BOARD QUESTION PAPER: NOVEMBER 2020

Maths - II

Time: 2 Hours **Max. Marks: 40**

Notes:

i. *All* questions are compulsory.
ii. Use of calculator is not allowed.
iii. The numbers to the right of the questions indicate full marks.
iv. In case of MCQ's [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.
v. For every MCQ, the correct alternative (A), (B), (C) or (D) with sub-question number is to be written as an answer.
vi. Draw proper figures for answers wherever necessary.
vii. The marks of construction should be clear. Do not erase them.
viii. Diagram is essential for writing the proof of the theorem.

Q.1. (A) For each of the following sub-question four alternative answers are given. Choose the correct alternative and write its alphabet: **[4]**

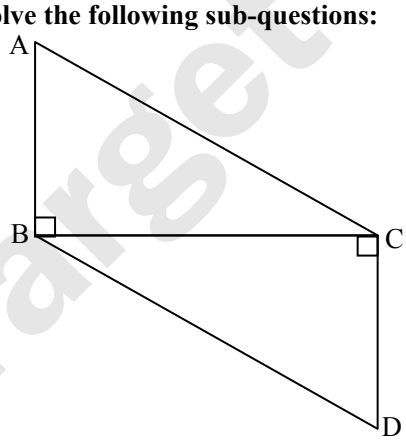
1. $\Delta ABC \sim \Delta PQR$ and $\angle A = 45°$, $\angle Q = 87°$, then $\angle C =$ _____.
(A) 45° (B) 87° (C) 48° (D) 90°

2. $\angle PRQ$ is inscribed in the arc PRQ of a circle with centre 'O'.
If $\angle PRQ = 75°$, then m(arc PRQ) = _____.
(A) 75° (B) 150° (C) 285° (D) 210°

3. A line makes an angle of 60° with the positive direction of X-axis, so the slope of a line is _____.
(A) $\frac{1}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\sqrt{3}$ (D) $\frac{1}{\sqrt{3}}$

4. Radius of a sector of a circle is 5 cm and length of arc is 10 cm, then the area of a sector is _____.
(A) 50 cm^2 (B) 25 cm^2 (C) 25 m^2 (D) 10 cm^2

(B) Solve the following sub-questions: **[4]**

1. 

In the above figure, seg AB ⊥ seg BC and seg DC ⊥ seg BC.
If AB = 3 cm and CD = 4 cm, then find $\frac{A(\Delta ABC)}{A(\Delta DCB)}$.

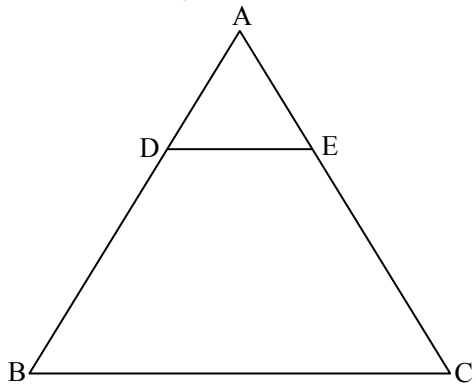
2. In cyclic □ABCD, $\angle B = 75°$, then find $\angle D$.

3. Point A, B, C are collinear. If slope of line AB is $-\frac{1}{2}$, then find the slope of line BC.

4. If $3 \sin\theta = 4 \cos\theta$, then find the value of $\tan\theta$.

Q.2. (A) Complete the following activities and rewrite it (Any two): **[4]**

1.



In ΔABC, seg DE || side BC. If AD = 6 cm, DB = 9 cm, EC = 7.5 cm, then complete the following activity to find AE.

Activity: In ΔABC, seg DE || side BC ….. (given)

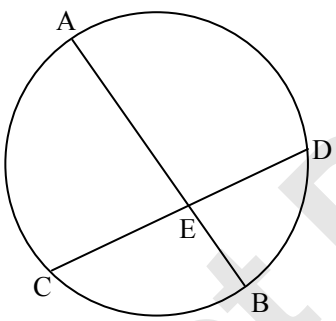
$\therefore \quad \frac{AD}{DB} = \frac{AE}{EC}$ ..... $\square$

$\therefore \quad \frac{6}{9} = \frac{AE}{\square}$

$\therefore \quad AE = \frac{6 \times 7.5}{\square}$

$\therefore \quad AE = \square$

2.



In the above figure, chord AB and chord CD intersect each other at point E. If AE = 15, EB = 6, CE = 12, then complete the activity to find ED.

Activity:

Chord AB and chord CD intersect each other at point E …… (given)

$\therefore \quad CE \times ED = AE \times EB$ ….. $\square$

$\therefore \quad \square \times ED = 15 \times 6$

$\therefore \quad ED = \frac{\square}{12}$

$\therefore \quad ED = \square$

3. If C(3, 5) and D(–2, –3), then complete the following activity to find the distance between points C and D.

Activity:

Let C(3, 5) ≡ (x_1, y_1), D(–2, –3) ≡ (x_2, y_2)

$CD = \sqrt{\left(x_2 - \square\right)^2 + \left(y_2 - y_1\right)^2}$ …. (formula)

$\therefore \quad CD = \sqrt{\left(-2 - \square\right)^2 + \left(-3 - 5\right)^2}$

$\therefore$ $CD = \sqrt{\square + 64}$

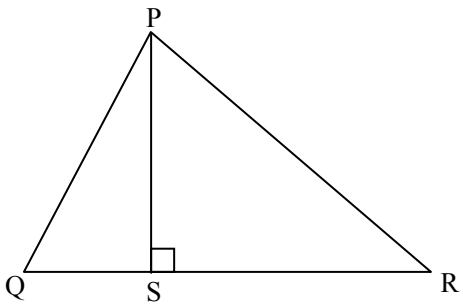
$\therefore$ $CD = \sqrt{\square}$

B. Solve the following sub-questions (Any four): **[8]**

1. $\Delta ABC \sim \Delta PQR$, $A(\Delta ABC) = 81\ cm^2$, $A(\Delta PQR) = 121\ cm^2$.
   If BC = 6.3 cm, then find QR.
2. In ΔPQR, $\angle P = 60°$, $\angle Q = 90°$ and $QR = 6\sqrt{3}$ cm, then find the values of PR and PQ.
3. Find the slope of a line passing through the points A(2, 5) and B(4, –1).
4. Draw a circle with centre 'O' and radius 3.2 cm. Draw a tangent to the circle at any point P on it.
5. Find the surface area of a sphere of radius 7 cm.

Q.3. A. Complete the following activities and rewrite it (Any one): **[3]**

1.



In ΔPQR, seg PS $\perp$ side QR, then complete the activity to prove $PQ^2 + RS^2 = PR^2 + QS^2$.

Activity:

In ΔPSQ, $\angle PSQ = 90°$

$\therefore$ $PS^2 + QS^2 = PQ^2$ ……. (Pythagoras theorem)

$\therefore$ $PS^2 = PQ^2 - \square$ …… (I)

Similarly,

In ΔPSR, $\angle PSR = 90°$

$\therefore$ $PS^2 + \square = PR^2$ …… (Pythagoras theorem)

$\therefore$ $PS^2 = PR^2 - \square$ …… (II)

$\therefore$ $PQ^2 - \square = \square - RS^2$ …….. from (I) and (II)

$\therefore$ $PQ^2 + \square = PR^2 + QS^2$

2. Measure of arc of a circle is 36° and its length is 176 cm. Then complete the following activity to find the radius of circle.

Activity:

Here, measure of arc = $\theta = 36°$

Length of arc = l = 176 cm

$\therefore$ Length of arc (l) = $\frac{\theta}{360} \times \square$ ……. (formula)

$\therefore$ $\square = \frac{36}{360} \times 2 \times \frac{22}{7} \times r$

$\therefore$ $176 = \frac{1}{\square} \times \frac{44}{7} \times r$

$\therefore$ $r = \frac{176 \times \square}{44}$

$\therefore$ $r = \square \times 70$

Radius of circle (r) = $\square$ cm

B. Solve the following sub-questions (Any two): **[6]**

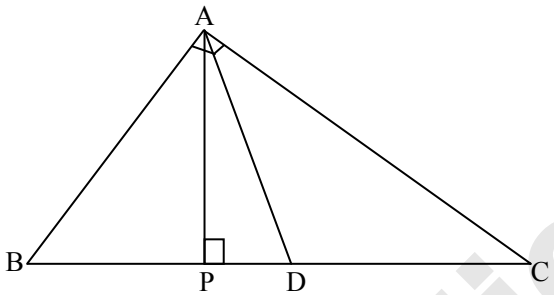
1. Prove that, "The ratio of the intercepts made on a transversal by three parallel lines is equal to the ratio of the corresponding intercepts made on any other transversal by the same parallel lines."

2. Draw a circle with centre 'O' and radius 3.4 cm. Draw a chord MN of length 5.7 cm in it. Construct tangents at points M and N to the circle.

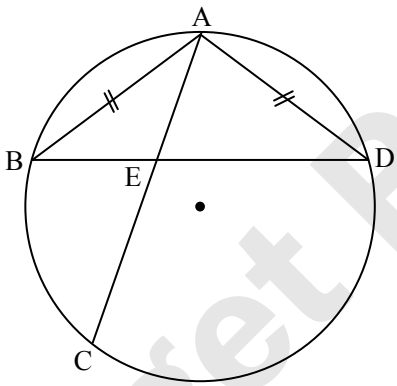
3. Prove that:
$$\frac{1}{\sec\theta - \tan\theta} = \sec\theta + \tan\theta.$$

4. Radii of the top and base of frustum are 14 cm and 8 cm respectively. Its height is 8 cm. Find its curved surface area.($\pi = 3.14$)

Q.4. Solve the following sub-questions (Any two): **[8]**

1.


In ΔABC, $\angle BAC = 90°$, seg AP $\perp$ side BC, B-P-C. Point D is the mid-point of side BC, then prove that $2AD^2 = BD^2 + CD^2$.

2.


In the above figure, chord AB $\cong$ chord AD. Chord AC and chord BD intersect each other at point E. Then prove that:
$AB^2 = AE \times AC$.

3. A straight road leads to the foot of the tower of height 48 m. From the top of the tower the angles of depression of two cars standing on the road are 30° and 60° respectively. Find the distance between the two cars.($\sqrt{3} = 1.73$)

Q.5. Solve the following sub-questions (Any one): **[3]**

i. Let M be a point of contact of two internally touching circles. Let line AMB be their common tangent. The chord CD of the bigger circle touches the smaller circle at point N. The chord CM and chord DM of bigger circle intersect the smaller circle at point P and R respectively.
   a. From the above information draw the suitable figure.
   b. Draw seg NR and seg NM and write the two pairs of congruent angles in smaller circle considering tangent and chord.
   c. By using the property which is used in (b) write the two pairs of congruent angles in the bigger circle.

ii. Draw a circle with centre 'O' and radius 3 cm. Draw a tangent segment PA having length $\sqrt{40}$ cm from an exterior point P.