BOARD QUESTION PAPER: MARCH 2020
Mathematics Part - 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) in front of 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 and distinct. Do not erase them.
viii. Diagram is essential for writing the proof of the theorem.

Q.1. A. Four alternative answers are given for every sub-question. Select the *correct* alternative and write the alphabet of that answer: **[4]**

i. Out of the following which is the Pythagorean triplet?
(A) (1, 5, 10) (B) (3, 4, 5) (C) (2, 2, 2) (D) (5, 5, 2)

ii. Two circles of radii 5.5 cm and 3.3 cm respectively touch each other externally. What is the distance between their centres?
(A) 4.4 cm (B) 2.2 cm (C) 8.8 cm (D) 8.9 cm

iii. Distance of point (–3, 4) from the origin is ________.
(A) 7 (B) 1 (C) –5 (D) 5

iv. Find the volume of a cube of side 3 cm:
(A) 27 cm^3 (B) 9 cm^3 (C) 81 cm^3 (D) 3 cm^3

B. Solve the following questions: **[4]**

i. The ratio of corresponding sides of similar triangles is 3 : 5, then find the ratio of their areas.

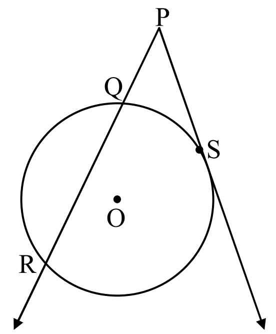
ii. Find the diagonal of a square whose side is 10 cm.

iii. □ABCD is cyclic. If ∠B = 110°, then find measure of ∠D.

iv. Find the slope of the line passing through the points A(2, 3) and B(4, 7).

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

i.



In the figure given above, 'O' is the centre of the circle, seg PS is a tangent segment and S is the point of contact. Line PR is a secant.
If PQ = 3.6, QR = 6.4, find PS.

Solution:

$PS^2 = PQ \times \square$ ...(tangent secant segments theorem)

$= PQ \times (PQ \times \square)$

$= 3.6 \times (3.6 + 6.4)$

$= 3.6 \times \square$

$= 36$

$\therefore$ PS = $\square$ ...(by taking square roots)

ii. If $\sec\theta = \dfrac{25}{7}$, find the value of $\tan\theta$.

Solution:

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

$\therefore \quad 1 + \tan^2\theta = \left(\dfrac{25}{7}\right)^{\square}$

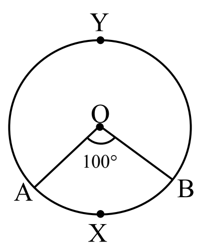
$\therefore \quad \tan^2\theta = \dfrac{625}{49} - \square$

$= \dfrac{625 - 49}{49}$

$= \dfrac{\square}{49}$

$\therefore \quad \tan\theta = \dfrac{\square}{7}$ ...(by taking square roots)

iii.

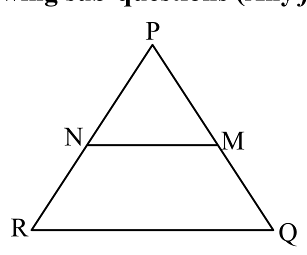


In the figure given above, O is the centre of the circle. Using given information complete the following table:

Type of arc	Name of the arc	Measure of the arc
Minor arc	$\square$	$\square$
Major arc	$\square$	$\square$

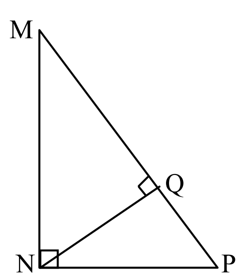
B. Solve the following sub-questions (Any *four*): **[8]**

i.



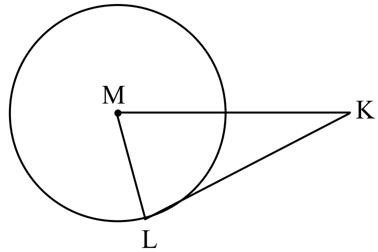
In ΔPQR, NM $\parallel$ RQ. If PM = 15, MQ = 10, NR = 8, then find PN.

ii.



In ΔMNP, $\angle MNP = 90^\circ$, seg NQ $\perp$ seg MP. If MQ = 9, QP = 4, then find NQ.

iii.



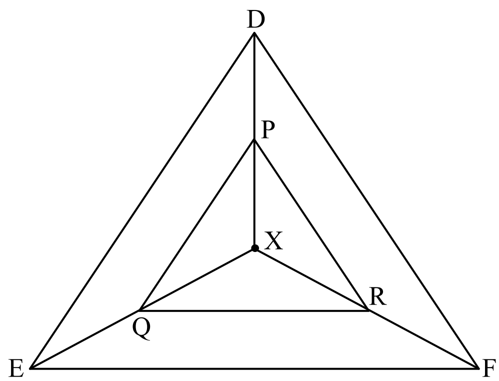
In the figure given above, M is the centre of the circle and seg KL is a tangent segment. L is a point of contact. If MK = 12, KL = $6\sqrt{3}$, then find the radius of the circle.

iv. Find the co-ordinates of midpoint of the segment joining the points (22, 20) and (0, 16).

v. A person is standing at a distance of 80 metres from a Church and looking at its top. The angle of elevation is of 45°. Find the height of the Church.

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

i.



In the given figure, X is any point in the interior of the triangle. Point X is joined to the vertices of triangle. seg PQ || seg DE, seg QR || seg EF. Complete the activity and prove that seg PR || seg DF.

Proof:

In ΔXDE,

PQ || DE ...(Given)

$\therefore \dfrac{XP}{PD} = \dfrac{\square}{QE}$ ...(Basic proportionality theorem)...(i)

In ΔXEF,

QR || EF ...(Given)

$\therefore \dfrac{XQ}{\square} = \dfrac{XR}{\square}$ ...($\square$)...(ii)

$\therefore \dfrac{XP}{PD} = \boxed{\dfrac{\square}{\square}}$ ...[From (i) and (ii)]

∴ seg PR || seg DF ...(By converse of basic proportionality theorem)

ii. If A(6, 1), B(8, 2), C(9, 4) and D(7, 3) are the vertices of □ABCD, show that □ABCD is a parallelogram.

Solution:

Slope of line = $\dfrac{y_2 - y_1}{x_2 - x_1}$

$\therefore$ Slope of line AB = $\dfrac{2-1}{8-6} = \square$ ...(i)

$\therefore$ Slope of line BC = $\dfrac{4-2}{9-8} = \square$ ...(ii)

$\therefore$ Slope of line CD = $\dfrac{3-4}{7-9} = \square$ ...(iii)

∴ Slope of line DA = $\frac{3-1}{7-6}$ = $\square$ ...(iv)

∴ Slope of line AB = $\square$ ...[From (i) and (iii)]

∴ line AB || line CD

∴ Slope of line BC = $\square$ ...[From (ii) and (iv)]

∴ line BC || line DA

Both the pairs of opposite sides of the quadrilateral are parallel.

∴ □ABCD is a parallelogram.

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

i. If ΔPQR, point S is the mid-point of side QR. If PQ = 11, PR = 17, PS = 13, find QR.

ii. Prove that, tangent segments drawn from an external point to the circle are congruent.

iii. Draw a circle with radius 4.1 cm. Construct tangents to the circle from a point at a distance 7.3 cm from the centre.

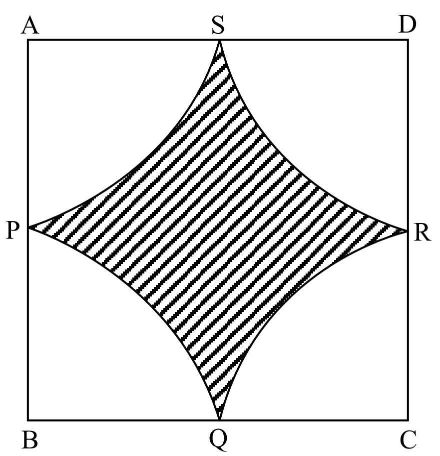
iv. A metal cuboid of measures 16 cm × 11 cm × 10 cm was melted to make coins. How many coins were made, if the thickness and diameter of each coin was 2 mm and 2 cm respectively? (π = 3.14)

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

i. In ΔABC, PQ is a line segment intersecting AB at P and AC at Q such that seg PQ || seg BC. If PQ divides ΔABC into two equal parts having equal areas, find $\frac{BP}{AB}$.

ii. Draw a circle of radius 2.7 cm and draw a chord PQ of length 4.5 cm. Draw tangents at points P and Q without using centre.

iii.



In the figure given above □ABCD is a square of side 50 m. Points P, Q, R, S are midpoints of side AB, side BC, side CD, side AD respectively. Find area of shaded region.

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

i. Circles with centres A, B and C touch each other externally. If AB = 3 cm, BC = 3 cm, CA = 4 cm, then find the radii of each circle.

ii. If $\sin\theta + \sin^2\theta = 1$
show that: $\cos^2\theta + \cos^4\theta = 1$