

BOARD QUESTION PAPER: MARCH 2019

MATHS (PART - II)

Time: 2 Hours

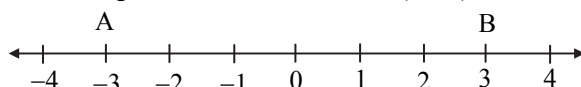
Max. Marks: 40

Note:

- All questions are compulsory.
- Use of calculator is not allowed.
- Figures to the right of questions indicate full marks.
- Draw proper figures for answers wherever necessary.
- The marks of construction should be clear and distinct. Do not erase them.
- While writing any proof, drawing relevant figure is necessary. Also the proof should be consistent with the figure.

1. (A) Solve the following questions (Any four): [4]

- If $\triangle ABC \sim \triangle PQR$ and $\angle A = 60^\circ$, then $\angle P = ?$
- In right-angled $\triangle ABC$, if $\angle B = 90^\circ$, $AB = 6$, $BC = 8$, then find AC .
- Write the length of largest chord of a circle with radius 3.2 cm.
- From the given number line, find $d(A, B)$:



- Find the value of $\sin 30^\circ + \cos 60^\circ$.
- Find the area of a circle of radius 7 cm.

(B) Solve the following questions (Any two): [4]

- Draw seg AB of length 7 cm and bisect it.
- In right-angled triangle PQR , if $\angle P = 60^\circ$, $\angle R = 30^\circ$ and $PR = 12$, then find the values of PQ and QR .
- In a right circular cone, if perpendicular height is 12 cm and radius is 5 cm, then find its slant height.

2. (A) Choose the correct alternative: [4]

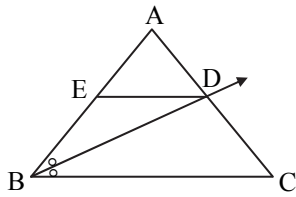
- $\triangle ABC$ and $\triangle DEF$ are equilateral triangles. If $A(\triangle ABC) : A(\triangle DEF) = 1 : 2$ and $AB = 4$, then what is the length of DE ?
(A) $2\sqrt{2}$ (B) 4 (C) 8 (D) $4\sqrt{2}$
- Out of the following which is a Pythagorean triplet?
(A) (5, 12, 14) (B) (3, 4, 2) (C) (8, 15, 17) (D) (5, 5, 2)
- $\angle ACB$ is inscribed in arc ACB of a circle with centre O . If $\angle ACB = 65^\circ$, find $m(\text{arc } ACB)$:
(A) 130° (B) 295° (C) 230° (D) 65°
- $1 + \tan^2 \theta = ?$
(A) $\sin^2 \theta$ (B) $\sec^2 \theta$ (C) $\text{cosec}^2 \theta$ (D) $\cot^2 \theta$

(B) Solve the following questions (Any two): [4]

- Construct tangent to a circle with centre A and radius 3.4 cm at any point P on it.
- Find slope of a line passing through the points $A(3, 1)$ and $B(5, 3)$.
- Find the surface area of a sphere of radius 3.5 cm.

3. (A) Complete the following activities (Any two):

i.



In $\triangle ABC$, ray BD bisects $\angle ABC$.

If $A-D-C$, $A-E-B$ and $seg\ ED \parallel$ side BC , then prove that: $\frac{AB}{BC} = \frac{AE}{EB}$.

Proof:

In $\triangle ABC$, ray BD is bisector of $\angle ABC$.

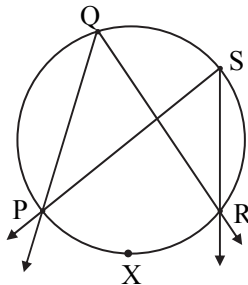
$\therefore \frac{AB}{BC} = \frac{AD}{DC}$... (i) (By angle bisector theorem)

In $\triangle ABC$, $seg\ DE \parallel$ side BC

$\therefore \frac{AE}{EB} = \frac{AD}{DC}$... (ii)

$\therefore \frac{AB}{BC} = \frac{AE}{EB}$... [From (i) and (ii)]

ii.



Prove that, angles inscribed in the same arc are congruent.

Given: $\angle PQR$ and $\angle PSR$ are inscribed in the same arc.
Arc PXR is intercepted by the angles.

To prove: $\angle PQR \cong \angle PSR$

Proof:

$m\angle PQR = \frac{1}{2} m(\text{arc } PXR)$... (i)

$m\angle \square = \frac{1}{2} m(\text{arc } PXR)$... (ii)

$\therefore m\angle \square = m\angle PSR$... [From (i) and (ii)]

$\therefore \angle PQR \cong \angle PSR$... (Angles equal in measure are congruent)

iii. How many solid cylinders of radius 6 cm and height 12 cm can be made by melting a solid sphere of radius 18 cm?

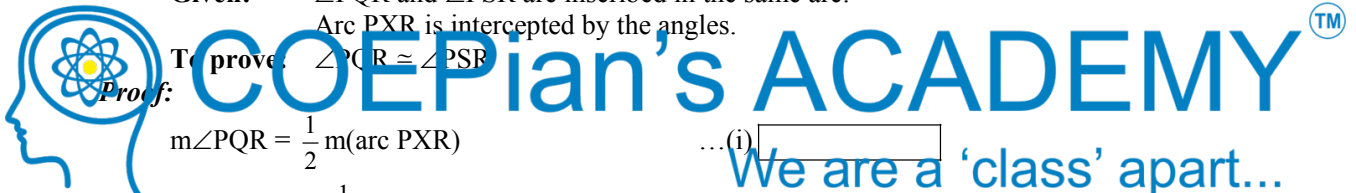
Activity: Radius of the sphere, $r = 18$ cm
For cylinder, radius $R = 6$ cm, height $H = 12$ cm

\therefore Number of cylinders can be made = $\frac{\text{Volume of the sphere}}{\text{Volume of cylinder}}$

$= \frac{\frac{4}{3} \pi r^3}{\pi R^2 H}$

$= \frac{\frac{4}{3} \times 18 \times 18 \times 18}{\pi \times 6^2 \times 12}$

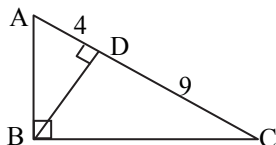
$= \square$



(B) Solve the following questions (Any two):

[4]

i.



In right-angled $\triangle ABC$, $BD \perp AC$.

If $AD = 4$, $DC = 9$, then find BD .

ii. Verify whether the following points are collinear or not:

$A(1, -3)$, $B(2, -5)$, $C(-4, 7)$.

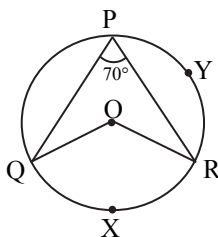
iii. If $\sec \theta = \frac{25}{7}$, then find the value of $\tan \theta$.

4. Solve the following questions (Any three):

[9]

i. In $\triangle PQR$, seg PM is a median, $PM = 9$ and $PQ^2 + PR^2 = 290$. Find the length of QR .

ii.



In the given figure, O is centre of circle. $\angle QPR = 70^\circ$ and $m(\text{arc } PYR) = 160^\circ$, then find the value of each of the following:

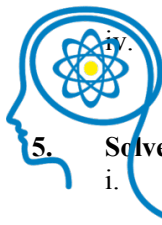
(a) $m(\text{arc } QXR)$

(b) $\angle QOR$

(c) $\angle PQR$

iii. Draw a circle with radius 4.2 cm. Construct tangents to the circle from a point at a distance of 7 cm from the centre.

iv. When an observer at a distance of 12 m from a tree looks at the top of the tree, the angle of elevation is 60° . What is the height of the tree? ($\sqrt{3} = 1.73$)

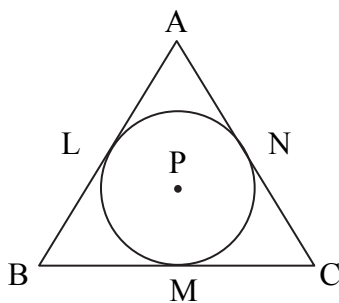


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We are a 'class' apart... [4]

5. Solve the following questions (Any one):

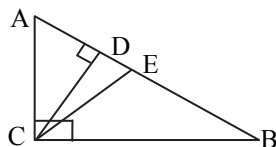
i.



A circle with centre P is inscribed in the $\triangle ABC$. Side AB , side BC and side AC touch the circle at points L , M and N respectively. Radius of the circle is r .

Prove that: $A(\triangle ABC) = \frac{1}{2} (AB + BC + AC) \times r$.

ii.



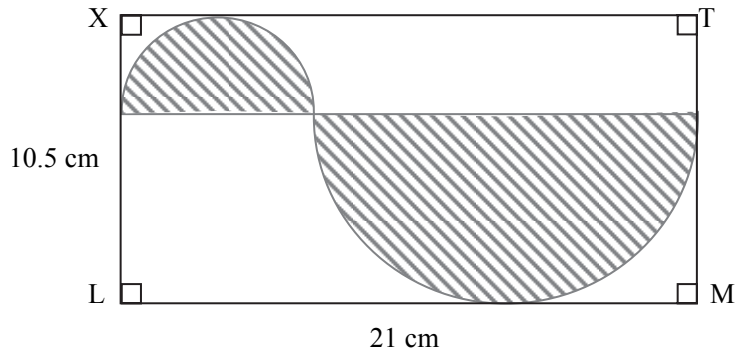
In $\triangle ABC$, $\angle ACB = 90^\circ$. seg $CD \perp$ side AB and seg CE is angle bisector of $\angle ACB$.

Prove that: $\frac{AD}{BD} = \frac{AE^2}{BE^2}$.

6. Solve the following questions (Any one):

i. Show that the points $(2, 0)$, $(-2, 0)$ and $(0, 2)$ are the vertices of a triangle. Also state with reason the type of the triangle.

ii.



In the above figure, $\square XLMT$ is a rectangle. $LM = 21$ cm, $XL = 10.5$ cm. Diameter of the smaller semicircle is half the diameter of the larger semicircle. Find the area of non-shaded region.



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