	**11-15**	**16-20**
f	**2**	**3**	**4**	**1**

C-I	Σfi	Xi	ΣfiXi
1-5	2	3	6
6-10	3	8	24
11-15	4	13	52
16-20	1	18	18
	n=10		100

Mean = $\overline{X} = \frac{\Sigma fiXi}{\Sigma fi}$

$\overline{X} = \frac{100}{10}$

$\therefore \overline{X} = 10$

2. Calculate the Mean for the following Data :

x	12	17	22	27	32
f	2	3	5	3	2

Xi	fi	fiXi
12	2	24
17	3	51
22	5	110
27	3	81
32	2	64
	Σfi=10	ΣfiXi= 330

$$\text{Mean} = \overline{X} = \frac{\Sigma fiXi}{\Sigma fi}$$

$$\overline{X} = \frac{330}{15}$$

$$\therefore \overline{X} = 22$$

3. Calculate the Median for the following data :

C-I	10-20	20-30	30-40	40-50	50-60
f	3	10	23	5	9

C-I	f	Cf
10-20	3	3
20-30	10	13
30-40	23	36
40-50	5	41
50-60	9	50
	n=50	

$l = 30;\ h = 10;\ f = 23;\ cf = 13$

$$\frac{n}{2} = \frac{50}{2} = 25$$

$$\text{Meidan} = l + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h$$

$$= 30 + \left(\frac{25-13}{23}\right) \times 10$$

$$= 30 + \left(\frac{12}{23}\right) \times 10$$

$$= 30 + \frac{120}{23}$$

$$= 30 + 5.21$$

$$\therefore \text{Median} = 35.21$$

4. Calcualte the Mode for the following data :

C-I	10-25	25-40	40-55	55-70	70-85	85-100
f	2	3	7	6	6	6

Modal Class = 40 - 55

$l = 40;\ h = 15;\ f_1 = 7;\ f_0 = 3;\ f_2 = 6$

$$\text{Mode} = l + \left(\frac{fi - fo}{2f_1 - f_0 - f_2}\right) \times h$$

$$= 40 + \left(\frac{7-3}{2(7)-3-6}\right) \times 15$$

$$= 40 + \frac{4}{14-9} \times 15$$

$$= 40 + \frac{4}{5} \times 15$$

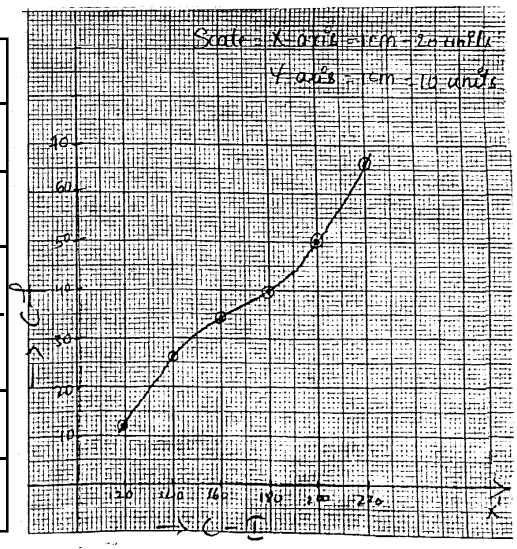
$= 40 + 4 \times 3 = 40 + 12$

$\therefore$ Mode = 52

5. Plot a less than type of O-Give curve for the following data :

C-I	**100-120**	**120-140**	**140-160**	**160-180**	**180-200**	**200-220**
f	**12**	**14**	**8**	**6**	**10**	**16**

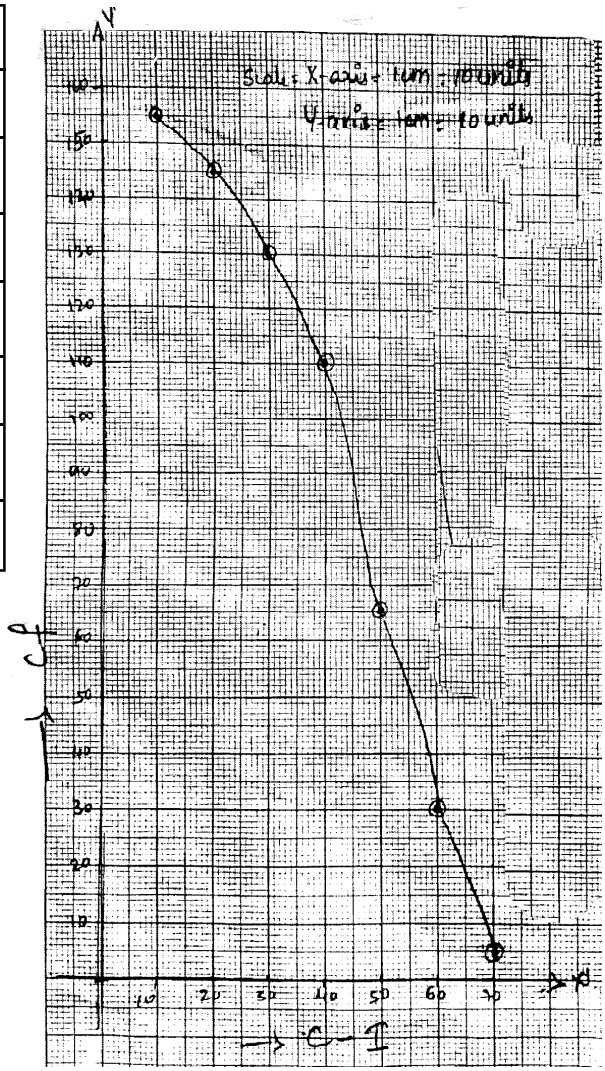
C-I	less than type	f	cf
100-120	less than 120	12	12
120-140	less than 140	14	26
140-160	less than 160	8	34
160-180	less than 180	6	40
180-200	less than 200	10	50
200-220	less than 220	16	66



6. Plot a More than type of O-Give curve for the following data.

C-I	10-20	20-30	30-40	40-50	50-60	60-70	70-80
f	10	15	20	45	35	25	5

C-I	>	f	cf
10-20	> 10	10	155
20-30	> 20	15	145
30-40	> 30	20	130
40-50	> 40	45	110
50-60	> 50	35	65
60-70	> 60	25	30
70-80	> 70	5	5



PRACTICE PAPER

1. Calculate the Mean for the following data.

C-I	0-10	10-20	20-30	30-40	40-50
f	3	5	9	5	3

2. Calculate the Median for the following data.

C-I	1-5	5-9	9-13	13-17	17-21
f	7	2	2	8	1

3. Calcuate the Mode for the following data.

C-I	0-6	6-12	12-18	18-24	24-30
f	6	8	10	9	7

4. Plot a less than type of O-Give curve for the following data.

C-I	20-30	30-40	40-50	50-60	60-70
f	5	4	3	8	7

5. Plot a More than type of O-Give curve for the following data.

C-I	40-45	45-50	50-55	55-60	60-65	65-70
f	4	6	16	20	30	24

UNIT - 11

SURFACE AREA AND VOLUME

1. Curved surface area of a cylinder : $A = 2\pi rh$
2. Total surface area of a cylinder : $A = 2\pi r(r+h)$
3. Volume of a Cylinder : $V = \pi r^2 h$
4. Curved surface area of a Cone : $A = \pi rl$
5. Total surface area of a Cone : $A = \pi r(r+l)$
6. Volume of a Cone : $V = \frac{1}{3}\pi r^2 h$
7. CSA of a Hemisphere : $A = 2\pi r^2$
8. TSA of a Hemisphere : $A = 3\pi r^2$
9. Volume of a Hemisphere : $V = \frac{2}{3}\pi r^3$
10. TSA of a Sphere : $A = 4\pi r^2$
11. Volume of a Sphere : $V = \frac{4}{3}\pi r^3$
12. CSA of Frustrum of a Cone : $A = \pi(r_1 + r_2)l$
13. TSA of Frustrum of a Cone : $A = \pi(r_1 + r_2)l + \pi(r_1^2 + r_2^2)$
14. Volume of Frustrum of Cone : $V = \frac{1}{3}\pi(r_1^2 + r_2^2 + r_1 r_2)$

1) What is the volume of a Cylinder having the area of its circular base 154 Sq cm and height 10cm.

$\pi r^2 = 154$ Sq cm; $h = 10$ cm

$V = \pi r^2 h$

$= 154 \times 10 = 1540$ cm^3

2) What is the volume of a Cylinder having the area of its circular base 22 Sq cm and height 10cm.

$\pi r^2 = 22$ Sq cm; $h = 10$ cm

$V = \pi r^2 h$

$= 22 \times 10 = 220$ cm^3

3. The height and areas of circular bases of a cylinder and a cone are equal. If Volume of cylinder if 360 cm^3, What would be the volume of Cone.

Vol of Cone = $\frac{1}{3} \times$ Vol. of Cylinder

$= \frac{1}{3} \times 360$

$= 120 \text{ cm}^3$

4. What is the formula to find out the Total surface area of a cone?

$A = \pi r(r+l)$

5. Find the volume of a Cone whose height is 4 cm and the diameter of its base is 21 cm

$h = 4\text{cm}; \quad r = \frac{d}{2} = \frac{21}{2}$

$V = \frac{1}{3} \pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times \left(\frac{21}{2}\right)^2 \times 4$

$= \frac{1}{3} \times \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} \times 4$

$= 22 \times 21$

$= 462 \text{ cm}^3$

6. Find the Curved surface area, Total surface area and Volume of a cylinder of height 7 cm and radius of base 5 cm.

$h = 7 \text{ cm}; \quad r = 5 \text{ cm}$

$CSA = 2\pi rh = 2 \times \frac{22}{7} \times 5 \times 7 = 2 \times 22 \times 5 = 220 \text{ cm}^2$

$TSA = 2\pi r(r + h) = 2 \times \frac{22}{7} \times 5(5+7) = 2 \times \frac{22}{7} \times 5 \times 12 = 2 \times 3.14 \times 60 = 376.8 \text{ cm}^2$

$Vol = \pi r^2 h = \frac{22}{7} \times 5 \times 5 \times 7 = 22 \times 25 = 550 \text{ cm}^3$

7. Find the CSA and TSA of a Cone whose Slant height is 14 cm and base radius 5 cm.

$l = 14 \text{ cm}; \quad r = 5 \text{ cm}$

$CSA = \pi rl = \frac{22}{7} \times 5 \times 14 = 22 \times 5 \times 2 = 220 \text{ cm}^2$

$TSA = \pi r(r+l) = \frac{22}{7} \times 5(5+14) = \frac{22}{7} \times 5 \times 19 = 3.14 \times 95 = 298.3 \text{ cm}^2$

8. Find the surface area and Volume of a Sphere of diameter 28cm

d = 28 cm; r = 14 cm

Surface area = $4\pi r^2 = 4 \times \frac{22}{7} \times 14 \times 14$

$= 4 \times 22 \times 2 \times 14$

$= 2464 \text{ cm}^2$

Volume = $\frac{4}{3}\pi r^3 = \frac{4}{3} \times \frac{22}{7} \times 14 \times 14 \times 14$

$= 1.33 \times 22 \times 2 \times 196$

$= 11469.92 \text{ cm}^3$

9. Find the TSA of a Frustrum of Cone of height 10 cm whose radii are 14 cm and 7 cm.

l = 10 cm; r_1 = 14 cm; r_2 = 7 cm

CSA = $\pi(r_1 + r_2)l = \frac{22}{7}(14+7)10 = \frac{22}{7}(21)10 = 22 \times 3 \times 10 = 660 \text{ cm}^2$

TSA = A = $\pi(r_1 + r_2)l + \pi(r_1^2 + r_2^2)$

$= \frac{22}{7}(14+7)10 + \frac{22}{7}(14^2 + 7^2)$

$= 660 + \frac{22}{7}(196+49)$

$= 660 + \frac{22}{7}(245)$

$= 660 + 22\ (35)$

$= 660 + 77$

$= 1430 \text{ cm}^2$

PRACTICE PAPER

I. Fill in the Blanks :

1. Curved Surface Area of a Cylinder is :……..
2. Total Surface Area of a Cone is :……
3. What is the volume of a Cylinder having the area of its circular base 154 Sq cm and height 10 cm : …….

II. Choose the correct answer for the following questions from the given option

4. Lateral surface area of a Frustrum of Cone is :
   a. $\pi(r_1 + r_2)l$ b. $\pi(r_1 + r_2)h$
   c. $\pi(r_1 - r_2)l$ d. $\pi(r_1 - r_2)h$

5. What is the volume of a Cylinder having the area of its circular base 22 Sq cm and height 10 cm :…….
   a. 220 cm^2 b. 220 cm^3
   c. 2200 cm^2 d. 2200 cm^3

6. The height and areas of circular bases of a cylinder and a cone are equal. If Volume of cylinder if 360 cm^3, What would be the volume of Cone:……..
   a. 120 cm^2 b. 120 cm^3
   c. 180 cm^2 d. 1080 cm^3

III. Answer the following Questions

7. What is the Formula to find out the Total surface area of a Cone?
8. The volume of a cone is 64 cm^3, What is the TSA of the cone?
9. Find the volume of a Cone whose height is 4 cm and the diameter of its base is 21 cm.
10. Find the CSA of a cylinder of height 7 cm and radius of base 5 cm.
11. Find the TSA of a Cone whose Slant height is 14 cm and base radius 5 cm.
12. Find the volume of a sphere whose Diameter is 28 cm.
13. Find the TSA of a Frustrum of Cone of height 10 cm whose radii are 14 cm and 7 cm.

ವಿದ್ಯಾರ್ಥಿಗಳ ದಿನಚರಿ			
1	ಬೆಳಿಗ್ಗೆ 5–00 ರಿಂದ 5–15	15 ನಿಮಿಷ	ನಿದ್ರೆಯಿಂದ ಎದ್ದು, ಲಘು ವ್ಯಾಯಾಮ, ಹಲ್ಲು ಉಜ್ಜುವುದು, ಮುಖತೊಳೆದು, ಬೆಳಗ್ಗಿನ ಅಭ್ಯಾಸಕ್ಕೆ ಸಿದ್ಧಗೊಳ್ಳುವುದು.
2	ಬೆಳಿಗ್ಗೆ 5–15 ರಿಂದ 8–00	1–30 ಗಂಟೆ	ಬೆಳಗಿನ ಓದು, ಕ್ಲಿಷ್ಟ ವಿಷಯಗಳ ಅಭ್ಯಾಸ ಗಣಿತ/ ಇಂಗ್ಲೀಷ್ / ವಿಜ್ಞಾನ / ಸಮಾಜ ವಿಜ್ಞಾನ
3	ಬೆಳಿಗ್ಗೆ 5–15 ರಿಂದ 8–00	1–30 ಗಂಟೆ	ಮನೆ ಕೆಲಸದಲ್ಲಿ ಪೋಷಕರಿಗೆ ಸಹಕರಿಸುವುದು ಮತ್ತು ನಿತ್ಯಕರ್ಮಗಳನ್ನು ಪೂರೈಸುವುದು.
4	ಬೆಳಿಗ್ಗೆ 8–00 ರಿಂದ 8–30	30 ನಿಮಿಷ	ಬೆಳಗಿನ ಉಪಹಾರ ನಂತರ ಶಾಲೆಗೆ ಹೊರಡಲು ಸಿದ್ಧತೆ ಮಾಡಿಕೊಳ್ಳುವುದು.
5	ಬೆ. 8–30 ರಿಂದ 9–00	30 ನಿಮಿಷ	ಶಾಲೆಗೆ ಪ್ರಯಾಣ ಮಾಡುವುದು.
6	ಬೆ. 9–00 ರಿಂದ 10–15	1–15 ಗಂಟೆ	ಶಾಲೆಯ ವಿಶೇಷ ತರಗತಿಗಳು/ಪರಿಹಾರ ಬೋಧನಾ ತರಗತಿ/ಗುಂಪು ಅಧ್ಯಯನದಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳುವುದು.
7	ಬೆ 10–15 ರಿಂದ ಮ 4–30	6–15 ಗಂಟೆ	ತರಗತಿಯಲ್ಲಿ ಕಲಿಕೆಯಲ್ಲಿ ತೊಡಗಿರುವುದು.
8	ಸಂ 4–30 ರಿಂದ 5–00	30 ನಿಮಿಷ	ಆಟೋಟಗಳಲ್ಲಿ ಭಾಗವಹಿಸುವುದು.
9	ಸಂ. 5–00 ರಿಂದ 5–30	30 ನಿಮಿಷ	ಮನೆಗೆ ಹಿಂತಿರುಗುವುದು
10	ಸಂ 5–30 ರಿಂದ 6–30	1 ಗಂಟೆ	ಸಂಜೆಯ ಚಟುವಟಿಕೆಗಳು
11	ಸಂ 6–30 ರಿಂದ 8–00	1–30 ಗಂಟೆ	ಶಾಲೆಯಲ್ಲಿ ನೀಡಿರುವ ಗೃಹ ಕಾರ್ಯಗಳನ್ನು ಪೂರ್ಣಗೊಳಿಸುವುದು.
12	ರಾತ್ರಿ 8–00 ರಿಂದ 8–30	30 ನಿಮಿಷ	ತೃತೀಯ ಭಾಷೆ ಅಭ್ಯಾಸ
13	ರಾತ್ರಿ 8–30 ರಿಂದ 9–00	30 ನಿಮಿಷ	ರಾತ್ರಿ ಊಟ
14	ರಾತ್ರಿ 9–00 ರಿಂದ 10–00	1 ಗಂಟೆ	ಕ್ಲಿಷ್ಟ ವಿಷಯಗಳ ಅಭ್ಯಾಸ
15	ರಾತ್ರಿ 10–00 ರಿಂದ 11–00	1 ಗಂಟೆ	ಸಮಾಜ ವಿಜ್ಞಾನ, ಪ್ರಥಮ ಭಾಷೆ ಅಭ್ಯಾಸ
16	ರಾತ್ರಿ 11–00 ರಿಂದ 5–00	6 ಗಂಟೆ ನಿದ್ದೆಗೆ ಮೀಸಲು	ಪುನರ್ ಮನನ ಮಾಡುತ್ತಾ ಸುಖ ನಿದ್ರೆಗೆ ಜಾರುವುದು

ವಿಷಯ ಸೂಚನೆ : ಪ್ರತಿ ದಿನ ನಿದ್ರೆಗೆ ಜಾರುವ ಮುನ್ನ ಆಯಾ ದಿನದಲ್ಲಿ ನಡೆದ ಎಲ್ಲಾ ಚಟುವಟಿಕೆಗಲನ್ನು ಒಮ್ಮೆ ನೆನಪಿಸಿಕೊಳ್ಳಬೇಕು. ಅವುಗಳಲ್ಲಿ ಯಾವುದಾದರೂ ಸೂತ್ರ, ಕೆಲವು ಚಿತ್ರದ ಭಾಗಗಳು, ಪತ್ರ ಲೇಖನಗಳು, ಉತ್ತರಗಳಲ್ಲಿನ ಸಾಲುಗಳು ಇವುಗಳನ್ನು ಬೆಳಿಗ್ಗೆ ಎದ್ದ ಕೂಡಲೇ ಪುನಃ ಒಮ್ಮೆ ಗುರುತುಮಾಡಿಕೊಳ್ಳಬೇಕು. ಹೀಗೆ ಮಾಡುವುದರಿಂದ ಓದಿದ್ದು ಶಾಶ್ವತವಾಗಿ ಮೆದುಲಿನಲ್ಲಿ ಉಳಿಯುತ್ತದೆ. ಆದರೂ ಕ್ಲಿಷ್ಟತೆ ಅನಿಸಿದರೆ ಶಿಕ್ಷಕರು ಅಥವಾ ಸಹಪಾಠಿಗಳೊಂದಿಗೆ ಚರ್ಚಿಸಿದರೆ ಅನುಕೂಲವಾಗುತ್ತದೆ.

(ಸೂಚನೆ : ಇಲ್ಲಿ ನೀಡಿರುವುದು ಕೇವಲ ಮಾದಿರ ದಿನಚರಿ ನಮೂನೆಯಾಗಿದ್ದು, ವಿದ್ಯಾರ್ಥಿಗಳು ತಮಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಮಾದರಿ ದಿನಚರಿಯನ್ನು ಸಿದ್ದಪಡಿಸಿಕೊಳ್ಳುವುದು.

2020–21ನೇ ಸಾಲಿನ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ವಿನ್ಯಾಸದ ಪಕ್ಷಿನೋಟ

ಕ್ರ. ಸಂ.	ವಿಷಯ	ಒಟ್ಟು ಪಾಠಗಳ ಸಂಖ್ಯೆ (ಕಡಿತಗಳಿಸಿದ)	ಒಟ್ಟು ಅಂಕ			ಪರೀಕ್ಷಾ ಅವಧಿ	ಪ್ರಶ್ನೆ – ಅಂಕಗಳ ವಿಧಗಳು					ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆಗಳು	ಅತ್ಯುತ್ತಮ	ಪ್ರಥಮ	ದ್ವಿತೀಯ	ತೃತೀಯ
			ಆಂತರಿಕ	ಬಾಹ್ಯ	ಒಟ್ಟು		1	2	3	4	5					
1	ಕನ್ನಡ	17	25	100	125	3.15	17	10	11	5	2	45	107	75	63	44
2	ಇಂಗ್ಲೀಷ್	14	20	80	100	3.00	16	8	9	4	1	38	85	60	50	53
3	ಹಿಂದಿ	16	20	80	100	3.00	16	8	9	4	1	38	85	60	50	35
4	ಗಣಿತ	11	20	80	100	3.15	16	8	9	4	1	38	85	60	50	35
5	ವಿಜ್ಞಾನ	14	20	80	100	3.15	16	8	9	4	1	38	85	60	50	35
6	ಸಮಾಜ ವಿಜ್ಞಾನ	31	20	80	100	3.15	16	8	9	4	1	38	85	60	50	35
	ಒಟ್ಟು	103	125	500	625	19.00	97	50	56	25	7	235	532	375	313	189

2020–2021 ರ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ ವಾರ್ಷಿಕ ಪರೀಕ್ಷೆಯ ವೇಳಾಪಟ್ಟಿ

ದಿನಾಂಕ ಮತ್ತು ವಾರ	ವಿಷಯ	ಸಮಯ	ಒಟ್ಟು ಅವಧಿ	ಗರಿಷ್ಟ ಅಂಕಗಳು
21–06–2021 ಸೋಮವಾರ	**ಕನ್ನಡ**	**ಬೆಳಿಗ್ಗೆ 9.30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 12.45**	**3 ಗಂಟೆ 15 ನಿಮಿಷ**	**100**
24–06–2021 ಗುರುವಾರ	**ಗಣಿತ**	**ಬೆಳಿಗ್ಗೆ 9.30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 12.45**	**3 ಗಂಟೆ 15 ನಿಮಿಷ**	**80**
28–06–2021 ಸೋಮವಾರ	**ವಿಜ್ಞಾನ**	**ಬೆಳಿಗ್ಗೆ 9.30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 12.45**	**3 ಗಂಟೆ 15 ನಿಮಿಷ**	**80**
30–06–2021 ಬುಧವಾರ	**ಹಿಂದಿ**	**ಬೆಳಿಗ್ಗೆ 9.30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 12.30**	**3 ಗಂಟೆ**	**80**
01–07–2021 ಗುರುವಾರ	**ಇಂಗ್ಲೀಷ್**	**ಬೆಳಿಗ್ಗೆ 9.30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 12.30**	**3 ಗಂಟೆ**	**80**
05–07–2021 ಸೋಮವಾರ	**ಸಮಾಜ ವಿಜ್ಞಾನ**	**ಬೆಳಿಗ್ಗೆ 9.30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 12.45**	**3 ಗಂಟೆ 15 ನಿಮಿಷ**	**80**

2020–21 ನೇ ಸಾಲಿನ ವಾರ್ಷಿಕ ಪರೀಕ್ಷೆಗೆ ಕೌಂಟ್ ಡೌನ್

29-03-2021 84	30-03-2021 83	31-03-2021 82	01-04-2021 81	02-04-2021 80	03-04-2021 79	04-04-2021 78	05-04-2021 77
06-04-2021 76	07-04-2021 75	08-04-2021 74	09-04-2021 73	10-04-2021 72	11-04-2021 71	12-04-2021 70	13-04-2021 69
14-04-2021 68	15-04-2021 67	16-04-2021 66	17-04-2021 65	18-04-2021 64	19-04-2021 63	20-04-2021 62	21-04-2021 61
22-04-2021 60	23-04-2021 59	24-04-2021 58	25-04-2021 57	26-04-2021 56	27-04-2021 55	28-04-2021 54	29-04-2021 53
30-04-2021 52	01-05-2021 51	02-05-2021 50	03-05-2021 49	04-05-2021 48	05-05-2021 47	06-05-2021 46	07-05-2021 45
08-05-2021 44	09-05-2021 43	10-05-2021 42	11-05-2021 41	12-05-2021 40	13-05-2021 39	14-05-2021 38	15-05-2021 37
16-05-2021 36	17-05-2021 35	18-05-2021 34	19-05-2021 33	20-05-2021 32	21-05-2021 31	22-05-2021 30	23-05-2021 29
24-05-2021 28	25-05-2021 27	26-05-2021 26	27-05-2021 25	28-05-2021 24	29-05-2021 23	30-05-2021 22	31-05-2021 21
01-06-2021 20	02-06-2021 19	03-06-2021 18	04-06-2021 17	05-06-2021 16	06-06-2021 15	07-06-2021 14	08-06-2021 13
09-06-2021 12	10-06-2021 11	11-06-2021 10	12-06-2021 09	13-06-2021 08	14-06-2021 07	15-06-2021 06	16-06-2021 05
17-06-2021 04	18-06-2021 03	19-06-2021 02	20-06-2021 01	**Good Luck**			

ಅಭ್ಯಾಸದ ಹಾಳೆಗಳು

ಅಭ್ಯಾಸದ ಹಾಳೆಗಳು

ಅಭ್ಯಾಸದ ಹಾಳೆಗಳು

ಅಭ್ಯಾಸದ ಹಾಳೆಗಳು