



Way to Excellence

Seat No. 

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Year: 2024-2025  
X (SSC)

# Nayak's Tutorials

Practice Paper -2  
Mathematics- Paper IIMarks: 40  
Duration: 2 Hrs.**Instructions :**

- (1) All questions / activities are compulsory.
- (2) Use of calculators is not allowed.
- (3) The numbers to the right of the question indicate full marks.
- (4) In case of MCQs, only the first attempt will be evaluated and will be given credit
- 5) For every MCQ, the correct alternative (A), (B), (C) or (D) of answers with subsequent number is written as an answer.

**Q.1A) Multiple Choice Questions**

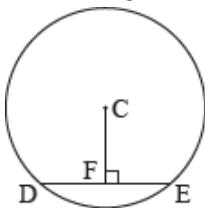
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- 1 Altitude on the hypotenuse of a right angled triangle divides it in two parts of lengths 4 cm and 9 cm. Find the length of the altitude.  
a. 9 cm      b. 4 cm      c. 6 cm      d.  $2\sqrt{6}$  cm
- 2 A line makes an angle of  $30^\circ$  with the positive direction of X- axis. So the slope of the line is .....  
a.  $\frac{1}{2}$       b.  $\frac{\sqrt{3}}{2}$       c.  $\frac{1}{\sqrt{3}}$       d.  $\sqrt{3}$
- 3 Complete the trigonometric identity  $\sin^2 \theta + \cos^2 \theta = ?$   
a. 1      b.  $\sqrt{2}$       c. -1      d. 0
- 4 Two circles having diameters 8 cm and 6 cm touch each other internally. Find the distance between their centres.  
a. 2      b. 14      c. 7      d. 1

**Q1B) Answer the following.**

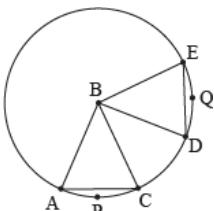
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- 1 Prove the following  
 $\cos^2 \theta (1 + \tan^2 \theta) = 1$
- 2 Find the distance between the points P(-1, 1) and Q (5,-7) .
- 3 Identify, with reason, if the following is Pythagorean triplet. (10, 24, 27)
- 4 In the adjoining figure, seg DE is the chord of the circle with center C. Seg CF  $\perp$  seg DE and DE = 16 cm, then find the length of DF.

**Q2A) Attempt the following (Activity)(Any Two)**

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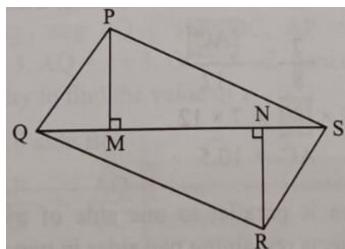
- 1 The chords corresponding to congruent arcs of a circle are congruent.  
Prove the theorem by completing following activity.

**Given:** In a circle with centre B, arc APC  $\cong$  arc DQE**To Prove:** chord AC  $\cong$  chord DE.

**Proof:**

In  $\triangle ABC$  and  $\triangle DBE$ ,  
 side AB  $\cong$  side DB .....  
 side BC  $\cong$  side .....  
 $\angle ABC \cong \angle DBE$  (Measure of congruent arcs)  
 $\therefore \triangle ABC \cong \triangle DBE$  .....

- 2 In fig. PM = 10 cm, A ( $\triangle PQS$ ) = 100 sqcm A ( $\triangle QRS$ ) = 110 sqcm then NR = ?



- 3 A washing tub in the shape of a frustum of a cone has height 21cm. The radii of the circular top and bottom are 20cm and 15cm respectively. What is the capacity of the tub? ( $\pi = \frac{22}{7}$ )

$$\begin{aligned}\text{Volume of washing tub} &= \frac{1}{3} \times \pi h (\quad) \\ &= \frac{1}{3} \times \frac{22}{7} \times 21 (20^2 + 15^2 + 20 \times 15) \\ &= 22 (\quad) \\ &= 22 \times \quad\end{aligned}$$

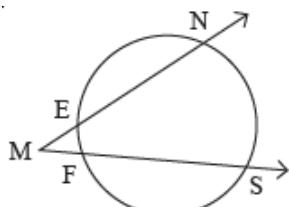
$$\text{Volume of washing tub} = \quad \text{cm}^3$$

$$\therefore \text{Capacity of washing tub is } \quad \text{cm}^3$$

**Q2B) Answer the following (Any Four)**

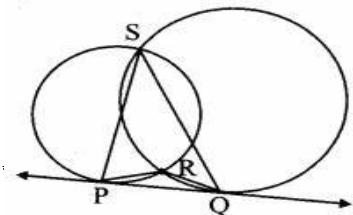
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- 1 Prove that :  $\sqrt{\frac{1 - \sin \theta}{1 + \sin \theta}} = \sec \theta - \tan \theta$

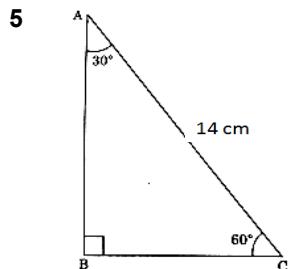


- 2 In figure,  $m(\text{arc NS}) = 125^\circ$ ,  $m(\text{arc EF}) = 37^\circ$ , find the measure  $\angle NMS$ .

- 3 If two circles intersect each other at points S and R. Their common tangent PQ touches the circle at points P, Q. Prove that,  $\angle PRQ + \angle PSQ = 180^\circ$



- 4 Find the centroids of the triangles whose vertices are given below.  
 $(4, 7), (8, 4), (7, 11)$



In  $\triangle ABC$ ,  $\angle B = 90^\circ$ ,  $\angle A = 30^\circ$ ,  $AC = 14$ , then find AB and BC.

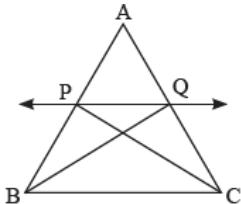
**Q3A) Attempt the following (Activity)(Any One)**

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- 1 A line is parallel to one side of triangle which intersects remaining two sides in two distinct point then that line divides sides in same proportion.

**Given:**

In  $\triangle ABC$  line  $l \parallel$  side  $BC$  & line  $l$  intersect side  $AB$  in  $P$  & side  $AC$  in  $Q$ .



$\triangle APQ$  and  $\triangle PQB$  have equal heights.

$$\therefore \frac{A(\Delta APQ)}{A(\Delta PQB)} = \frac{AP}{PB} \quad \dots \text{(I) (areas proportionate to bases)}$$

$$\text{and } \frac{A(\Delta APQ)}{A(\Delta PQC)} = \frac{AQ}{QC} \quad \dots \text{(II) (areas proportionate to bases)}$$

seg  $PQ$  is common base of  $\triangle PQB$  and  $\triangle PQC$ . seg  $PQ \parallel$  seg  $BC$ ,

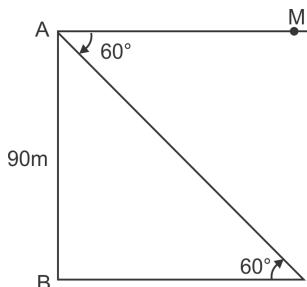
hence  $\triangle PQB$  and  $\triangle PQC$  have equal heights.

$$A(\Delta PQB) = A(\Delta PQC) \quad \dots \text{(III)}$$

$$\frac{A(\Delta APQ)}{A(\Delta PQB)} = \frac{A(\Delta APQ)}{A(\Delta PQC)} \quad \dots \text{[from (I), (II) and (III)]}$$

$$\therefore \frac{AP}{PB} = \frac{AQ}{QC} \quad \dots \text{[from (I) and (II)]}$$

- 2 From the top of a lighthouse, an observer looking at a ship makes an angle of depression of  $60^\circ$ . If the height of the lighthouse is 90 m then find how far is the ship from the lighthouse. ( $\sqrt{3} = 1.73$ )



Let  $AB$  be the light house.

The ship is at  $C$  and observer is at  $A$ .

$\angle MAC$  is the angle of depression.

$$\angle MAC = \angle ACB = \underline{\hspace{2cm}}$$

..... Alternate angle

$$AB = \underline{\hspace{2cm}}.$$

$$\text{From the figure, } \tan 60^\circ = \underline{\hspace{2cm}}$$

$$\sqrt{3} = \frac{90}{BC}$$

$$BC = \frac{90}{\sqrt{3}} = \underline{\hspace{2cm}} = \frac{90\sqrt{3}}{3} = \underline{\hspace{2cm}}$$

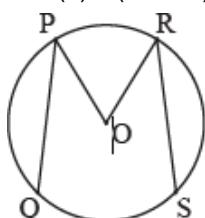
$$\therefore BC = 30 \times 1.73$$

$\therefore$  The ship is at a distance of  $\underline{\hspace{2cm}}$  from the light house.

**Q3B) Solve the following (Any Two)**

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- 1 In figure,  $O$  is the centre of a circle, chord  $PQ \cong$  chord  $RS$ . If  $\angle POR = 70^\circ$  and  $(\text{arc } RS) = 80^\circ$ .  
Find (1)  $m(\text{arc } PR)$  (2)  $m(\text{arc } QS)$  (3)  $m(\text{arc } QSR)$

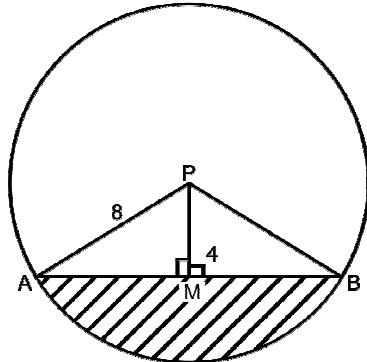


- 2 Ratio of areas of two triangles with equal heights is  $2 : 3$ . If base of the smaller triangle is 6 cm then what is the corresponding base of the bigger triangle?
- 3  $\triangle ABC$  is an equilateral triangle. Point  $P$  is on base  $BC$  such that  $PC = \frac{1}{3} BC$ , if  $AB = 6$  cm find  $AP$ .
- 4 Draw a circle with centre  $O$  and radius 3.5 cm. Take point  $P$  at a distance of 5.7 cm. from the centre. Draw a tangent to the circle from point  $P$ .

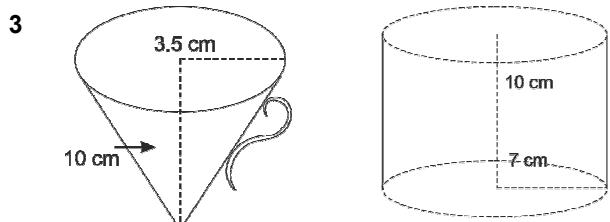
**Q4) Answer the following(Any Two)**

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- 1 In the figure, seg AB is a chord of a circle with centre P.  
 If PA = 8 cm and distance of chord AB from the centre P is 4 cm, find the area of the shaded portion.  
 $(\pi = 3.14, \sqrt{3} = 1.73)$



- 2 Construct  $\square PYQ$  such that, PY = 6.3 cm, YQ = 7.2 cm, PQ = 5.8 cm. If  $\frac{YZ}{YQ} = \frac{6}{5}$  then construct  $\square XYZ$  similar to  $\square PYQ$ .

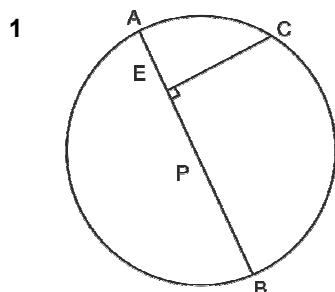


Observe the measures of pots in the above figures.

How many jugs of water can the cylindrical pot hold?

#### Q5) Creative questions(Any One)

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In the above figure, seg AB is a diameter of a circle with centre P. C is any point on the circle. seg  $CE \perp$  seg AB.  
 Prove that CE is the geometric mean of AE and EB. Write the proof with the help of following steps :

- Draw ray CE. It intersects the circle at D.
- Show that  $CE = ED$ .
- Write the result using theorem of intersection of chords inside a circle.
- Using  $CE = ED$ , complete the proof.

- 2  $\Delta ABC$  is a triangle where  $\angle C = 90^\circ$ .

Let BC = a, CA = b, AB = c and let 'p' be the length of the perpendicular C on AB.

i) With the help of area of triangle, prove  $cp = ab$ ,

ii) with the application of Pythagoras theorem, prove  $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$