Mathademy®

Maharashtra State Board

Class X Mathematics – Geometry – Paper II

Board Paper 2019

Time: 2 hours **Maximum Marks: 40**

Note:

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

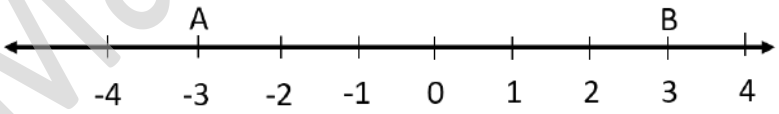
1. (A) Solve the following questions (Any *four*) : **4**

(i) If $\Delta ABC \sim \Delta PQR$ and $\angle A = 60°$, then $\angle P$ =?

(ii) In right – angled ΔABC, if $\angle B = 90°$, AB = 6, BC = 8, then find AC.

(iii) Write the length of largest chord of a circle with radius 3.2 cm.

(iv) From the given number line, find d(A,B) :



(v) Find the value of sin 30° + cos 60°.

(vi) Find the area of a circle of radius 7 cm.

(B) Solve the following questions (Any *two*): **4**

(i) Draw seg AB of length 5.7 cm and bisect it.

(ii) In right-angled triangle PQR, if $\angle P = 60°$, $\angle R = 30°$ and PR = 12, then find the values of PQ and QR.

(iii) 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**

(i) Δ ABC and ΔDEF are equilateral triangles. If A (Δ ABC): A (ΔDEF) = 1: 2 and AB = 4, then what is the length of DE?

(a) $2\sqrt{2}$ (b) 4

(c) 8 (d) $4\sqrt{2}$

(ii) 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)

(iii) ∠ACB is inscribed in arc ACB of a circle with centre O. if ∠ACB = 65°, find m (arc ACB):

(a) 130° (b) 295°

(c) 230° (d) 65°

(iv) $1 + \tan^2\theta$ =?

(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**

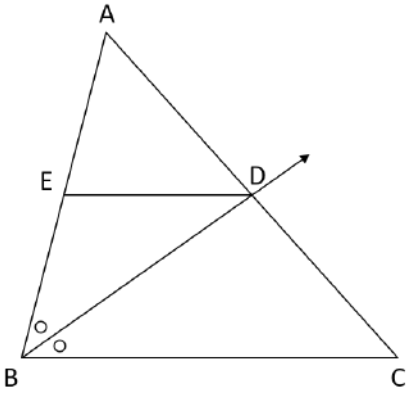
(i) Construct tangent to a circle with centre A and radius 3.4 cm at any point P on it.

(ii) Find slope of a line passing through the points A (3, 1) and B (5, 3).

(iii) Find the surface area of a sphere of radius 3.5 cm.

3. (A) Complete the following activities (Any two) : **4**

(i)



In Δ ABC, ray BD bisects ∠ABC.

If A -D-C, A-E-B and seg ED ∥ side BC, then prove that:

$$\frac{AB}{BC} = \frac{AE}{EB}$$

Proof:

In Δ ABC, ray BD is bisector of ∠ABC.

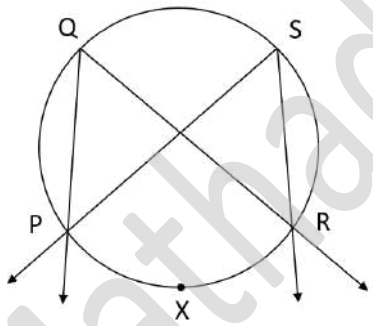
$\therefore \quad \frac{AB}{BC} = \frac{\square}{\square}$ (I) (by angle bisector theorem)

In Δ ABC, seg DE ∥ side BC.

$\therefore \quad \frac{AE}{EB} = \frac{AD}{DC}$ (II) ☐

$\therefore \quad \frac{AB}{\square} = \frac{\square}{EB}$ ..... (From I and II)

(ii)



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

Given: ∠PQR and ∠PSR are inscribed in the same arc.

Arc PXR is intercepted by the angles

To prove:

∠PQR ≅ ∠PSR

Proof

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

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

$\therefore \quad m\angle\square = m\,PSR$ (from I and II)

$\therefore \quad \angle PQR \cong \angle PSR$ (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 = $\frac{\text{Volume of the sphere}}{\square}$

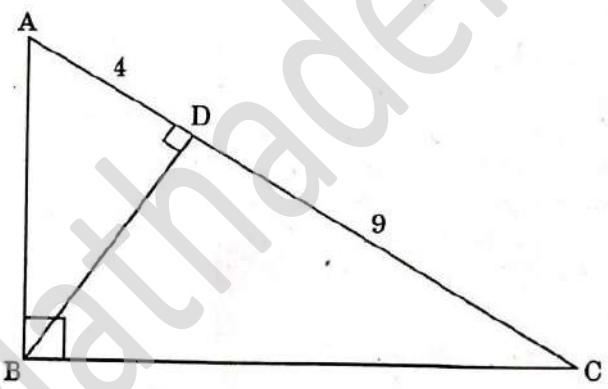
$= \frac{\frac{4}{3}\pi r^3}{\square}$

$= \frac{\frac{4}{3} \times 18 \times 18 \times 18}{\square}$

$= \square$

(B) **Solve the following questions (Any two):** **4**

(i)



In right-angled Δ ABC; BD ⊥ AC.

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

(ii) Verify whether the following points are collinear or not :

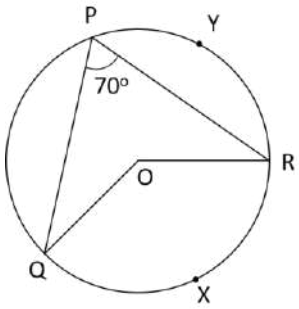
A (1,-3), B (2,-5), C (-4, 7).

(iii) if $\sec\theta = \frac{25}{7}$, then find the value of $\tan\theta$

4. Solve the following questions (Any three) : **9**

(i) In Δ 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. ∠QPR = 70° and m (arc PYR) = 160°, then find the value of each of the following:

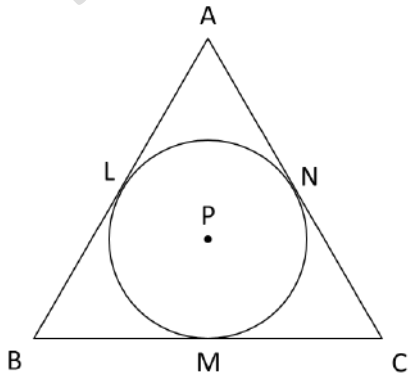
(a) m (arc QXR)
(b) ∠QOR
(c) ∠PQR

(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 cm m from a tree looks at the top of the tree, the angle of elevation is 60°. What is the height of the tree? $\left(\sqrt{3} = 1.73\right)$

5. Solve the following questions (Any one) : **4**

(i)

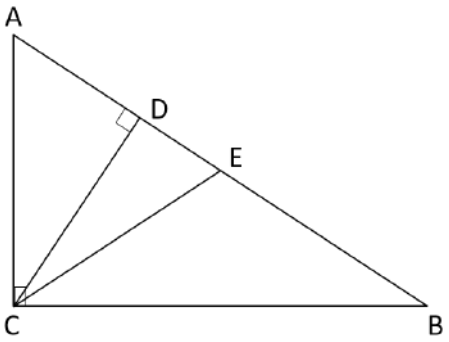


A circle with centre P is inscribed in the Δ ABC. Side AB, side BC and side AC touch the circle at points L, M and N respectively. Radius of the circle is r.

Prove that:

$$A(\Delta ABC) \frac{1}{2}(AB + BC + AC) \times r$$

(ii)



In Δ ABC, ∠ACB = 90°. Seg CD ⊥ side AB and seg CE is angle bisector of ∠ACB.

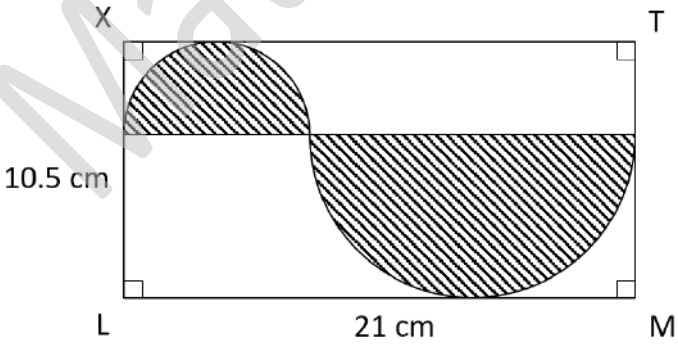
Prove that:

$$\frac{AD}{BD} = \frac{AE^2}{BE^2}$$

6. Solve the following questions (Any one) : **3**

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

(ii)



In the above figure, ⧹XLMT is a rectangle 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.