

~~12/03/20~~

FOUNDATION (V₂)

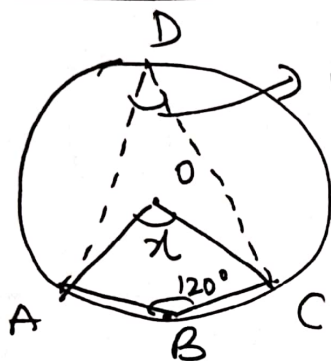
Class: IX, MATHEMATICS

①

2. CIRCLES

TEACHING TASK (JEE MAINS)

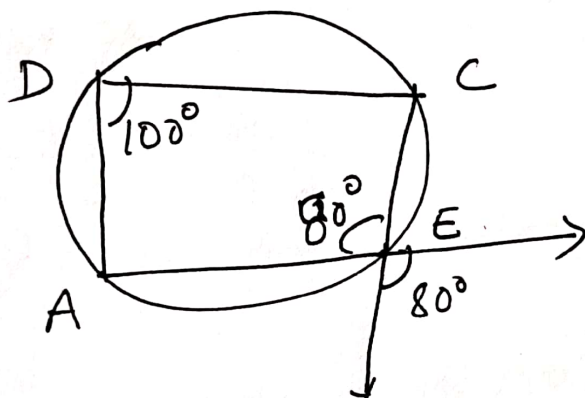
Q1.



$$\therefore x = 60^\circ \times 2 = 120^\circ$$

Ans: A

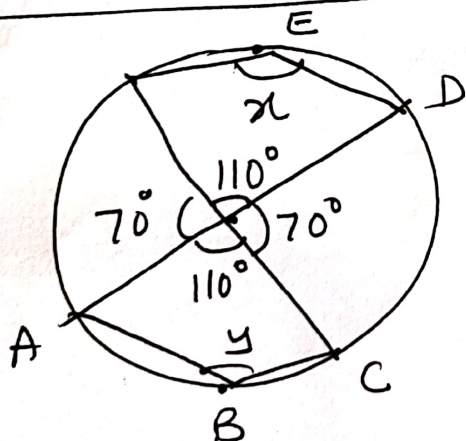
Q2



$$x = 100^\circ$$

Ans: C

Q3



From figure

$$70^\circ + 110^\circ + 70^\circ = 250^\circ$$

$$\therefore \angle y = \frac{1}{2} (250^\circ) = 125^\circ$$

Similarly $\angle x = 125^\circ$

$$\therefore \angle x + \angle y = 250^\circ$$

Ans: D

04. Given $\angle ADE - \angle ABC = 15^\circ$

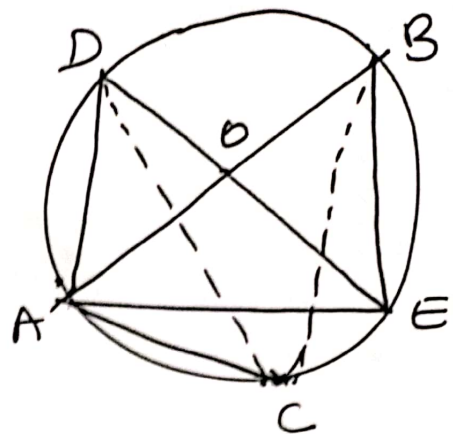
$$\Rightarrow (\angle ADC + \angle CDE) - \angle ABC = 15^\circ$$

$$\Rightarrow \angle ABC + \angle CDE - \angle ABC = 15^\circ$$

$$\Rightarrow \angle CDE = 15^\circ$$

Also, $\angle CDE = \angle CAE$ (Angles in the same segment)

$$\therefore \angle CAE = 15^\circ$$



Ans. C

05. From figure

$$\triangle AOB \sim \triangle COD \text{ (AAA)}$$

$$\therefore \frac{AB}{DC} = \frac{AO}{OC}$$

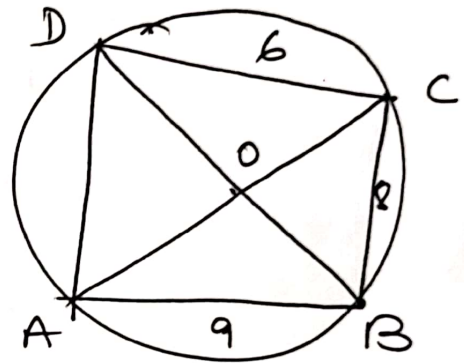
$$\Rightarrow \frac{9}{6} = \frac{AO}{OC} \rightarrow \textcircled{1}$$

$$\text{Also, } \triangle BOC \sim \triangle AOD \text{ (AA)}$$

$$\therefore \frac{BC}{AD} = \frac{OC}{OA}$$

$$\Rightarrow \frac{8}{AD} = \frac{9}{6} \text{ (from } \textcircled{1})$$

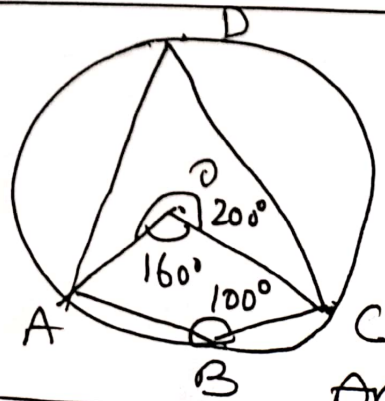
$$\Rightarrow AD = 12 \text{ cm}$$



Ans. C

06. From figure

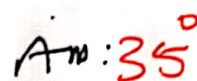
$$\angle ABC = 100^\circ$$



Ans. A

3

From figure
 $\angle BAC = 35^\circ$



08 Area of Circle = $\pi r^2 = \pi$

Radius of the bigger

Area of Shaded region
 = Area of Smaller Circle - (Area of Smaller Semi
 circle - area of right angled Δ) - area
 of Sector of Larger Circle

$$= \pi - \left(\frac{\pi}{2} - 1 \right) = \frac{\pi}{2}$$

Ans: C

09 From figure

$$x + x + 100^\circ = 180^\circ$$

$$\Rightarrow x = 40^\circ$$

$$y + y + 135^\circ = 180^\circ$$

$$\Rightarrow y = \frac{45^\circ}{2}$$

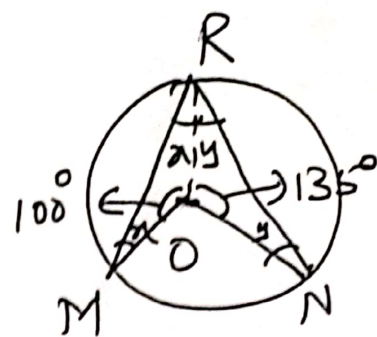
$$\text{Now, } \frac{1}{2} \angle ORN + \frac{1}{4} \angle ORM$$

$$= \frac{1}{2} \left(\frac{45^\circ}{2} \right) + \frac{1}{4} (40^\circ)$$

$$= 11\frac{1}{4}^\circ + 10^\circ$$

$$= 21\frac{1}{4}^\circ$$

Ans: D



10

$$x + x + 100^\circ = 180^\circ$$

$$\Rightarrow x = 40^\circ$$

$$\text{Also, } y + y + 80^\circ = 180^\circ$$

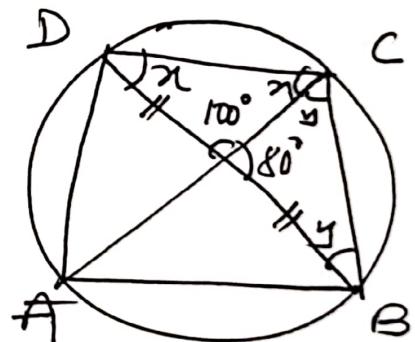
$$\Rightarrow y = 50^\circ$$

$$\therefore \angle DCB = x + y$$

$$= 40^\circ + 50^\circ$$

$$= 90^\circ$$

Ans: C



JEE ADVANCED

01

01.

$$\angle A = \frac{1}{2} \angle BOC$$

$$= \frac{1}{2} \times 110^\circ = 55^\circ$$

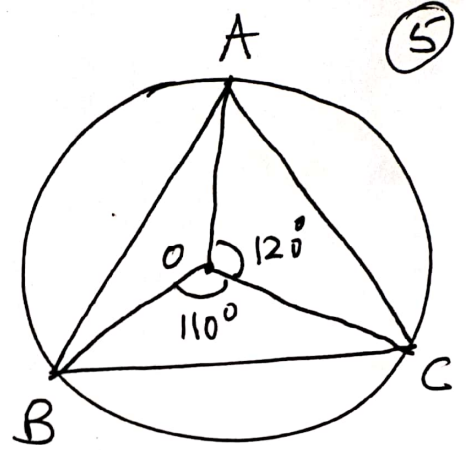
$$\angle B = \frac{1}{2} \angle COA$$

$$= \frac{1}{2} \times 120^\circ = 60^\circ$$

$$\therefore \angle A + \angle B + \angle C = 180^\circ$$

$$\Rightarrow 55^\circ + 60^\circ + \angle C = 180^\circ \Rightarrow \angle C = 65^\circ$$

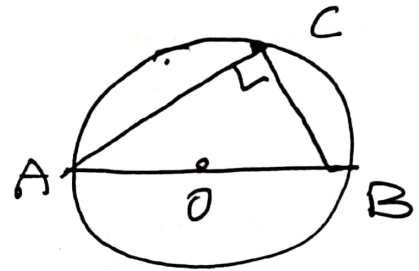
Ans: A, B, C



02

$$\angle ACB = 90^\circ$$

$$\therefore \angle AOB = 180^\circ$$



Ans: A, B

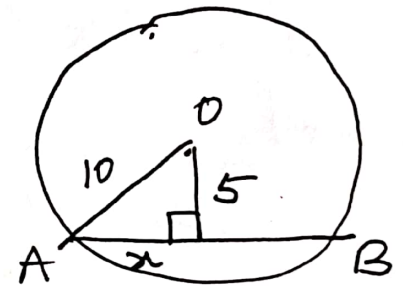
03

Statement I:

$$x^2 + 5^2 = 10^2$$

$$\Rightarrow x = \sqrt{75}$$

$$\therefore AB = 2\sqrt{75} = 10\sqrt{3} = 17.32 \text{ (False)}$$

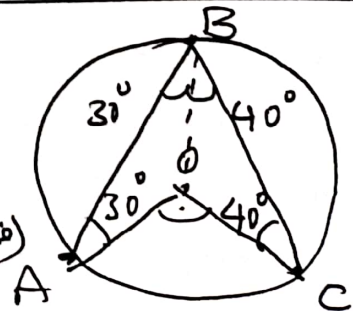
Statement II: Conceptual (True)

Ans: D

04 Statement I:

$$\therefore \angle ABC = 70^\circ$$

$$\therefore \angle AOC = 2 \times 70^\circ = 140^\circ \text{ (False)}$$

Statement II: Conceptual (True)

Ans: D

05 Assertion A: Conceptual (True)

Reason: Conceptual (False)

Ans: C

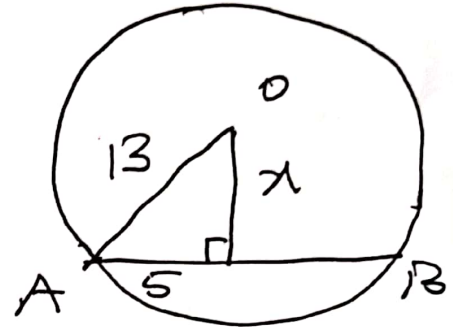
06 Assertion A: Conceptual (True)

Reason: Conceptual (True)

Ans: A

07

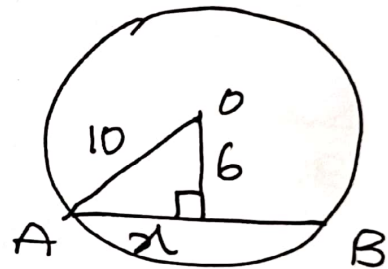
$$x^2 + 5^2 = 13^2$$
$$\Rightarrow x = 12 \text{ cm}$$



Ans: B

08

$$x^2 + 6^2 = 10^2$$
$$\Rightarrow x = 8$$
$$\therefore AB = 2 \times 8 = 16 \text{ cm}$$



Ans: D

09

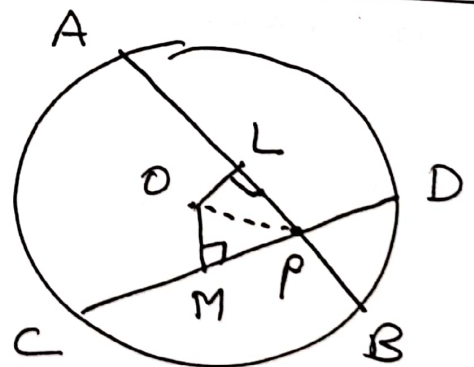
Since $AB = CD$

$\Rightarrow OL = OM$ (Theorem)

In $\triangle OLP \cong \triangle OMP$ (RHS)

$$\therefore \angle OPL = \angle OPM$$

$$\Rightarrow AP = CP$$



Ans: C

10

$$\angle OPL = \angle OPM$$

Ans: D

11

$\overline{OD}$ bisects $\overline{AB}$

i.e. $AD = DB$

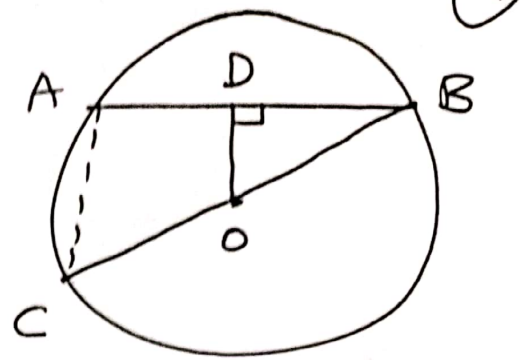
We have $OD \parallel AC$

Also, $OD = \frac{1}{2} AC$

$$\Rightarrow 6 = \frac{1}{2} AC$$

$$\Rightarrow AC = 12 = 3K$$

$$\Rightarrow K = 4$$



Ans: 4

12

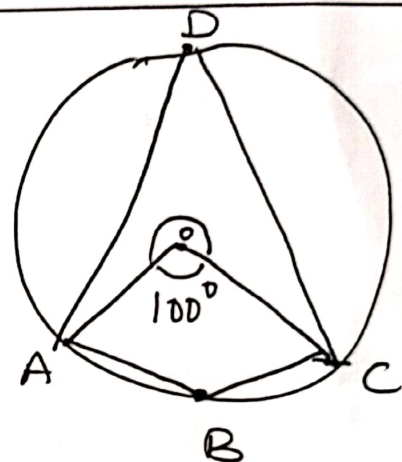
$$\text{ext } \angle AOC = 360^\circ - 100^\circ = 260^\circ$$

$$\therefore \angle ABC = \frac{1}{2} \times 260^\circ = 130^\circ$$

$$\therefore \angle ADC = \frac{1}{2} \times 100^\circ = 50^\circ$$

$$\therefore \frac{\angle ABC - \angle ADC}{80} = \frac{130^\circ - 50^\circ}{80^\circ} = \frac{80^\circ}{80^\circ} = 1$$

Ans: 1



13

a) Conceptual (8)

b) Conceptual (9)

c) Conceptual (5)

d) Conceptual (P)

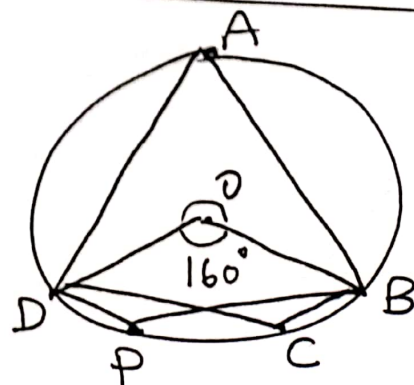
Ans: 8, 9, 5, P

14

$$\text{i) Ext } \angle BOD = 360^\circ - 160^\circ = 200^\circ$$

$$\therefore \angle BCD = \frac{1}{2} \times 200^\circ = 100^\circ$$

$$\therefore \angle BCD = \angle BPD = 100^\circ$$



ii) ABCD is a cyclic quadrilateral

$$\therefore \angle B + \angle D = 180^\circ$$

$$\Rightarrow \angle B + 130^\circ = 180^\circ$$

$$\Rightarrow \angle B = 50^\circ$$

$$\therefore \angle x = 40^\circ$$

iii) $\angle BAC = 60^\circ$

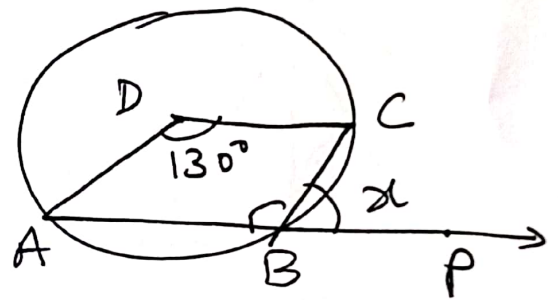
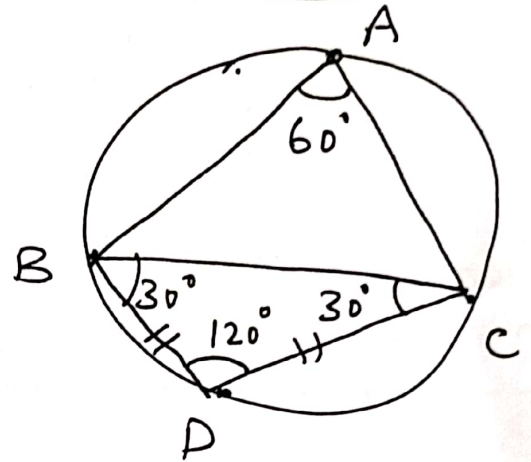
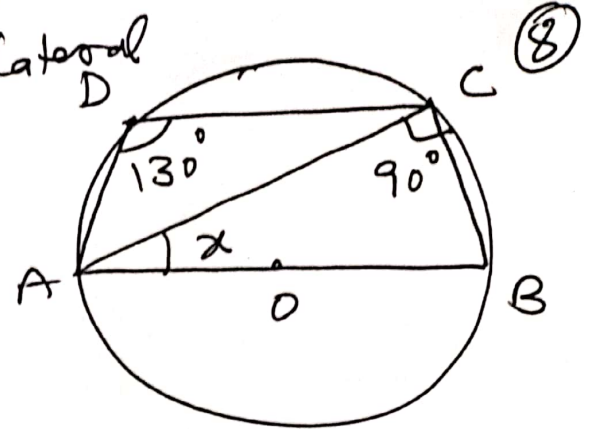
iv) ext $\angle ADC = 360^\circ - 130^\circ$
 $= 230^\circ$

$$\therefore \angle ABC = \frac{1}{2} \times 230^\circ$$

$$= 115^\circ$$

$$\therefore x + 115^\circ = 180^\circ \Rightarrow x = 65^\circ$$

Ans: S, x, P, Q



LEARNERS TASK (CQ'S)

01. Conceptual

Ans: B

02. Conceptual

Ans: B

03. Conceptual

Ans: B

04. Conceptual

Ans: B

05. Conceptual

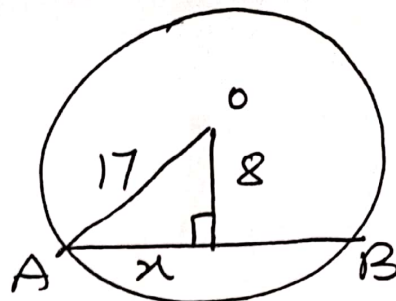
Ans: A

06

$$x^2 + 8^2 = 17^2$$

$$\Rightarrow x^2 = 15$$

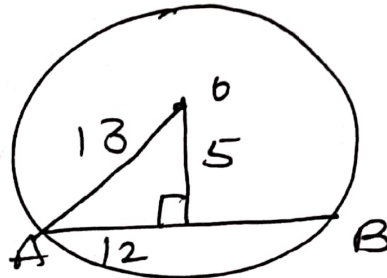
$$\therefore AB = 2 \times 15 = 30 \text{ cm}$$



Ans: A

07

$$AB = 2 \times 12 = 24$$



Ans: D

08

Conceptual

Ans: C

09

Conceptual

Ans: B

10

$$AD^2 = (9)^2 - \left(\frac{9}{2}\right)^2$$

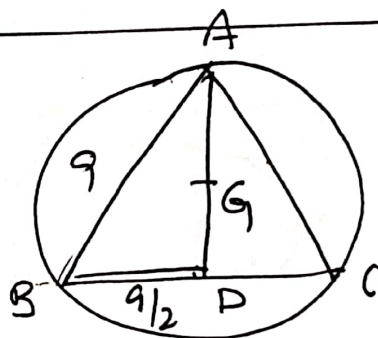
$$AD = 81 \times \frac{3}{4}$$

$$\therefore AD = \frac{9\sqrt{3}}{2}$$

We know $AG : GD = 2 : 1$

$$AG = \frac{2}{3} \times \frac{9\sqrt{3}}{2} = 3\sqrt{3}$$

$$\therefore \text{Radius} = 3\sqrt{3}$$



Ans: C

JEE MAINS LEVEL

01.

$$\text{Let } OM = x \Rightarrow AM = 5 - x$$

$$\text{In } \triangle OMB \Rightarrow BM^2 = 25 - x^2$$

$$\text{In } \triangle AMB \Rightarrow 36 = (5 - x)^2 + BM^2$$

$$\Rightarrow 36 = (5 - x)^2 + 25 - x^2$$

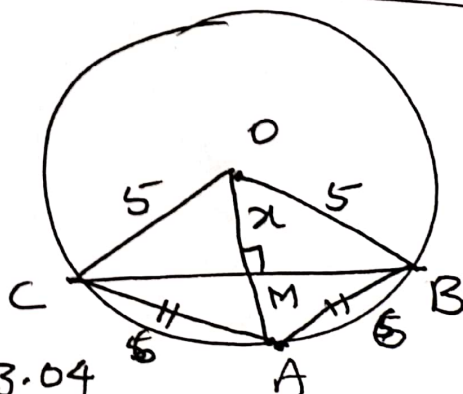
$$\Rightarrow x = 1.4$$

$$\therefore BM^2 = 25 - (1.4)^2 = 23.04$$

$$\Rightarrow BM = 4.8$$

$$\therefore BC = 2 \times 4.8 = 9.6 \text{ cm}$$

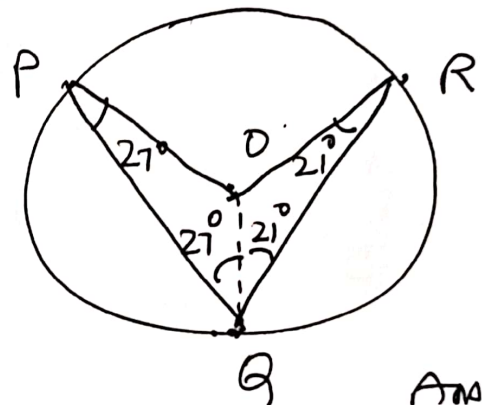
Ans: A



02 Sum of the interior angles of a regular pentagon $= (n-2) \times 180^\circ$
 $= (5-2) \times 180^\circ = 540^\circ$
 Each interior angle $= \frac{540^\circ}{5} = 108^\circ$
 $\therefore$ from figure $= x = \frac{108^\circ}{2} = 54^\circ$ Ans. B

03 From figure
 since $AB = AC$
 $\Rightarrow OA \perp BC$
 $\Rightarrow OE \perp BC$
 clearly $\angle OEA = 180^\circ - (90^\circ + 20^\circ)$
 $= 70^\circ$ Ans. D

04 $\angle PQR = 27^\circ + 21^\circ$
 $= 48^\circ$
 $\therefore \angle POR = 2 \times 48^\circ$
 $= 96^\circ$

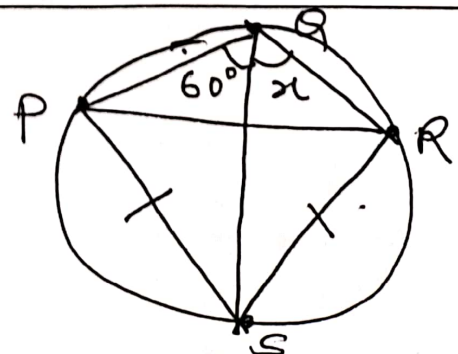


Ans. B

05 From figure $OA = OC$
 $\Rightarrow \angle A = \angle C$
 clearly $x = 70^\circ$

Ans: C

06 From figure
 $\angle PRS = \angle PQS = 60^\circ$
 $\therefore \angle SPR = 60^\circ$



$\therefore \triangle PRS$ is an equilateral triangle
 $\therefore \angle S + \angle Q = 180^\circ$ (cyclic quadrilateral)
 $\therefore 60^\circ + (60^\circ + x) = 180^\circ$
 $\Rightarrow x = 60^\circ$

Ans. B

07.

$$\angle x - \angle y = 58^\circ$$

$$\text{let } \angle x > \angle y$$

$$\angle x + \angle y = 180^\circ$$

$$2\angle x = 238^\circ$$

$$\Rightarrow \angle x = 119^\circ$$

$$\Rightarrow \angle y = 61^\circ$$

Ans. D

08

From figure $\angle A = 2x$

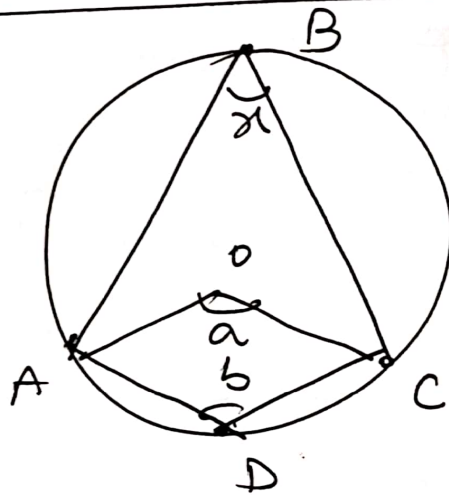
$$\begin{aligned}
 \therefore \angle D &= \frac{360^\circ - a}{2} \\
 &= \frac{360^\circ - 2x}{2} \\
 &= 180^\circ - x
 \end{aligned}$$

Given $a:b = 2:5$

$$\Rightarrow 2x : 180^\circ - x = 2:5$$

$$\Rightarrow x = 30^\circ$$

Ans. C



09

Conceptual

Ans. B

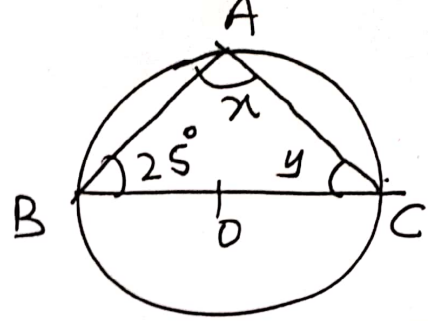
10

Conceptual

Ans. A

JEE ADVANCED

- 01 $\overline{BOC}$ is the diameter of the circle
 $\therefore \angle = 90^\circ$



(12)

clearly $x + 25^\circ + y = 180^\circ$
 $\Rightarrow 90^\circ + 25^\circ + y = 180^\circ$
 $\Rightarrow y = 65^\circ$

Ans: A, D

- 02 From figure

$\angle B + \angle C = 90^\circ$
 $\Rightarrow 10x + 17 + 15y - 7 = 90^\circ$
 $\Rightarrow 2x + 3y = 16$

clearly, $x=5, y=2$ satisfies this equation
 Ans: A, D

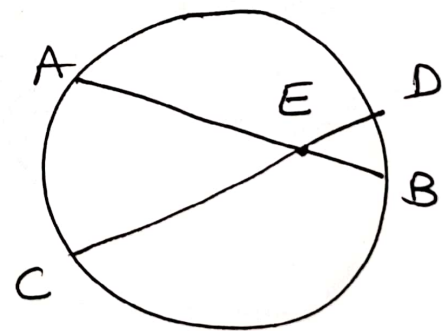
- 03 Statement I: Conceptual (False)

Statement II: Conceptual (True)

Ans: D

- 04 Statement I:

$BE = DE$
 $\Rightarrow AE = CE$, since
 We have, $AE \times BE = CE \times DE$
 $\Rightarrow AE = CE$ (True)



Statement II: Conceptual (True)

Ans: A

- 05 Assertion (A): Conceptual (True)

Reason: Conceptual (True)

Ans: A

06

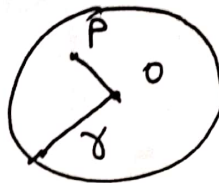
Assertion (A):

$$OP < r$$

$\Rightarrow$ P lies interior of the circle (True)

Reason: Conceptual (True)

Ans. A



(13)

07

$$z = 2x$$

Ans: C

08

From figure, $x + y + z = 180^\circ$

$$\Rightarrow z + 2y = 180^\circ$$

$$\Rightarrow 2x + 2y = 180^\circ$$

$$\Rightarrow x + y = 90^\circ$$

$$\therefore \angle BAC + \angle OBC = 90^\circ$$

Ans: D

09

Conceptual

Ans.. B

10

Conceptual

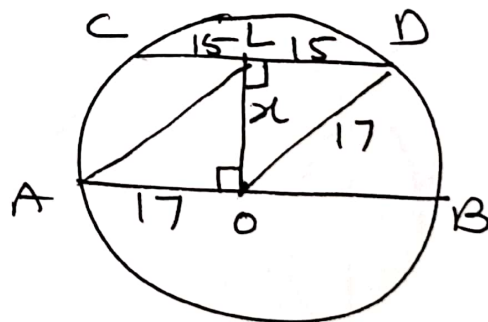
Ans: A

11.

From the figure

$$x^2 + 15^2 = 17^2$$

$$\Rightarrow x = 8$$



Ans: 8

12

From figure

$$\angle ADC = 100^\circ$$

$$\therefore \angle ABC = 80^\circ$$

$$x^\circ = 100^\circ$$

$$\frac{x^\circ}{50} = 2$$

Ans: 2

13

(i) Ext $\angle AOB = 360^\circ - y$

We have $360^\circ - y = 2x$

$\Rightarrow y + 2x = 360^\circ$

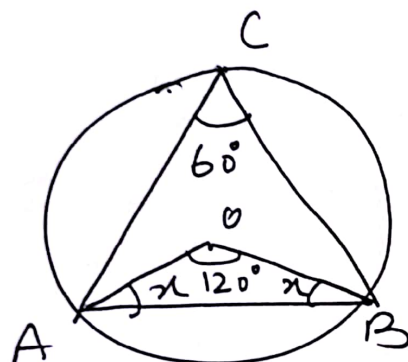
$\Rightarrow x + 2x = 360^\circ$

$\Rightarrow x = 120^\circ$

ii) $x + 55^\circ = 90^\circ$

$\therefore x = 35^\circ$

iii)

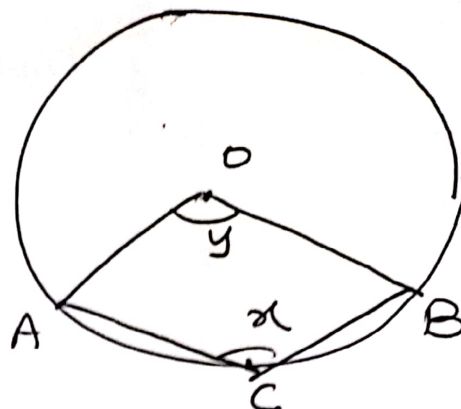


iv) From figure

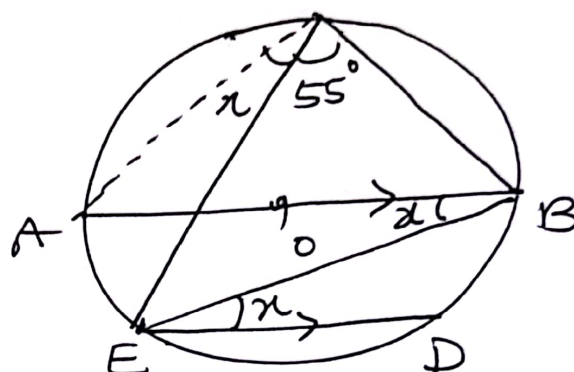
$40^\circ + 100^\circ + x^\circ = 180^\circ$

$\Rightarrow x^\circ = 40^\circ$

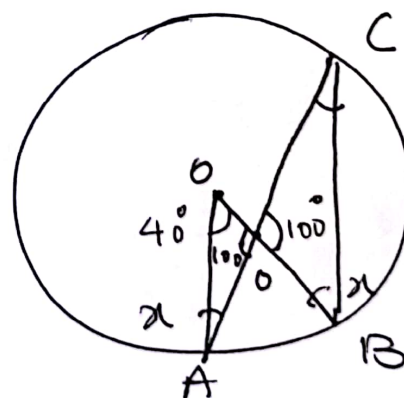
14



Ans:



$\therefore \angle OAB = 30^\circ$



Ans: —, 9, x, —

14. a) Sum of the interior angles of a (15)

$$\text{Septagon} = (n-2) \times 180^\circ$$

$$= (7-2) \times 180^\circ$$

$$= 900^\circ$$

$$\text{Each Angle} = \frac{900^\circ}{7} =$$

$$\text{From figure} = x^\circ = \frac{1}{2} \left(\frac{900^\circ}{7} \right) = \frac{900^\circ}{14}$$

$$= 128 \frac{4}{7}$$

$$b) \text{Ext } \angle AOC = 360^\circ - 130^\circ$$

$$= 230^\circ$$

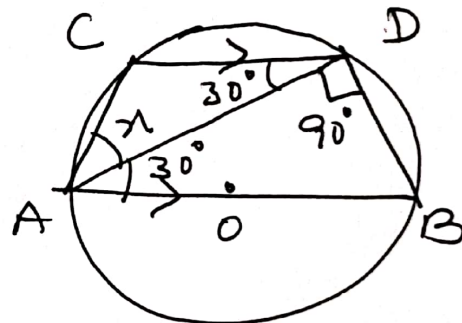
$$\therefore \angle ABC = \frac{1}{2} \times 230^\circ = 115^\circ$$

$$c) \text{From figure}$$

$$\angle A + \angle D = 180^\circ$$

$$(\angle x + 30^\circ) + (30^\circ + 90^\circ) = 180^\circ$$

$$\therefore \angle x = 30^\circ$$



$$d) 130^\circ + x^\circ = 180^\circ$$

$$\therefore x = 50^\circ$$

