SECOND TERM EVALUATION
2022-23
MATHEMATICS

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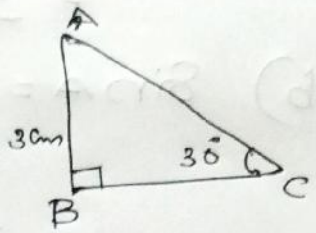
CLASS X

1.

a) $\angle A = 180 - (90+30)$

$= 180 - 120$

$= \underline{60^\circ}$



b) Here angles are $30^\circ, 60^\circ, 90^\circ$

$\therefore AB : BC : AC = 1 : \sqrt{3} : 2$

Here $AB = 3$ cm $\quad \therefore BC = \underline{\underline{3\sqrt{3}}}$ cm

2) Let the side of the original square = x metre

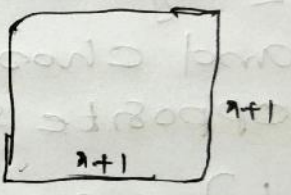
Given $(x+1)^2 = 49$

$\therefore x+1 = \sqrt{49}$

$x+1 = 7$

$\therefore x = 7-1$

$= \underline{\underline{6}}$

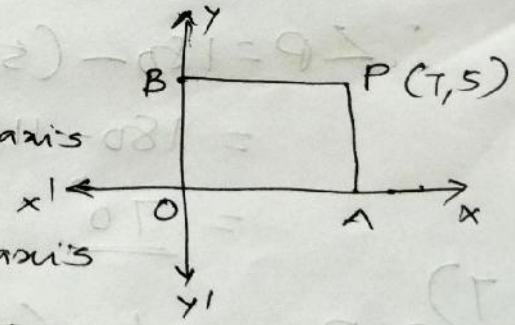


$\therefore$ Side of the original square = $\underline{\underline{6}}$ m

3)

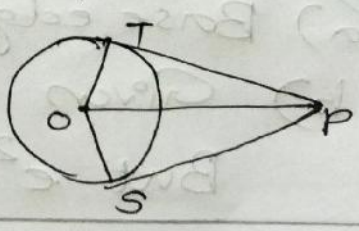
a) A = (7, 0), A on x-axis

b) B = (0, 5), B on y-axis

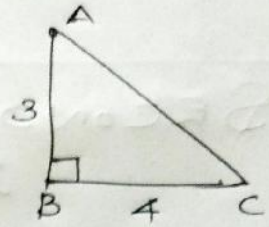


4) a) $\angle SOT = 180 - 60 = \underline{120^\circ}$

b) $\angle POT = \frac{120^\circ}{2} = \underline{60^\circ}$



5)



a) $AC = \sqrt{3^2+4^2}$

$= \sqrt{9+16}$

$= \sqrt{25}$

$= \underline{5 \text{ cm}}$

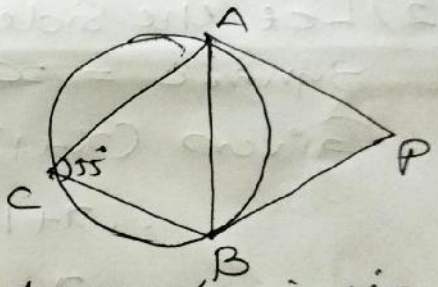
b) $\sin A = \frac{\text{opp. side}}{\text{Hypotenuse}}$

$= \underline{\frac{4}{5}}$

$\cos A = \frac{\text{Adj. side}}{\text{Hypotenuse}}$

$= \underline{\frac{3}{5}}$

6)



a) $\angle PAB = 55^\circ$

[angle b/w tangent and chord is equal to angle in its opposite segment]

b) $\angle PBA = 55^\circ$ ($\because \triangle PAB$ is isosceles with $PA = PB$)

$\therefore \angle P = 180 - (55+55)$

$= 180 - 110$

$= \underline{70^\circ}$.

7)

a) Base edge $(a) = 10$

b) Given $e = 13$

But $e^2 = l^2 + \left(\frac{a}{2}\right)^2$

$13^2 = l^2 + \left(\frac{10}{2}\right)^2$

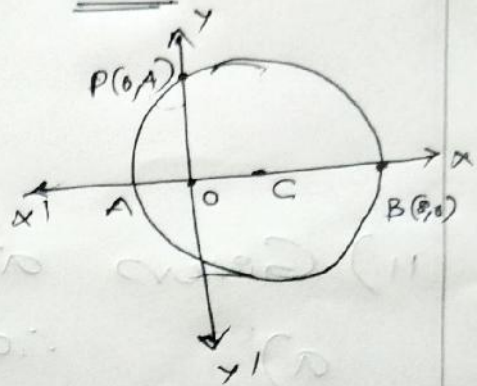
$169 = l^2 + 5^2$

$\therefore l^2 = 169 - 25$

$l^2 = 144 \quad \therefore l = \sqrt{144}$

$= \underline{12}$

8) a) We have



$OA \times OB = OP^2$

$OA \times 8 = 4^2$

$OA = \frac{16}{8}$

$OA = \underline{2}$

b) $A = \underline{(-2, 0)}$

9) a) Given polynomial is $x^2 + 8x$.

Number to be added to make a perfect square $= \left(\frac{8}{2}\right)^2$

$= 4^2$

$= \underline{16}$.

b) Given $x^2 + 8x = 20$

$\Rightarrow x^2 + 8x + 16 = 20 + 16$

$(x+4)^2 = 36$

$x + 4 = \sqrt{36}$

$x + 4 = 6 \quad \therefore x = 6 - 4 = \underline{2}$.

10) a) $\angle OAQ = 90^\circ$ [tangent $\perp^r$ radius]

b) fig.

11) Given $a^2 = 144$ | $h = 8\text{cm}$.

a) $\therefore a = \sqrt{144}$

Base edge $= \underline{12\text{ cm}}$

b) We have $l^2 = h^2 + \left(\frac{a}{2}\right)^2$

$l^2 = 8^2 + \left(\frac{12}{2}\right)^2$

$l^2 = 8^2 + 6^2$

$l^2 = 64 + 36$

$l^2 = 100$

$\therefore l = \sqrt{100}$

Slant height $= \underline{\underline{10\text{ cm}}}$

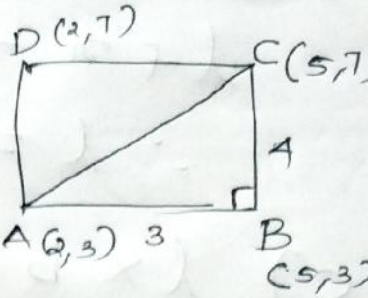
c) L.S.A $= 2al$

$= 2 \times 12 \times 10$

$= 240\text{cm}^2$

12) $B = (5, 3)$

a) $D = (2, 7)$



b) Here $AB = 3$, $BC = 4$

$\therefore AC = \sqrt{3^2 + 4^2}$

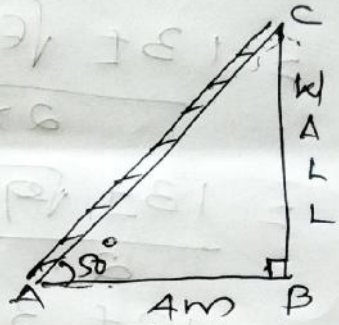
$= \sqrt{9 + 16}$

$= \sqrt{25}$

$= \underline{5}$.

13)

a)



b) Here

$\tan 50 = \frac{\text{opp. side}}{\text{adj. side}}$

$1.19 = \frac{BC}{4}$

$\therefore BC = 4 \times 1.19$

$= 4.76$

Height of wall $= \underline{\underline{4.76 \text{ m}}}$

14) Fig.

15) a) $2(\text{length} + \text{width}) = 26$

$\therefore \text{length} + \text{width} = \frac{26}{2} = \underline{\underline{13 \text{ cm}}}$

b) $l + b = 13$

$l + x = 13$

$\therefore l = \underline{13 - x}$

c) $l \times b = \text{area}$

$(13 - x)x = 40$

$13x - x^2 = 40$

$\therefore x^2 - 13x + 40 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{13 \pm \sqrt{(13)^2 - 4 \times 1 \times 40}}{2 \times 1}$$

$$= \frac{13 \pm \sqrt{9}}{2}$$

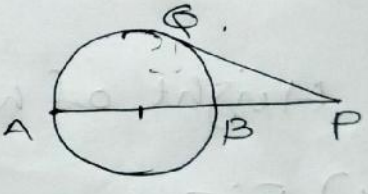
$$= \frac{13 \pm 3}{2}$$

$$= \frac{13+3}{2}, \quad \frac{13-3}{2}$$

$= 8, 5$

$\therefore$ length = 8cm, breadth = 5cm

16)



a) We have,

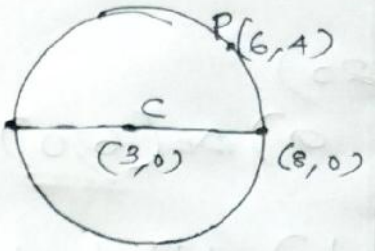
$PB \times PA = PQ^2$

$PB \times 12 = 6^2$

$PB = \frac{36}{12} = 3\text{cm}$

b) Diameter $(AB) = PA - PB = 12 - 3 = 9\text{cm}$.

17)



a) radius = $|\overline{CP}|$

$= \sqrt{(6-3)^2 + (4-0)^2}$

$= \sqrt{3^2 + 4^2}$

$= \sqrt{9+16}$

$= \sqrt{25}$

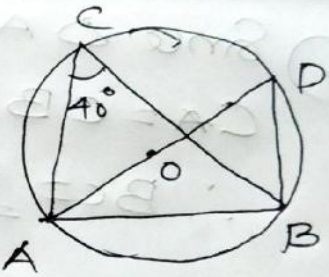
$= \underline{5}$

distance $= \sqrt{(x_1-x_2)^2 + (y_1-y_2)^2}$

b) Points at which the circle cuts the x axis $(3 \pm 5, 0)$

$(8, 0)$ and $(-2, 0)$

18)



a) $\angle D = 40^\circ$ ($\because \angle D = \angle C$)

(angles in the same arc)

b) $\angle ABD = 90^\circ$ (angle in semicircle)

c) In $\triangle ABD$, $\sin D = \frac{\text{opp. side}}{\text{Hyp}}$

$\sin 40 = \frac{AB}{AD}$

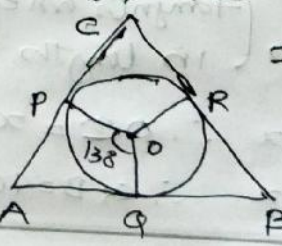
$0.64 = \frac{AB}{6}$

$\therefore AB = 6 \times 0.64$

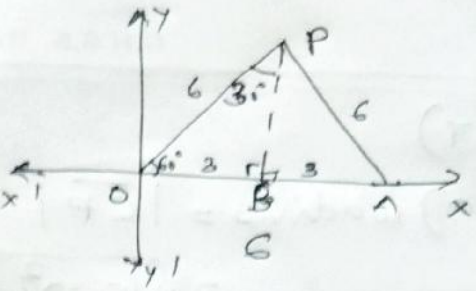
$= \underline{3.84 \text{ cms.}}$

19) a) $\angle A = 180 - 130$

$= 50^\circ$.



19)
b) fig



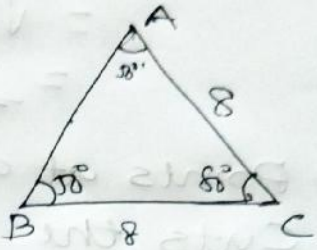
20)
a) A = (6, 0)

b) ⊥r distance = $3\sqrt{3}$ units

30°, 60°, 90°
1 : √3 : 2

c) P = $(3, 3\sqrt{3})$

21)

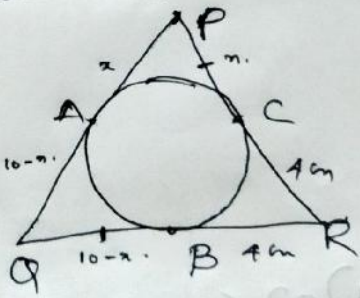


a) ∠A = 180 − (50 + 80)
= 180 − 130
= 50°

b) Since △ABC is isosceles with
CA = CB
∴ BC = 8 cm

c) Area of △ABC = $\frac{1}{2} \times 8 \times 8 \times \sin 80°$
= 32 × 0.98
= 31.36 cm²

22) Given PQ = 10 cms
BR = 4 cms



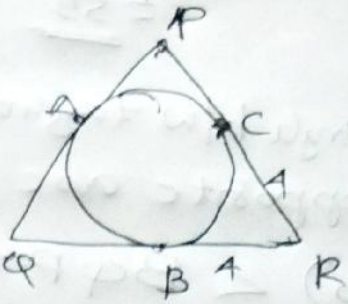
a) CR = BR
= 4 cms (tangents are equal in length)

b) Let PA = x ∴ PC = x
So QA = 10 − x ∴ QB = 10 − x.

22) b) $QB + PC = (10 - x) + x$

$= 10$ Cms

c)



Perimeter of $\triangle PQR$

$= PQ + QR + PR$

$= 10 + (QB + BR) + (PC + RC)$

$= 10 + (QB + PC) + BR + RC$

$= 10 + 10 + 4 + 4$

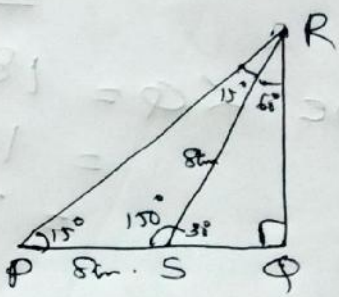
$= 28$ Cms.

d) $A = r \times S$

$= 2 \times 28$

$= 56 \text{ cms}^2$

23)



a) $\angle PRS = 180 - (150 + 15)$

$= 180 - 165$

$= 15°$

b) $SR = PS$

$= 8$ Cms ($\triangle PSR$ is isosceles)

c) $\angle QS = 180 - 150$

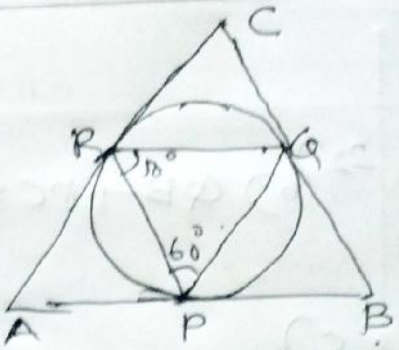
$= 30°$

d) Angles of $\triangle RQS$ are $30°, 60°, 90°$

So $QR : SQ : SR = 1 : \sqrt{3} : 2$

$QR = \frac{8}{2} = 4$ Cms & $QS = 4\sqrt{3}$ Cms

24)



a) $\angle BPQ = \angle R$

$= 50^\circ$

(angle b/w tangent and chord is equal angle in its opposite arc)

b) $\angle BQP = \angle BPQ = 50^\circ$ $(\because BP = BQ)$

$\therefore \angle B = 180 - (50 + 50)$

$= 180 - 100$

$= 80^\circ$.

c)

Here $\angle CQR = \angle CRQ = 60^\circ$

$\therefore \angle C = 180 - (60 + 60)$

$= 180 - 120^\circ$

$= 60^\circ$.

Here $\angle Q = 180 - (50 + 60)$

$= 180 - 110$

$= 70^\circ$.

$\angle APR = \angle ARP = 70^\circ$

$\therefore \angle A = 180 - (70 + 70)$

$= 180 - 140$

$= 40^\circ$.

25) Given $a = 10$ cms $\quad e = a$

a) Sum of length of edges $= 4a + 4e$

$= 4a + 4a$

$= 8a$

$= 8 \times 10$

$= 80$ cms

b) Here $l = \frac{\sqrt{3}a}{2}$

$= \frac{\sqrt{3} \times 10}{2}$

$= 5\sqrt{3}$ cms

$e^2 = l^2 + (a/2)^2$

$a^2 = l^2 + \frac{a^2}{4}$

$l^2 = a^2 - \frac{a^2}{4}$

$l^2 = \frac{3a^2}{4}$

$\therefore l = \frac{\sqrt{3}a}{2}$

c) $l^2 = h^2 + \left(\frac{a}{2}\right)^2$

$(5\sqrt{3})^2 = h^2 + 5^2$

$75 - 25 = h^2$

$\therefore h^2 = 50 \quad \therefore h = \sqrt{50}$

$= 5\sqrt{2}$ cms

d) $V = \frac{1}{3}a^2h$.

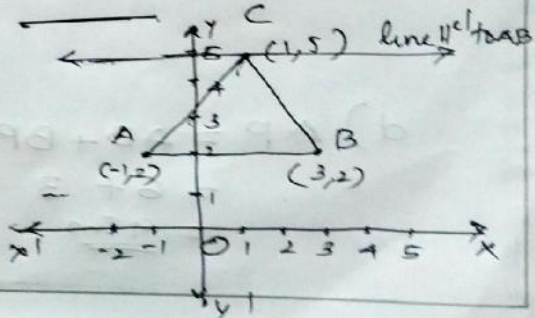
$= \frac{1}{3} \times 10 \times 10 \times 5\sqrt{2}$

$= \frac{500}{3}\sqrt{2}$ cms^3

26)

c) we can any point with y coordinate as 5

Point is (0, 5)

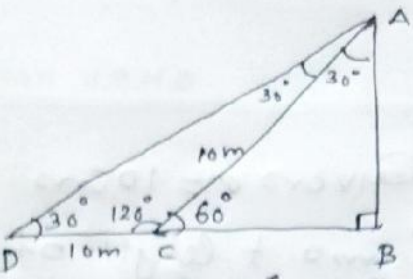


27)

b) Here

In $\triangle ACD$,

$CD = CA = 10m$



In $\triangle ABC$, angles are $30°, 60°, 90°$

$\therefore BC : AB : AC = 1 : \sqrt{3} : 2$

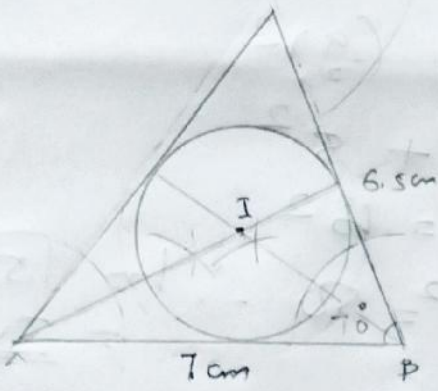
Here $BC = \frac{10}{2} = 5m$

$\therefore$ width of river $= \underline{5m}$

Also $AB = 5\sqrt{3}m$.

$\therefore$ Height of tree $= \underline{5\sqrt{3}m}$

28)



29)

a) $BP = 3cm$

b) $CR = 2cm$

c) Perimeter of $ABC = AB + BC + AC$

$= AB + (BQ + QC) + AC$

$= 6 + (3 + 2) + 7$

$= \underline{18cm}$

d) $AP = AB + BP$.

$= 6 + 3$

$= \underline{9cm}$

2a)

e) Perimeter of $\triangle ABC = AB + BC + AC$

$= AB + (BQ + QC) + AC$

$= AB + (BP + CR) + AC$

$= (AB + BP) + (CR + AC)$

$= AP + AR$

$= AP + AP$ (tangents are equal)

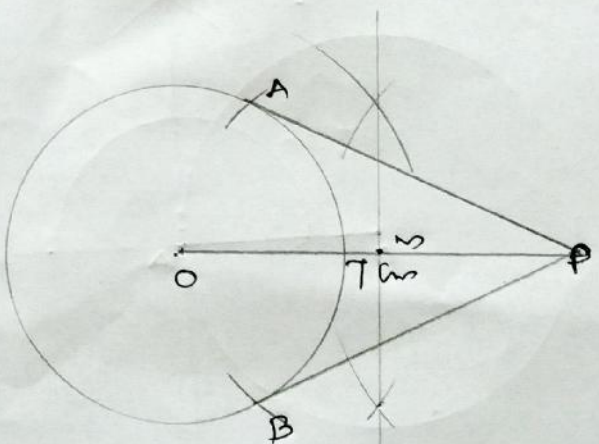
$= 2AP$.

$\therefore 2AP = 30$

$\therefore AP = \frac{30}{2}$

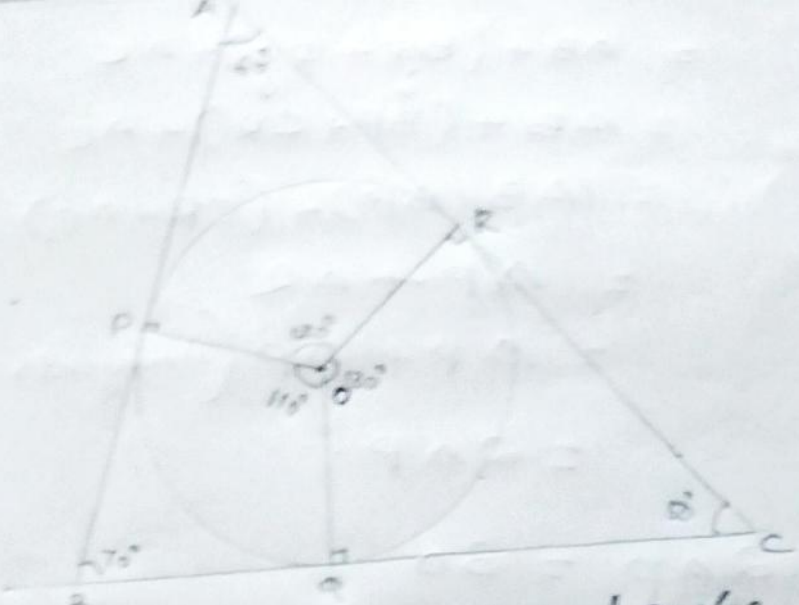
$= \underline{15 \text{ cms}}$

14)



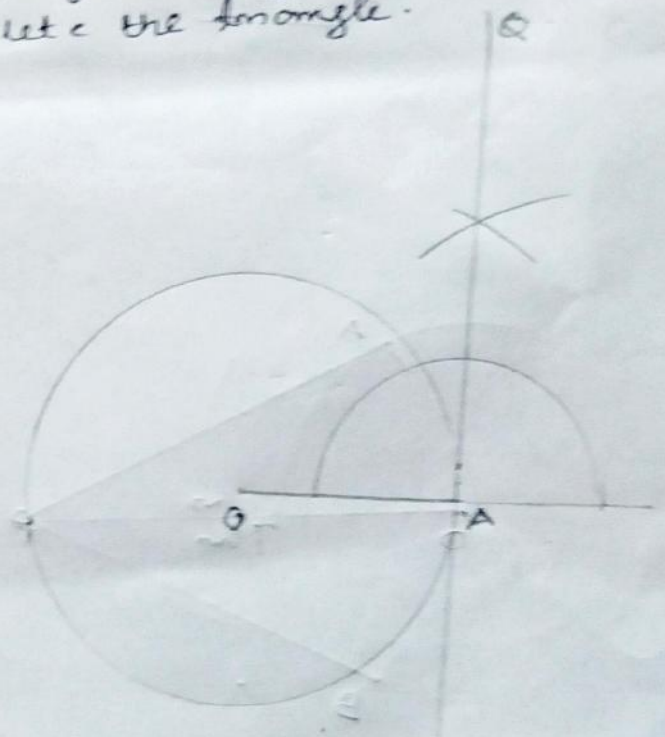
Draw the circle with radius 3cms. mark P which is 7cms away from the centre 'O', draw ⊥r bisector to OP, let M be the mid point of OP. Taking centre at M and MP or MO as radius draw two arcs on the circle, let A, B be the pts of intersections, join PA, PB

19)



Draw the circle, by taking central angles 180-50, 180-60, 180-70, i.e, 130°, 120°, 110°, we get 3 pts P, Q, R on the circle, by drawing tangents through them we can complete the triangle.

10)



First draw the given circle with centre O, mark a point A on the circle, join the radius OA, by drawing ⊥r through A to OA, we can draw the required tangent PQ.