LITTLE FLOWER CONVENT HIGH SCHOOL

STD	SUBJECT	EXAM	DATE	MARKS
X	MATHS-PAPER 2	PRELIMINARY-2021 -22	21-01-2022	40

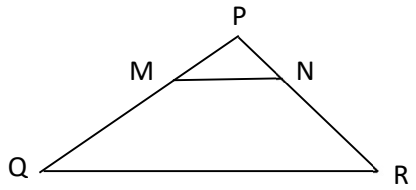
NOTE : (i) All questions are compulsory.
(ii) The numbers to the right of the questions indicate full marks.
(iii) In case of MCQ's [Q. No. 1A], only the first attempt will be evaluated and will be given credit.
(iv) For every MCQ, the correct alternative (A), (B), (C) or (D) in front of sub-question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

Q. 1. (A) Four alternative answers are given for each of the following sub-questions. Choose the correct alternative and write the letter of the alphabet of that answer: [4]

(i) In given figure, seg MN || seg QR, then which of the following statements is true?

[A] $\frac{PM}{MQ} = \frac{PN}{PR}$ [B] $\frac{MQ}{PM} = \frac{NR}{PN}$

[C] $\frac{PM}{PQ} = \frac{PN}{NR}$ [D] $\frac{PM}{PN} = \frac{PQ}{NR}$



Q

(ii) Out of the following which is the Pythagorean triplet?

[A] (2,3,4) [B] (3,4,5) [C] (1,5,10) [D] (5,6,4)

(iii) ∠ABC is inscribed in arc ABC of a circle with centre O. If ∠ABC = 75°, find m(arc ABC).

[A] 75° [B] 150° [C] 210° [D] 215°

(iv) Distance of point (-4,3), from the origin is …….

[A] 6 [B] 5 [C] 1 [D] -5

Q. 1. (B) Solve the following sub-questions : [4]

(i) Base of a triangle is 12 and height is 7. Base of another triangle is 14 and height is 8.

Find the ratio of areas of these triangles.

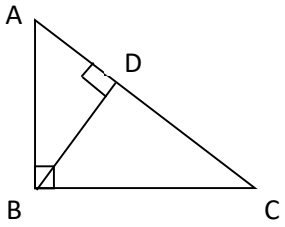
(ii) Find the diagonal of a rectangle whose length is 20cm and breadth is 15cm.

(iii) □MRPN is cyclic, ∠R = 135°. Find m∠N.

(iv) If $\sin\theta = \frac{12}{13}$, find the value of $\cos\theta$.

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

(i) In figure, ∠ABC = 90°, seg BD ⊥ seg AC, AD =9, DC = 25. Find BD.



→ In △ABC, seg BD ⊥ seg AC.

BD^2 = ☐ x DC ---------- geometric mean property

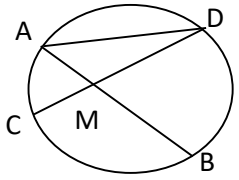
BD = $\sqrt{\square}$ x DC

= $\sqrt{9 \times \square}$

BD = ☐

(ii) In figure, chords AB and CD intersect at M. m ∠ ADC = 32°, m ∠ BMD = 68° . Find m (arc BD)

→ **∠DMB is exterior angle of △AMD,**



By remote interior angles' theorem,

m ∠DAB = m ∠DAM = 68° - ☐ **°**

∴ ∠DAB = ☐ **°**

∠DAB is inscribed angle and intersects arc BD

m∠DAB = $\frac{1}{2}$ **m(arc BD)----------** ☐ **Reason**

∴ m(arc BD) = 2m ∠DAB

∴ m(arc BD) = ☐ **°**

(iii) If cosecθ = $\frac{25}{7}$ **, complete the following activity to find the value of cotθ**

→ **$1 + \cot^2\theta = \operatorname{cosec}^2\theta$**

$1 + \cot^2\theta$ = $\left(\frac{\square}{\square}\right)^2$

∴ $\cot^2\theta = \frac{625}{49}$ - ☐

∴ $\cot^2\theta = \frac{625-49}{49} = \frac{\square}{49}$

∴ $\cot\theta = \frac{\square}{7}$ **----------(by taking square roots)**

Q. 2. (B) Solve *any four* of the following sub-questions: **[8]**

(i) If△DEF ~ △MNP, A(△DEF) = 100, A(△MNP) =225, then find $\frac{DE}{MN}$

(ii) In △XYZ , ∠Y = 90°, ∠X= 30°, XZ = 18, then find XY and YZ.

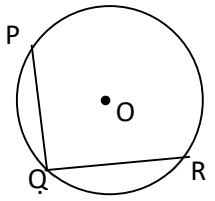
(iii) The radii of two circles are 3cm and 2.5cm. Draw figure of these circles touching each other externally. Also, find the distance between their centres.

(iv) If point P divides the line segment AB with A (-4,8) and B (-2,6) in the ratio 3: 1, find the y co ordinate of point P.

(v) If $\sin\theta = \frac{\sqrt{3}}{2}$, find θ , $\operatorname{cosec}\theta$, $\cos\theta$, $\tan\theta$.

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

(i) Observe the figure and answer the following:



P, Q, R are any points on the circle with centre O.

m(arc PQ) = m(arc QR) = 75°

Find m(arc PQR) , m(arc PR) and show chord PQ ≅ chord QR.

→ m(arc PQ) = m(arc QR) = 75°----------given

m(arc PQR) = m(arc ☐) + m(arc ☐) ----------property of sum of measures of arcs.

∴ m(arc PQR) = ☐ °

m(arc PR) =360° - m(arc ☐) = ☐ °

m(arc PQ) = m(arc QR)----------given

∴ chord PQ ≅ chord QR ----------☐ reason

(ii) Show that points P (1,2), Q (-2,3) and R (4,1) are collinear.

→ If the sum of any two distances out of d (P, Q), d(Q, R) and d(P,R) is equal to the third, then the three points P, Q and R are collinear.

∴ we will find d(P, Q) ,d(Q,R) and d(P,R).

d(P, Q) = ☐ -------- (I)--------find distance by using distance formula

d(Q, R) = ☐ ---------(II)

d(P, R) = ☐ ----------(III)

From I, II, and III,

☐ + ☐ = $2\sqrt{10}$

∴ d(P, Q) + d(P,R) = d(☐)

∴ Points P, Q, Rare collinear.

Q. 3. (B) Solve *any two* of the following sub-questions: **[6]**

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

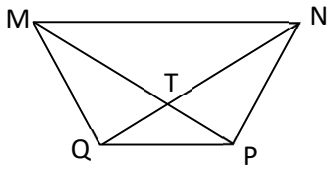
(ii) Draw a circle of radius 4.2cm and centre O. Mark a point B at a distance of 7.5cm from the centre. Draw tangents to the circle from point B.

(iii) In □MNPQ, seg MN || seg QP.

Diagonal MP and diagonal QN intersect each other in point T.

Then show that:

$\frac{MT}{MN} = \frac{PT}{PQ}$



(iv) In ΔABC, G (6, -2) is the centroid. If A (3, -5) and B (4, 3), then find the co ordinates of point C.

Q. 4. Solve *any two* of the following sub-questions: **[8]**

(i) The line segment AB is divided into five congruent parts at P, Q, R and S, such that A – P – Q – R – S – B. If point Q (12,14) and S (4,18) are given, find the co ordinates of A, P, R and B.

(ii) ΔSPQ ~ ΔSTR. In ΔSPQ, SP = 5.8cm, $\angle QSP = 60^{o}$, SQ = 4.6cm.

$\frac{SP}{ST} = \frac{5}{3}$. Construct ΔSTR

(iii) Prove that, if two lines containing chords of a circle intersect each other outside the circle, then the measure of angle between them is half the difference in measures of the arcs intercepted by the angle.

Q. 5. Solve *any one* of the following sub-questions: **[3]**

(i) The lengths of perpendicular sides of right triangle are 8cm and 6cm.

Draw a circle passing through all three vertices of a triangle,

also draw a tangent to the circle at any one vertex of the triangle.

(ii) Anju and Manju started walking to the West and to the North respectively, from the same point and at the same speed. After 2 hours distance between them was $17\sqrt{2}$ km. Find their speed per hour.

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