

# SECOND TERM EVALUATION

2022-23

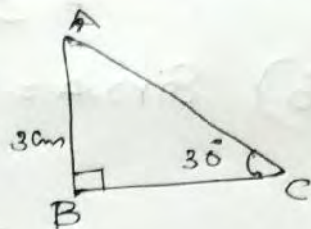
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MATHEMATICS CLASS X

1.

$$\begin{aligned} a) \angle A &= 180 - (90 + 30) \\ &= 180 - 120 \\ &= \underline{60^\circ} \end{aligned}$$



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

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

Here  $AB = 30\text{cm}$   $\therefore BC = \underline{\underline{3\sqrt{3}\text{cm}}}$

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

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

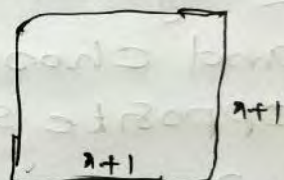


$$\therefore x+1 = \sqrt{49}$$

$$x+1 = 7$$

$$\therefore x = 7 - 1$$

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

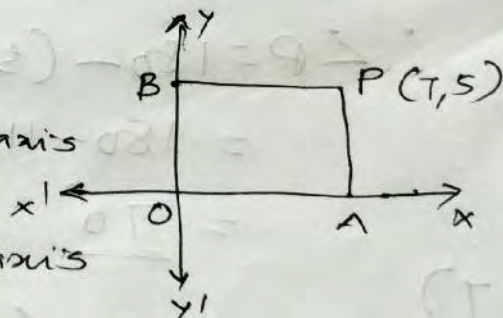


$\therefore$  Side of the original square = 6m

3)

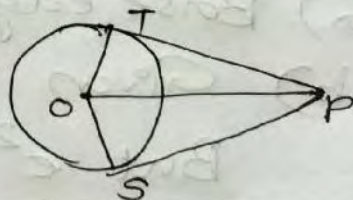
a)  $A = (7, 0)$ , A on x-axis

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



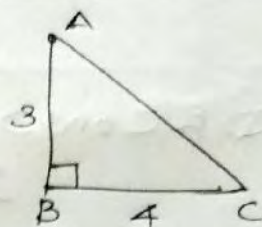
4) a)  $\angle SOT = 180 - 60 = \underline{120^\circ}$

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



5)

$$\begin{aligned} \text{a) } AC &= \sqrt{3^2 + 4^2} \\ &= \sqrt{9 + 16} \\ &= \sqrt{25} \\ &= \underline{5 \text{ cm}} \end{aligned}$$



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

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

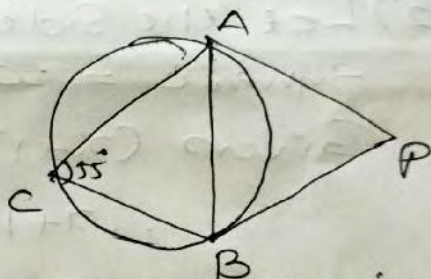
$$\cos A = \frac{\text{Adj. side}}{\text{Hypotenuse}}$$

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

6)

$$\text{a) } \angle PAB = 55^\circ$$

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



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

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

$$= 180 - 110$$

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

7)

$$\text{a) Base edge (a) = 10$$

$$\text{b) Given } e = 13$$

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

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

$$169 = l^2 + 5^2$$

$$\therefore l^2 = 169 - 25$$

$$l^2 = 144 \quad \therefore l = \sqrt{144} \\ = \underline{\underline{12}}$$

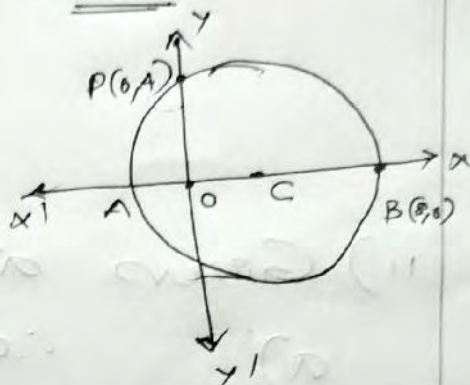
8) a) We have

$$OA \times OB = OP^2$$

$$OA \times 8 = 4^2$$

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

$$OA = \underline{\underline{2}}$$



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

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

Number to be added to make

$$\text{a perfect square} = \left(\frac{8}{2}\right)^2$$

$$= 4^2$$

$$= \underline{\underline{16}}$$

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

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

$$(x+4)^2 = 36$$

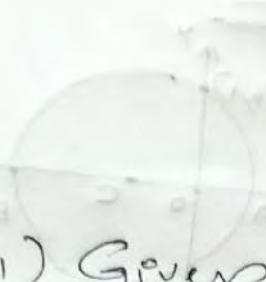
$$x+4 = \sqrt{36}$$

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

10)  $\angle O A Q = 90^\circ$  [tangent  $\perp$  radius]

a)

b) fig.



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

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

Base edge = 12 cm

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

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

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

$$\left(\frac{8}{2}\right) = l^2 = 64 + 36$$

$$l^2 = 100$$

$$\therefore l = \sqrt{100}$$

Slant height = 10 cm

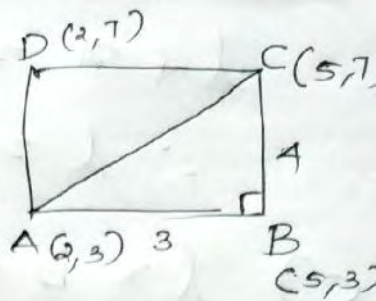
c) L.S.A =  $2a l$

$$= 2 \times 12 \times 10$$

$$= 240 \text{ cm}^2$$

12)  $B = (5, 3)$

a)  $D = (2, 7)$

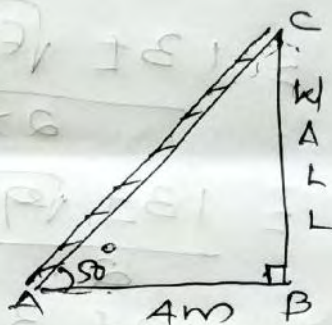


b) Here  $AB = 3$ ,  $BC = 4$

$$\begin{aligned} \therefore AC &= \sqrt{3^2 + 4^2} = 5 \\ &= \sqrt{9 + 16} \\ &= \sqrt{25} \\ &= \underline{5} \end{aligned}$$

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 = 4.76 m

14) Fig.

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

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

$$b) \quad l + b = 13$$

$$l + x = 13$$

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

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

$$(13 - x)x = 40$$

$$13x - x^2 = 40$$

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

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

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

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

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

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

$$= 8, \quad 5$$

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

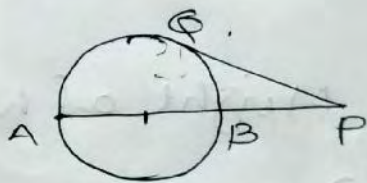
16)

a) We have

$$PB \times PA = PQ^2$$

$$PB \times 12 = 6^2$$

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

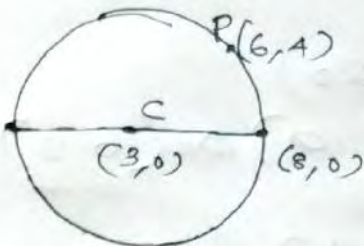


b) Diameter (AB) = PA - PB = 12 - 3 = 9cm

17)

a) radius =  $|CP|$

$(-2, 0)$



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

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

$$= \sqrt{9+16}$$

$$= \sqrt{25}$$

$$= \underline{\underline{5}}$$

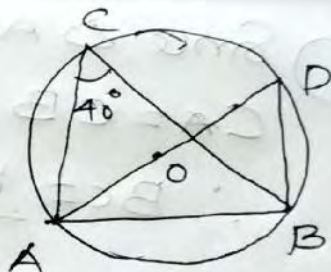
distance =  $\sqrt{(x_1-x_2)^2 + (y_1-y_2)^2}$

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  $\Delta ABD$ ,  $\sin P = \frac{\text{opp side}}{\text{Hyp}}$

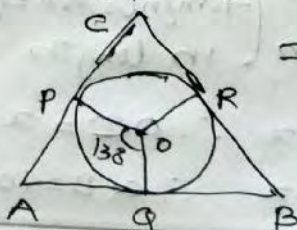
$$\sin 40 = \frac{AB}{AD}$$

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

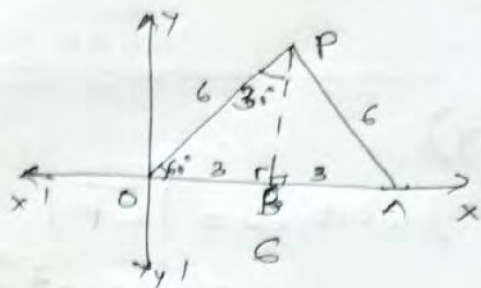
$$\therefore AB = 6 \times 0.64$$

$$= \underline{\underline{3.84 \text{ cm}}}$$

19) a)  $\angle A = 180 - 130$   
 $= 50^\circ$



19)  
b) fig.



20)  
a)  $A = (6, 0)$

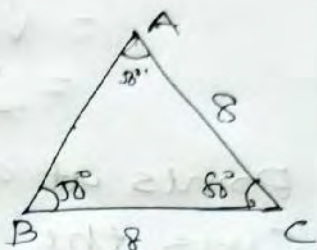
b)  $\perp^r$  distance =  $3\sqrt{3}$  units

$30^\circ, 60^\circ, 90^\circ$   
 $1 : \sqrt{3} : 2$

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

21)

$$\begin{aligned} a) \angle A &= 180 - (50 + 80) \\ &= 180 - 130 \\ &= \underline{50^\circ} \end{aligned}$$



b) Since  $\triangle ABC$  is isosceles with  $CA = CB$

$$\therefore BC = \underline{8 \text{ cm}}$$

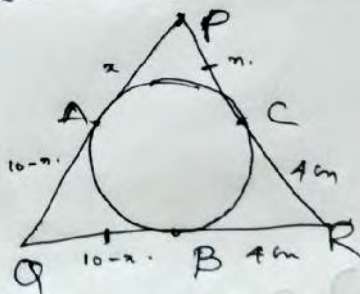
$$\begin{aligned} c) \text{Area of } \triangle ABC &= \frac{1}{2} \times 8 \times 8 \times \sin 80^\circ \\ &= 32 \times 0.98 \\ &= \underline{31.36 \text{ cm}^2} \end{aligned}$$

22) Given  $PQ = 10 \text{ cm}$   
 $BR = 4 \text{ cm}$

a)  $QR = BR$  (Tangents are equal in length)

b) Let  $PA = x \therefore PC = x$

So  $QA = 10 - x \therefore QB = 10 - x$





$$22) \text{ b) } \varphi B + PC = (10 - x) + x \\ = \underline{10 \text{ cm}}$$

c)

Perimeter of  $\Delta PQR$

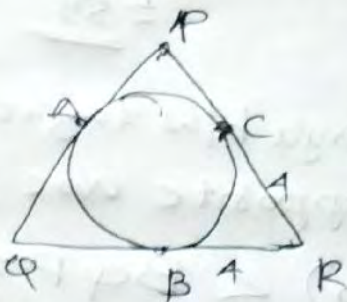
$$= PQ + QR + PR$$

$$= 10 + (\varphi B + BR) + (PC + RC)$$

$$= 10 + (\varphi B + PC) + BR + RC$$

$$= 10 + 10 + 4 + 4$$

$$= \underline{28 \text{ cm}}$$



$$d) A = axS$$

$$= 2 \times 28$$

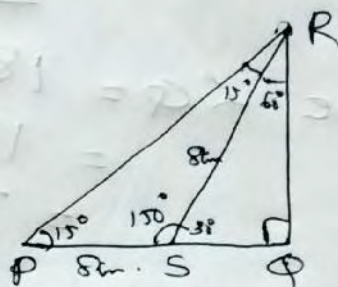
$$= \underline{56 \text{ cm}^2}$$

23)

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

$$= 180 - 165$$

$$= \underline{15^\circ}$$



$$b) SR = PS$$

$$= 8 \text{ cm } (\Delta PSR \text{ is isosceles})$$

$$c) \angle QS = 180 - 150$$

$$= \underline{30^\circ}$$

d) Angles of  $\Delta RQS$  are  $30^\circ, 60^\circ, 90^\circ$

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

$$QR = \frac{8}{2} = 4 \text{ cm } \& \quad QS = \underline{4\sqrt{3} \text{ cm}}$$



25) Given  $a = 10 \text{ cm}$   $e = a$

$$\begin{aligned} \text{a) Sum of lengths of edges} &= 4a + 4e \\ &= 4a + 4a \\ &= 8a \\ &= 8 \times 10 \\ &= \frac{80 \text{ cm}}{2} \end{aligned}$$

$$\begin{aligned} \text{b) Here } l &= \sqrt{\frac{3a}{2}} & e^2 &= l^2 + (a/2)^2 \\ &= \sqrt{\frac{3 \times 10}{2}} & a^2 &= l^2 + \frac{a^2}{4} \\ &= \underline{\underline{5\sqrt{3} \text{ cm}}} & l^2 &= a^2 - \frac{a^2}{4} \\ & & l^2 &= \frac{3a^2}{4} \\ & & \therefore l &= \frac{\sqrt{3a}}{2} \end{aligned}$$

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

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

$$75 - 25 = b^2$$

$$\therefore b^2 = 50 \quad \therefore b = \sqrt{50} = \underline{\underline{5\sqrt{2} \text{ cm}}}$$

$$\text{d) } V = \frac{1}{3} a^2 b$$

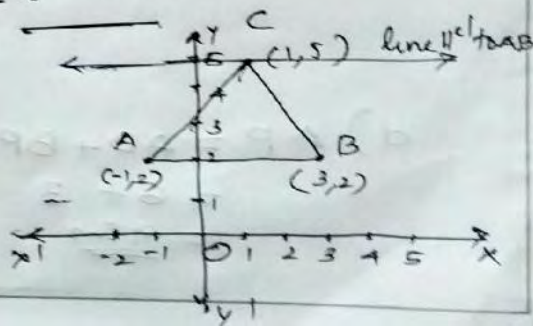
$$= \frac{1}{3} \times 10 \times 10 \times 5\sqrt{2}$$

$$= \frac{500\sqrt{2} \text{ cm}^3}{3}$$

26)

c) we can any point with y coordinate as 5

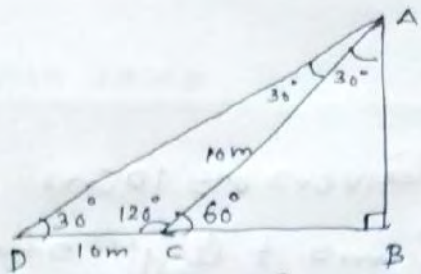
Point is  $(0, 5)$



27)

b) Here

In  $\triangle ACD$ ,  
 $CD = CA = 10\text{m}$



In  $\triangle ABC$ , angles are  $36^\circ, 60^\circ, 90^\circ$

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

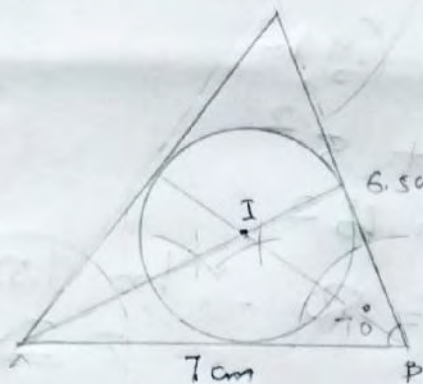
Here  $BC = \frac{10}{2} = 5\text{m}$

$\therefore$  width of river = 5m

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

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

28)



29)

a)  $BP = 3\text{cm}$

b)  $CR = 2\text{cm}$

c) Perimeter of  $ABC = AB + BC + AC$   
 $= AB + (BP + CR) + AC$   
 $= 6 + (3 + 2) + 7$   
 $= \underline{18\text{cm}}$

d)  $AP = AB + BP$   
 $= 6 + 3$   
 $= \underline{9\text{cm}}$

29)

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

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

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

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

$$= AP + AR$$

$$= AP + AP \text{ (tangents are equal)}$$

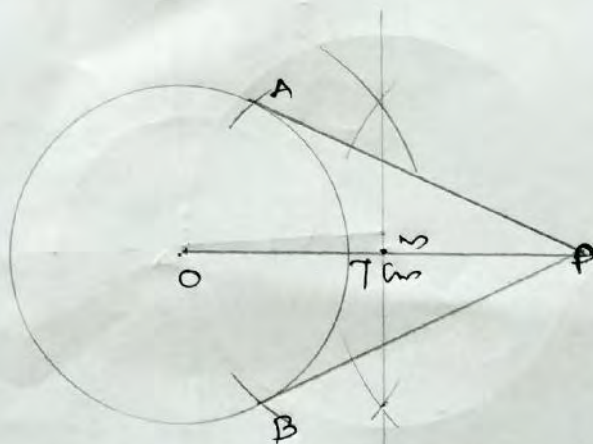
$$= 2AP$$

$$\therefore 2AP = 30$$

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

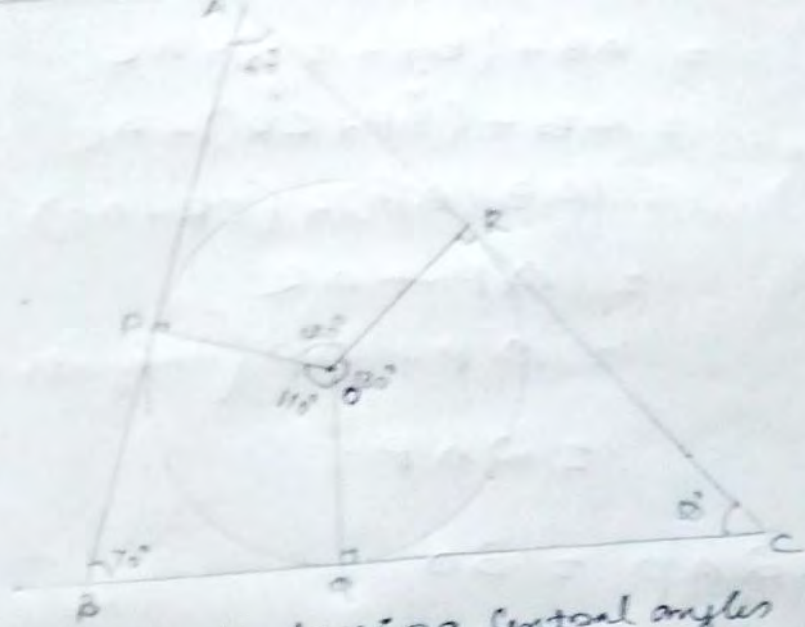
$$= \underline{\underline{15 \text{ cm}}}$$

14)



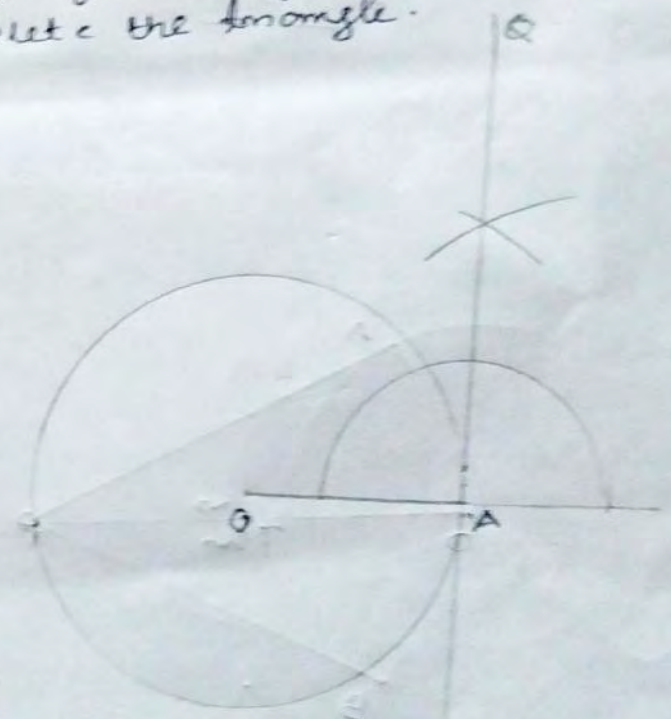
Draw the circle with radius 3 cm. mark P which is 7 cm away from the centre O, draw its bisector to OP, let M be the mid point of OP. Taking centre at M and MP or MO as radius draw two arcs on the circle, let A, B be the pts of intersections, join PA, PB

19)



Draw the Circle, by taking central angles  $180-50, 180-60, 180-70$ , i.e.,  $130^\circ, 120^\circ, 110^\circ$ , 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. mark a A on the circle, join the radius OA, by drawing  $\perp r$  through A to OA, we can draw the required tangent PQ.