S.S.L.C EXAM MARCH: 2021

MATHEMATICS

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ANSWER KEY By REGHU.S

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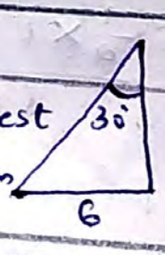
1) Seq. with $d=2$ is $7, 9, 11, \ldots\ldots$

2) Square.

3) $(2, 0)$

4) Length of largest side $= 6 \times 2 = 12$ cm



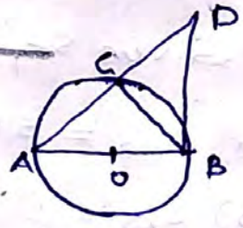
5) Slope $= \frac{7-5}{3-2} = \frac{2}{1} = 2$

6) Given $x_n = 3n + 2$

$\therefore x_1 = 3 + 2 = \underline{5}$.

$d = \underline{3}$.

7)



$\angle ACB = 90°$ (angle on a Semi Circle)

$\therefore \angle ADB = \frac{90}{2} = \underline{45°}$.

8) $P(\text{odd number}) = \frac{5}{9}$

$P(\text{Not even}) = P(\text{odd number})$

$= \frac{5}{9}$

9) Given $B = (3, 0)$

$\therefore O = (0, 0)$

$C = (0, 3)$

10) $x^2 - 1 = x^2 - 1^2$

$= (x+1)(x-1)$

11) a) $x_{10} = a + 10$

b) $d = 1$

c) $x_n = a + n$.

12) Fig.

13) a) Seq. of even natural numbers is $2, 4, 6, 8, \ldots$.

b) Let the numbers are $x, (x+2)$

$\therefore x(x+2) + 1 = 289$

$x^2 + 2x + 1 = 289$

$(x+1)^2 = 289$ $\therefore x+1 = \sqrt{289}$

$x + 1 = 17$

$\therefore x = 17 - 1$

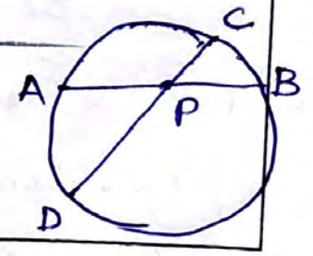
$= \underline{16}$

$\therefore$ Two Consecutive natural numbers are $\underline{16, 18}$

14) a) $PA = AB - PB$

$= 10 - 4$

$= \underline{6}$ cm.



b) We have,

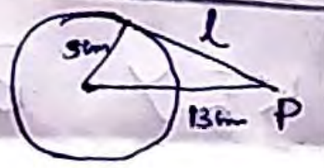
$PA \times PB = PC \times PD$.

14) b) $PA \times PB = PC \times PD$

$6 \times 4 = 3 \times PD$

$\frac{24}{3} = PD \quad \therefore PD = 8 \text{ cms}$

15) a) No. of tangents = 2



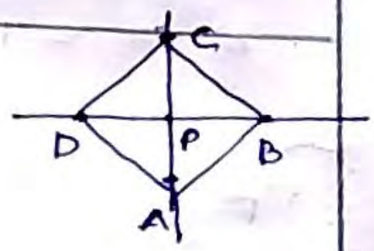
b) $l = \sqrt{13^2 - 5^2}$

$= \sqrt{169 - 25}$

$= \sqrt{144}$

$= 12 \text{ cms}$

16) ABCD is a square



Given $A = (1, -5)$

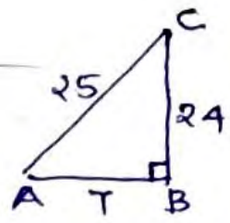
and $P = (1, 0)$

$\therefore C = (1, 5)$

$B = (6, 0)$

$D = (-4, 0)$

17) a) Given $\sin A = \frac{24}{K}$



From fig. $\sin A = \frac{24}{25} \quad \therefore K = 25$

b) $\cos C = \frac{\text{adj. side}}{\text{Hyp.}} = \frac{24}{25}$

$\sin C = \frac{\text{opp side}}{\text{Hyp.}} = \frac{7}{25}$

18) For sector, $x = 120°$, radius $= 12 \text{ cm}$

a) For Cone, $l = 12 \text{ cm}$.

$r = \frac{l \times x}{360} = \frac{12 \times 120}{360} = 4 \text{ cm}$

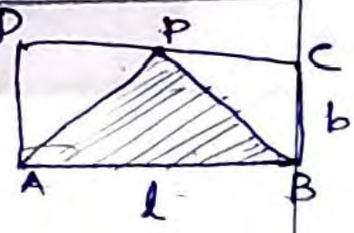
19)

a) $\angle OAP = 90°$

(angle b/w tangent and radius)

b) fig.

20)



a) P(dot inside $\triangle APB$)

$= \frac{\text{area of } \triangle APB}{\text{area of rectangle ABCD}}$

$= \frac{\frac{1}{2} \times l \times b}{l \times b} = \frac{1}{2}$

b) P(dot inside $\triangle ADP$)

$= \frac{\text{area of } \triangle ADP}{\text{area of rectangle ABCD}}$

$= \frac{\frac{1}{2} \times \frac{l}{2} \times b}{l \times b} = \frac{1}{4}$

21) Given Seq is 5, 10, 15, - - - -

a) $x_{20} = 5 \times 20 = 100$.

b) $S_n = \frac{n}{2}(x_1 + x_n)$

$S_{20} = \frac{20}{2}(5 + 100) = 10 \times 105 = 1050$

c) For the Seq: 4, 9, 14, - - - -

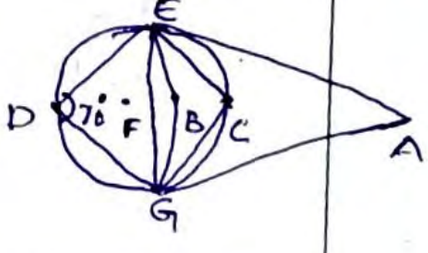
$S_{20} = 1050 - 20 \times 1 = 1030$.

22)

$\angle ECG = 180 - 70 = 110°$

$\angle EBG = 120°$

$\angle EAG = 60°$



23)

3	a	13
b	e	d
T	e	f

Here $a = \frac{3+13}{2} = \underline{\underline{8}}$.

$b = \frac{3+7}{2} = \underline{\underline{5}}$.

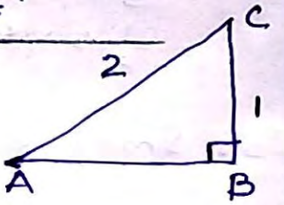
$c = \frac{13+7}{2} = \underline{\underline{10}}$.

$d = 10+5 = \underline{\underline{15}}$

$e = 10+2 = \underline{\underline{12}}$

$f = 12+5 = \underline{\underline{17}}$.

24) Given $\sin A = \frac{1}{2}$



But $\sin A = \frac{BC}{AC} = \frac{1}{2}$

∴ a) $AC = \underline{\underline{2\text{ cm}}}$

b) $AB = \sqrt{2^2 - 1^2} = \underline{\underline{\sqrt{3}\text{ cm}}}$

Since $\sin 30 = \frac{1}{2}$ ∴ $A = 30°$

∴ $\angle C = 90 - 30 = \underline{\underline{60°}}$.

$\sin 60 = \frac{\sqrt{3}}{2}$.

25) Fig.

26) mean $= \frac{\text{Sum}}{\text{Number}}$

$= \frac{11+32+33+35+39+41+45+47+48+49}{10}$

$= \frac{380}{10} = \underline{\underline{38}}$

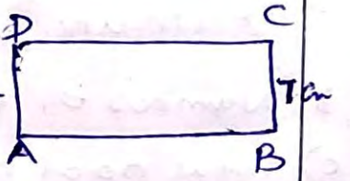
Ascending order is

11, 32, 33, 35, [39, 41] 45, 47, 48, 49.

median $= \frac{39+41}{2} = \frac{80}{2} = \underline{\underline{40}}$

27) Fig.

28) a) Given $p = 40$



Smaller side = 7cm

∴ Longer side $= \frac{40}{2} - 7 = 20 - 7 = \underline{\underline{13\text{ cm}}}$

b) Given $p = 40$, $A = 96$.

Let One side $= x$

∴ other side $= 20 - x$.

$l \times b = 96$.

$x(20-x) = 96$

$20x - x^2 = 96$

$-x^2 + 20x = 96$

$x^2 - 20x = -96$.

$x^2 - 20x + 100 = -96 + 100$

$(x-10)^2 = 4$ ∴ $x - 10 = \sqrt{4} = 2$

∴ $x = 2 + 10 = \underline{\underline{12}}$

∴ Breadth = 12 cm.

length $= 20 - 12 = \underline{\underline{8\text{ cm}}}$.

29) P (both same digits) $= \frac{9}{90} = \frac{1}{10}$.

P (I digit twice the II digit) $= \frac{4}{90} = \underline{\underline{\frac{2}{45}}}$

30) $p(x) = x^2 - 5x + 9$

$p(2) = (2)^2 - 5(2) + 9$

$= 4 - 10 + 9$

$= 13 - 10$

$= \underline{\underline{3}}$.

$p(3) = (3)^2 - 5(3) + 9$

$= 9 - 15 + 9$

$= 18 - 15$

$= \underline{\underline{3}}$.

30)

b) $P(x) - P(2) = x^2 - 5x + 9 - 3$

$= 2x^2 - 5x + 6$

$= (x-2)(x-3)$

31)

a) Fifth line is 11, 12, 13, 14, 15

b) Number of nos in 10^{th} line = 10

c) Total no of nos upto 10^{th} line

$= 1 + 2 + 3 + \ldots + 10$

$= \frac{10 \times 11}{2} = 55$.

d) Last term of 10^{th} line = 55

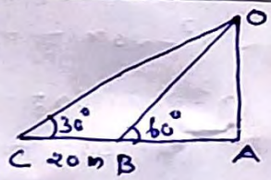
$\therefore$ First term of 11^{th} line = 56.

32) a) Area of Square = Area of rectangle

$= 8 cm^2$

b) fig

33)



Here $\angle OBC = 180 - 60 = 120°$

$\therefore \angle BOC = 30°$

$\therefore \triangle BOC$ is isosceles $\therefore BC = BO = 20m$

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

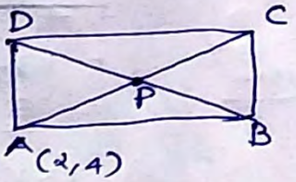
AB = Side opp. to $30°$

$= \frac{20}{2} = 10m$

width of river = 10m

34) $B = (6, 4)$

a) $D = (2, 12)$

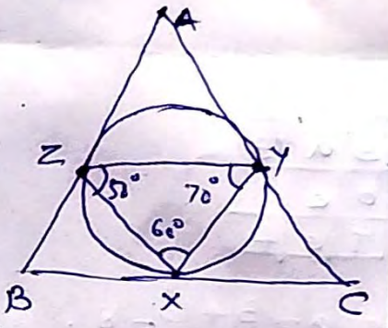


b) mid pt of $AC = \left(\frac{2+6}{2}, \frac{4+12}{2}\right)$

$= (4, 8)$

c) If x-Coordinate of a pt on AC is a, then its y-Coordinate $= 2a$.

35)



$\angle A = 60°$, $\angle B = 40°$, $\angle C = 80°$

36) For large Cone

$r = 5cms$, $l = 13 cms$

$\therefore h = \sqrt{13^2 - 5^2} = 12 cms$

$V = \frac{1}{3}\pi r^2 h$.

$= \frac{1}{3}\pi \times 5 \times 5 \times 12 = 100\pi cm^3$

For Small Cone $r = 1cm$, $h = 1cms$

No. of Small Cones $= \frac{\text{Vol. of large Cone}}{\text{Vol. of Small Cone}}$.

$= \frac{\frac{1}{3}\pi \times 5 \times 5 \times 12}{\frac{1}{3}\pi \times 1 \times 1 \times 1}$

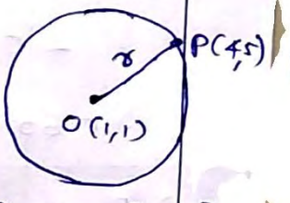
$= 300$.

37)

$r = \sqrt{(4-1)^2 + (5-1)^2}$

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

$= 5$ units



eq: of circle is $(x-1)^2 + (y-1)^2 = 5^2$

put $x = 6$ in above eq: of Circle.

$(6-1)^2 + (y-1)^2 = 5^2$ $\quad \therefore (y-1)^2 = 0$

$\therefore y - 1 = \sqrt{0}$

$y - 1 = 0$

$y = 1$.

y-Coordinate = 1.

38) a) $r_1 : r_2 = \underline{1:2}$.

b) $A_1 : A_2 = 4\pi(1)^2 : 4\pi(2)^2 = \underline{1:4}$

c) If $A_1 = 10\pi$, then $A_2 = 10\pi \times 4$
$= \underline{40\pi \text{ cm}^2}$

39) a) remainder = 1

b) 108, 117, ... , 999

c) $n = \left(\frac{999-108}{9}\right) + 1 = 99 + 1 = \underline{100}$

40)

a) Since ABC is isosceles
AD is the angle bisector of $\angle A$
$\therefore$ In $\triangle ADB$, $\angle A = 60°$, $\angle D = 90°$
$\therefore \angle B = 90 - 60 = \underline{30°}$.

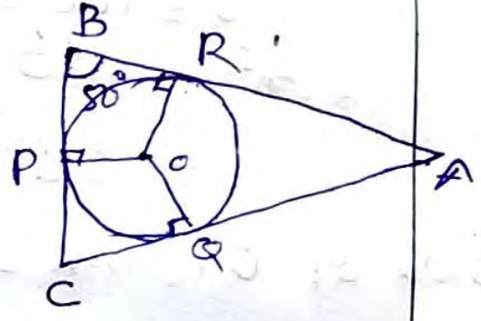
b) The angles of $\triangle ADB$ are
$30°, 60°, 90°$, So its opposite sides
are $1 : \sqrt{3} : 2$ $\therefore AD = \frac{4}{2} = \underline{2\text{cm}}$

c) Area of $\triangle ABC = \frac{1}{2}bh$.

Also $BD = DC = 2\sqrt{3}$ $\therefore BC = \underline{4\sqrt{3}\text{cm}}$

Area $= \frac{1}{2} \times BC \times AD$
$= \frac{1}{2} \times 4\sqrt{3} \times 2 = \underline{4\sqrt{3}\text{cm}^2}$

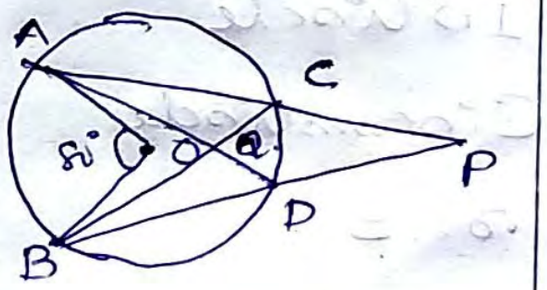
41
a)



$\angle POR = 180 - 50 = \underline{130°}$.

b) fig.

42)



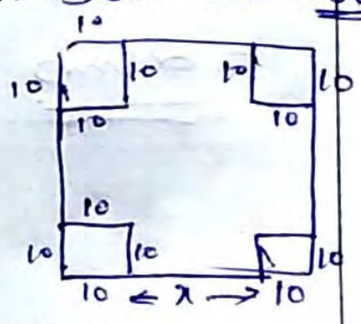
a) $\angle ACB = \frac{80}{2} = 40°$

b $\angle ADB = \frac{80}{2} = 40°$

$\angle ADP = 180 - 40 = \underline{140°}$

b) In quad. PCQD
$\angle PCQ = 180 - 40 = 140°$
$\therefore \angle P + \angle Q + \angle PCQ + \angle PDQ = 360°$
$\angle P + \angle CQD + 140 + 140 = 360°$
$\therefore \angle P + \angle CQD = 360 - 280 = \underline{80°}$.

43) a)
Side of cutting Square = $\underline{10\text{cm}}$



b) For the open box,
$l = x$, $b = x$, $h = 10$.

43)

b) $V = l \times b \times b$

$x \times x \times 10 = 1000 \text{ cm}^3$

$x^2 \times 10 = 1000$

$\therefore x^2 = 100$

$\therefore x = \underline{10 \text{ cm}}$.

Side of original Square $= \underline{30 \text{ cm}}$

44)

Score	No. of Children	Score	No. of Children
0-10	5	upto 10	5
10-20	8	" 20	13
20-30	10	" 30	23 ← 20
30-40	13	" 40	36
40-50	9	" 50	45.
TOTAL	45		

Here $n = 45$, So median

$= \left(\frac{45+1}{2}\right)^{th}$ child's Score

$= 23^{th}$ "

$\therefore$ median class is 20-30.

Here $d = \frac{30-20}{10} = \frac{10}{10} = \underline{1}$.

So we can divide 20-30 into 10 subclasses having size 1, 20-21, 21-22, ... 29-30.

(a) $\therefore x_{14} = \frac{20+21}{2} = \underline{20.5}$

(b) $x_{23} = x_{14} + 9d$

$= 20.5 + 9 \times 1$

$= \underline{29.5}$

median Score $= \underline{29.5}$

45)

a) In Circle

b) Circum Circle

c) $r \times s$

d) ~~Ex~~ $= r \times s$

$= 2 \times \frac{20}{2}$

$= \underline{20 \text{ cm}^2}$

e) $A = 24 \text{ cm}^2$

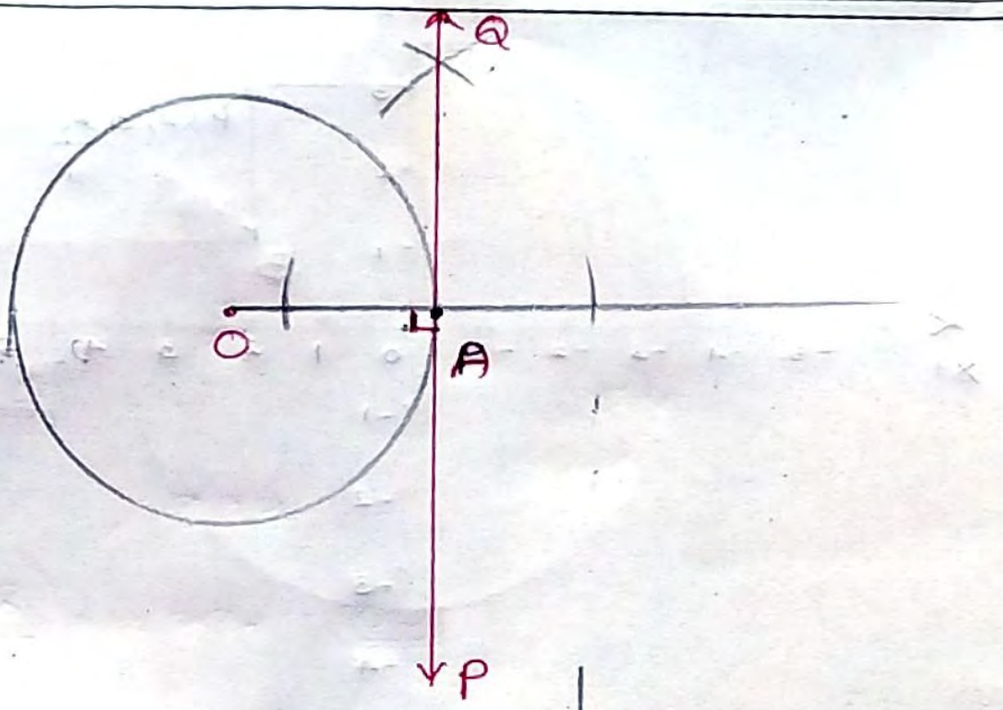
$s = \frac{24}{2} = 12 \text{ cm}$

$\therefore r = \frac{A}{s} = \frac{24}{12}$

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

19)

b)



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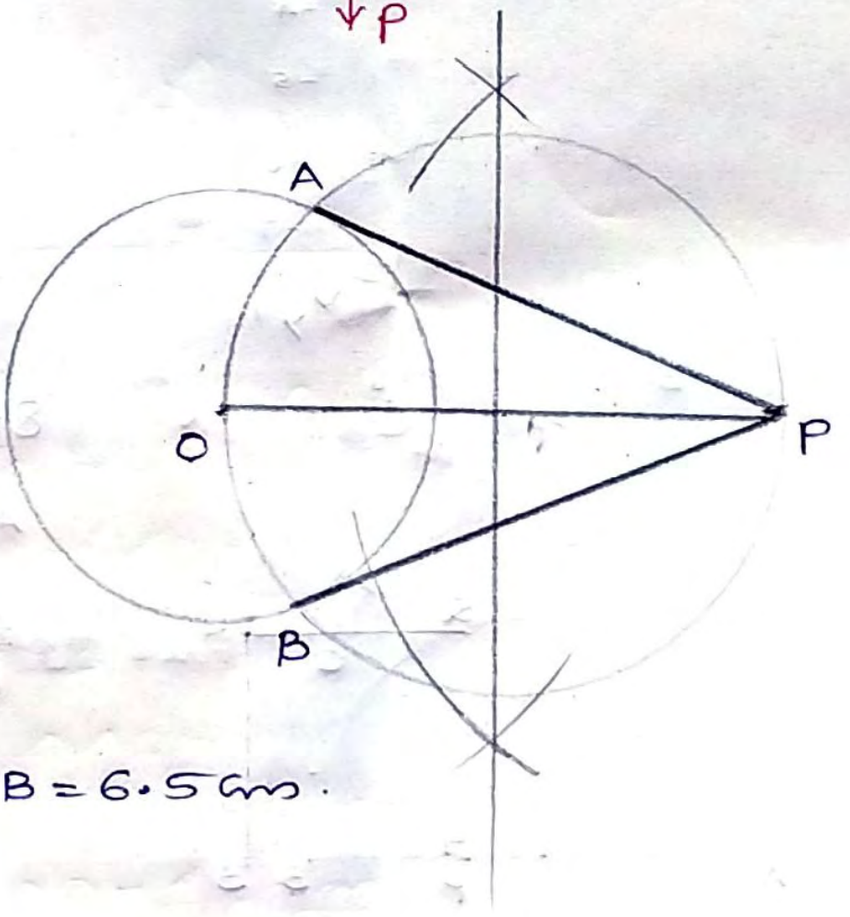
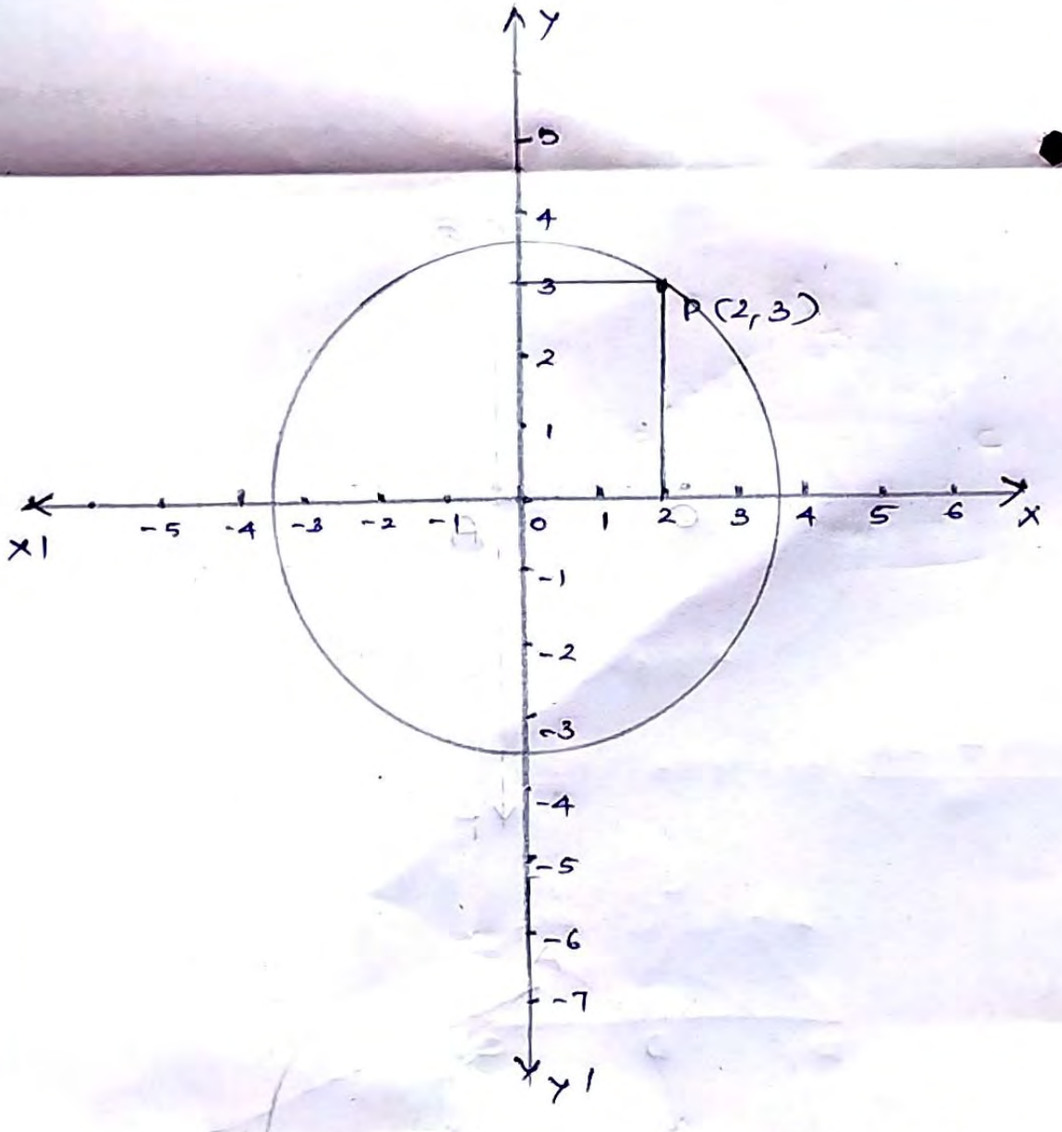


PA = PB = 6.5 cm.

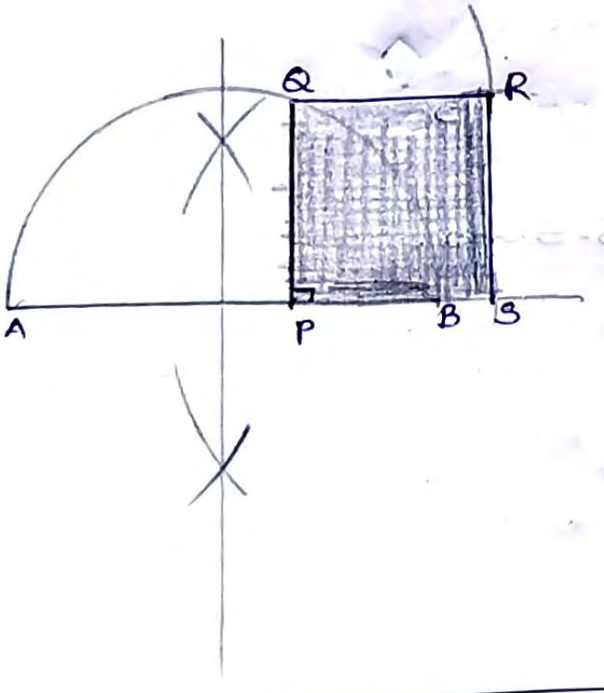
27)



32)

$8 = 4 \times 2$

b)



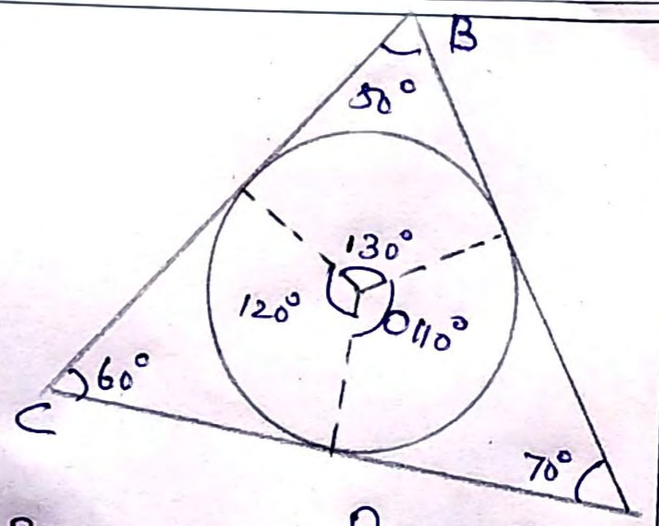
AB = 4 + 2
= 6cm

AP = 4cm

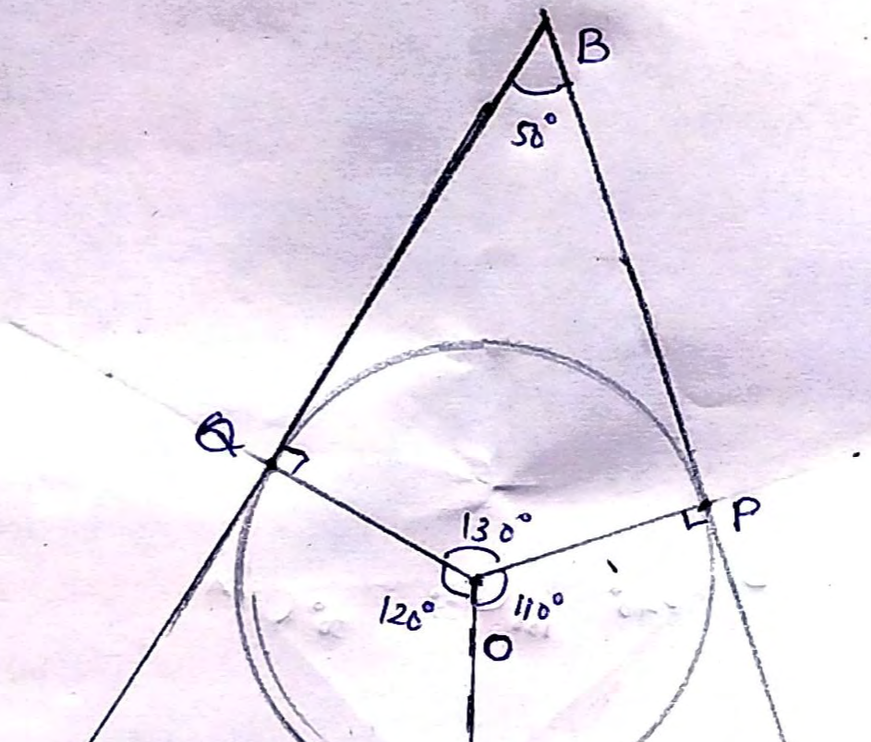
PB = 2cm

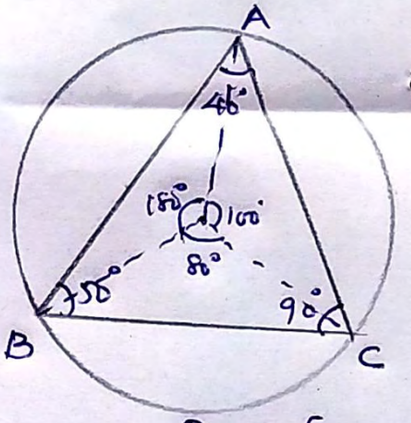
41)

b)



Rough fig.





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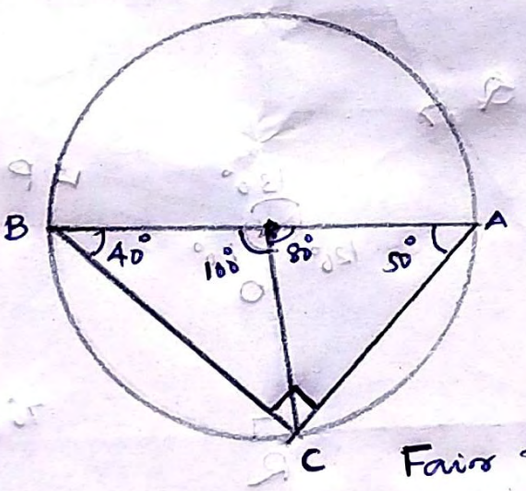

Fair figure.