gradeup

Sahi Prep Hai Toh Life Set Hai

CIRCLE

Part 2

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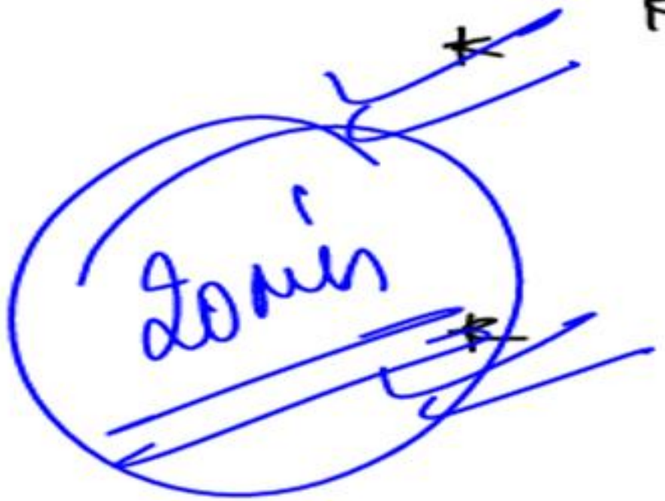
Agenda



* Revise all the theorems → (8-10) min
* Alternate segment Theorem → (10-12) min
* Practice Question → (75 min)

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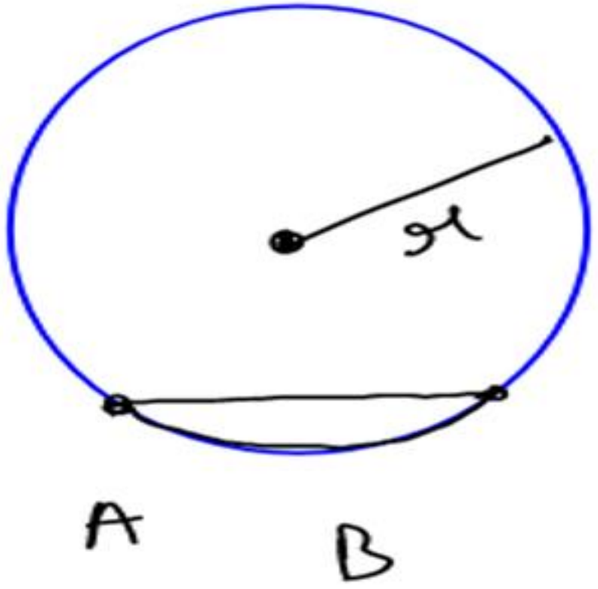

$\frac{1}{2}l \cdot r$

Area of sector $= \frac{\pi r^2 \theta}{360}$

Length of Arc $= \frac{2\pi r \theta}{360}$

Area of segment

$= \frac{\pi r^2 \theta}{360} - \frac{1}{2} r^2 \sin\theta$

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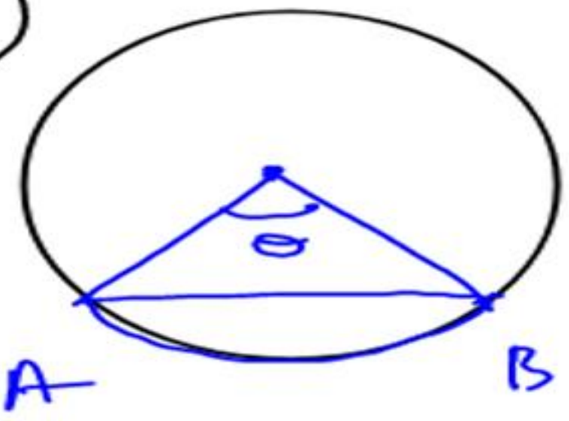
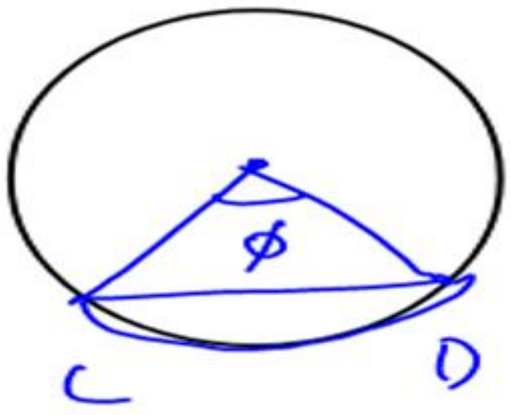
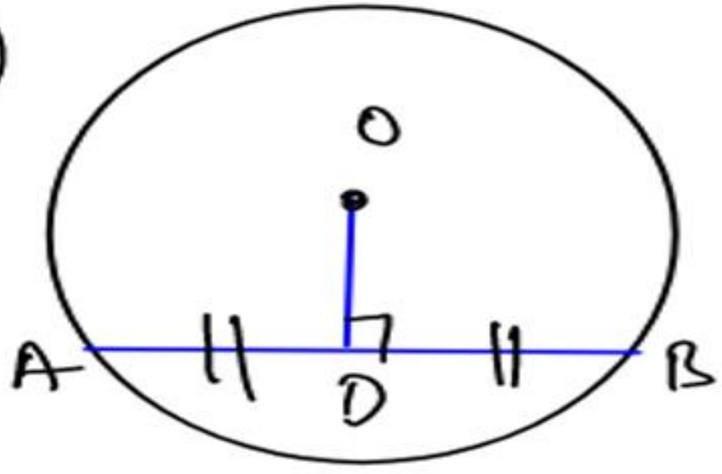
1





If out of these 3 any one is equal then rem 2 are also equal

2



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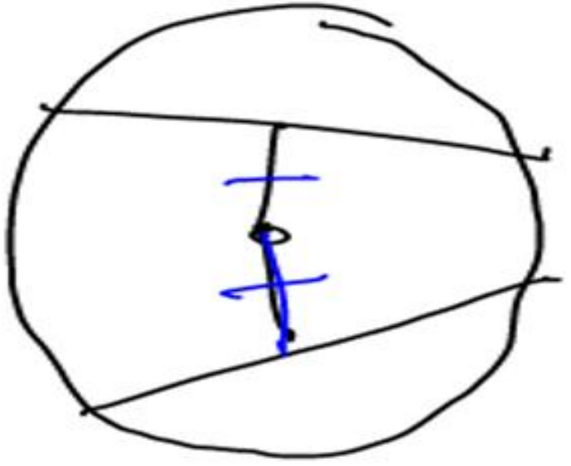

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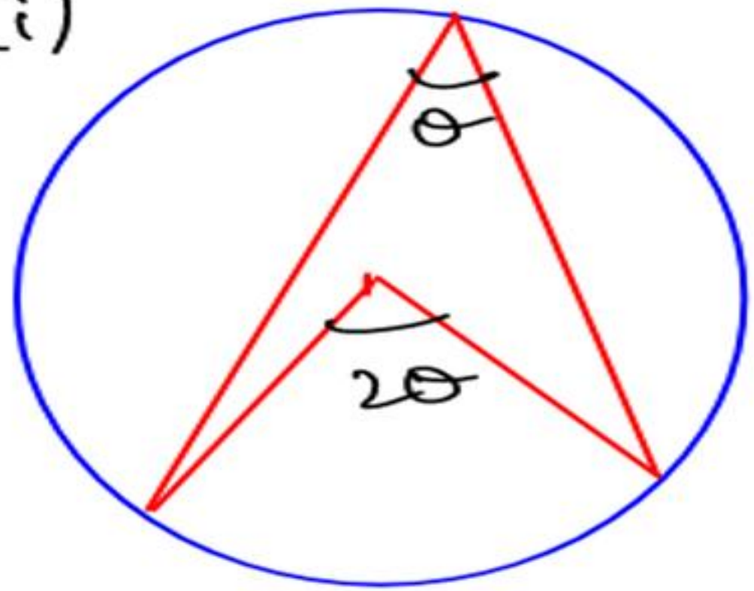
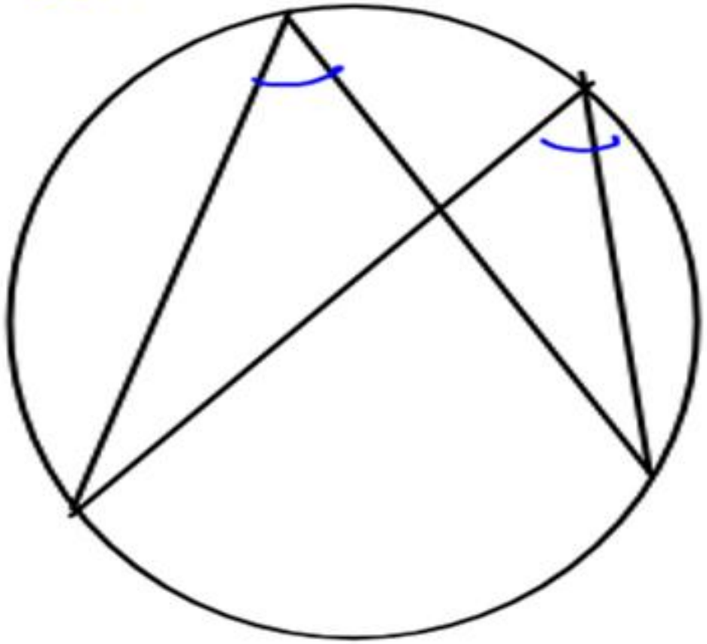
4

(i)



(ii)



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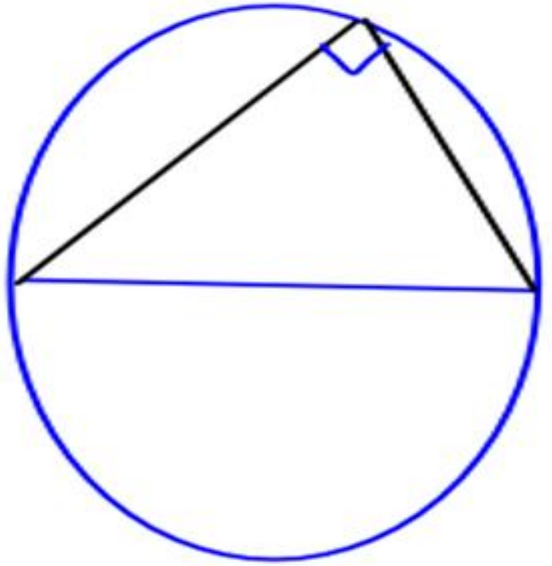

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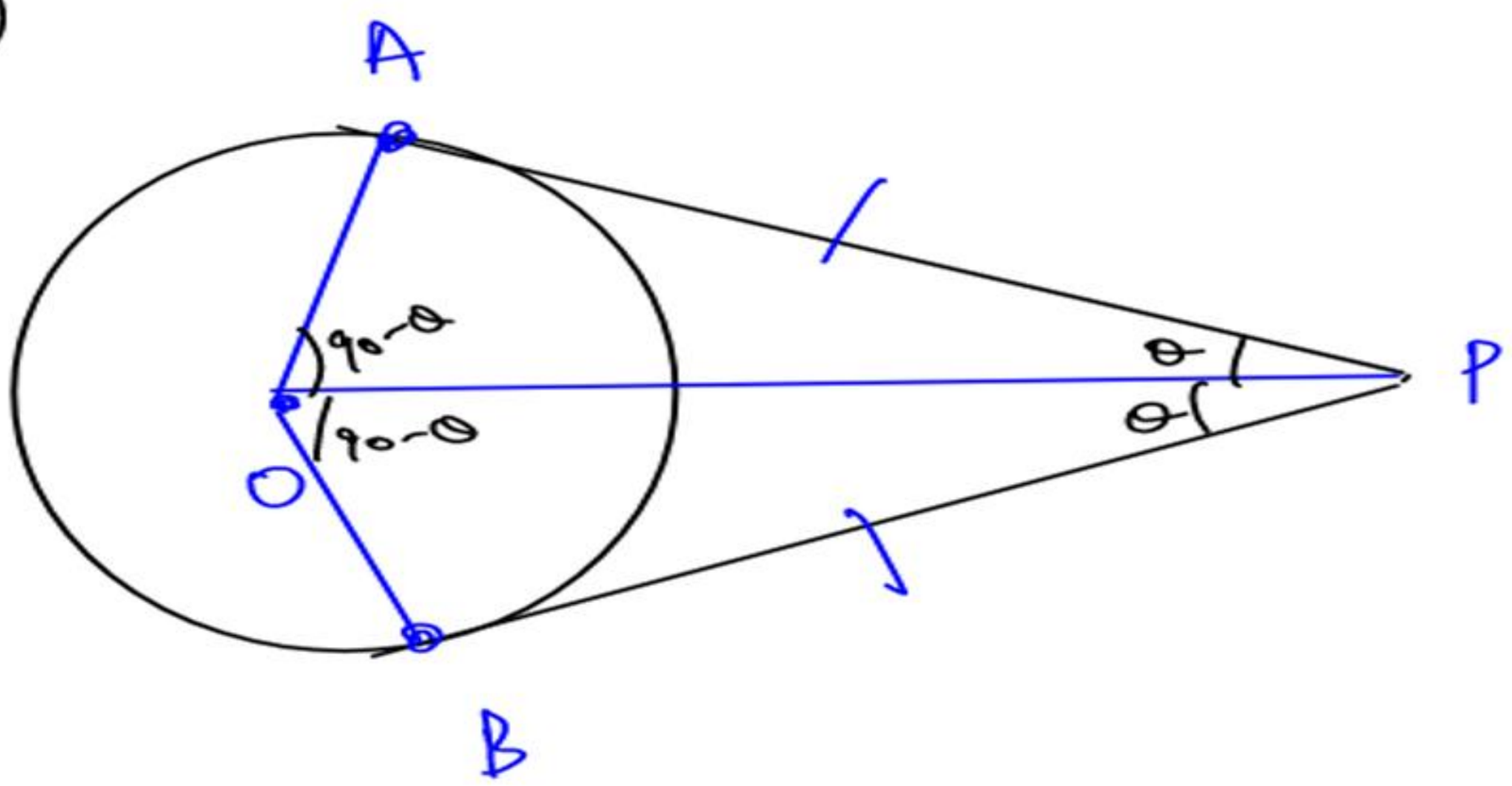
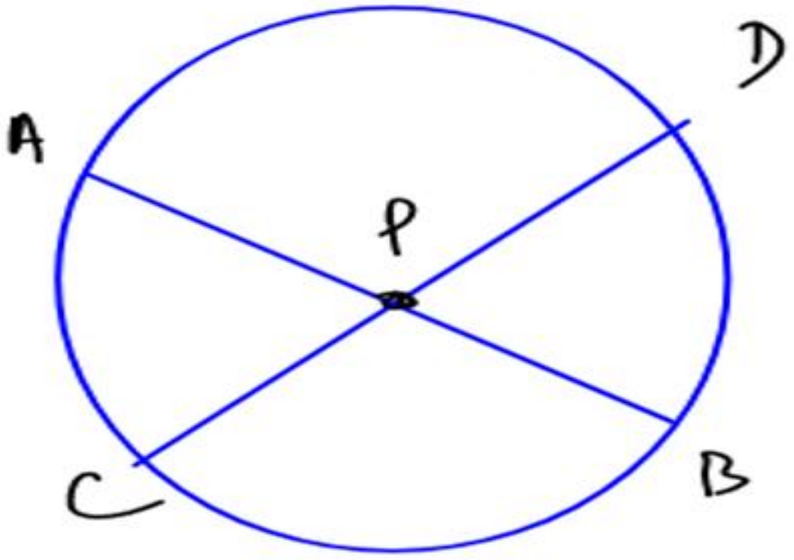
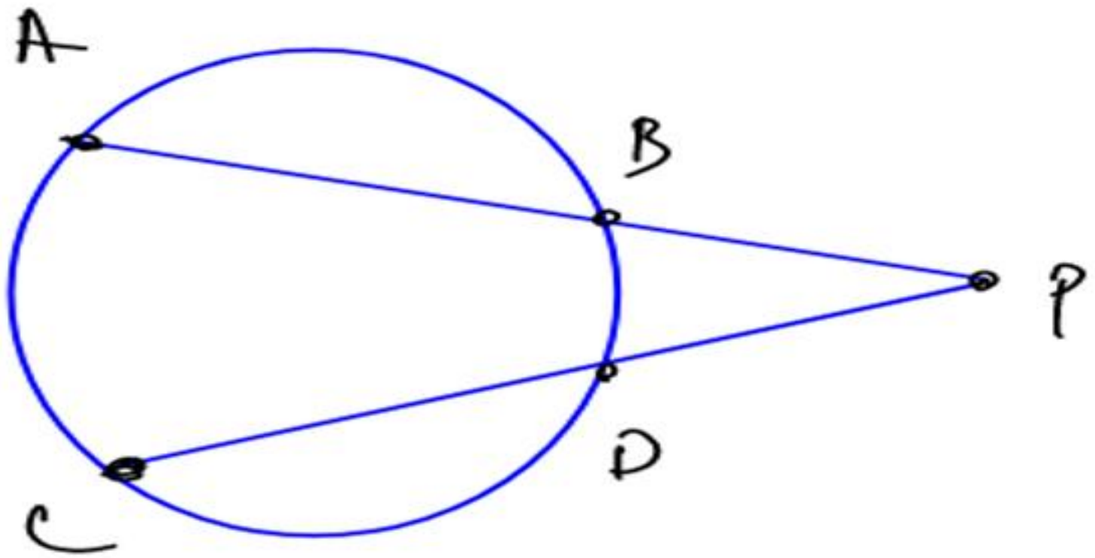
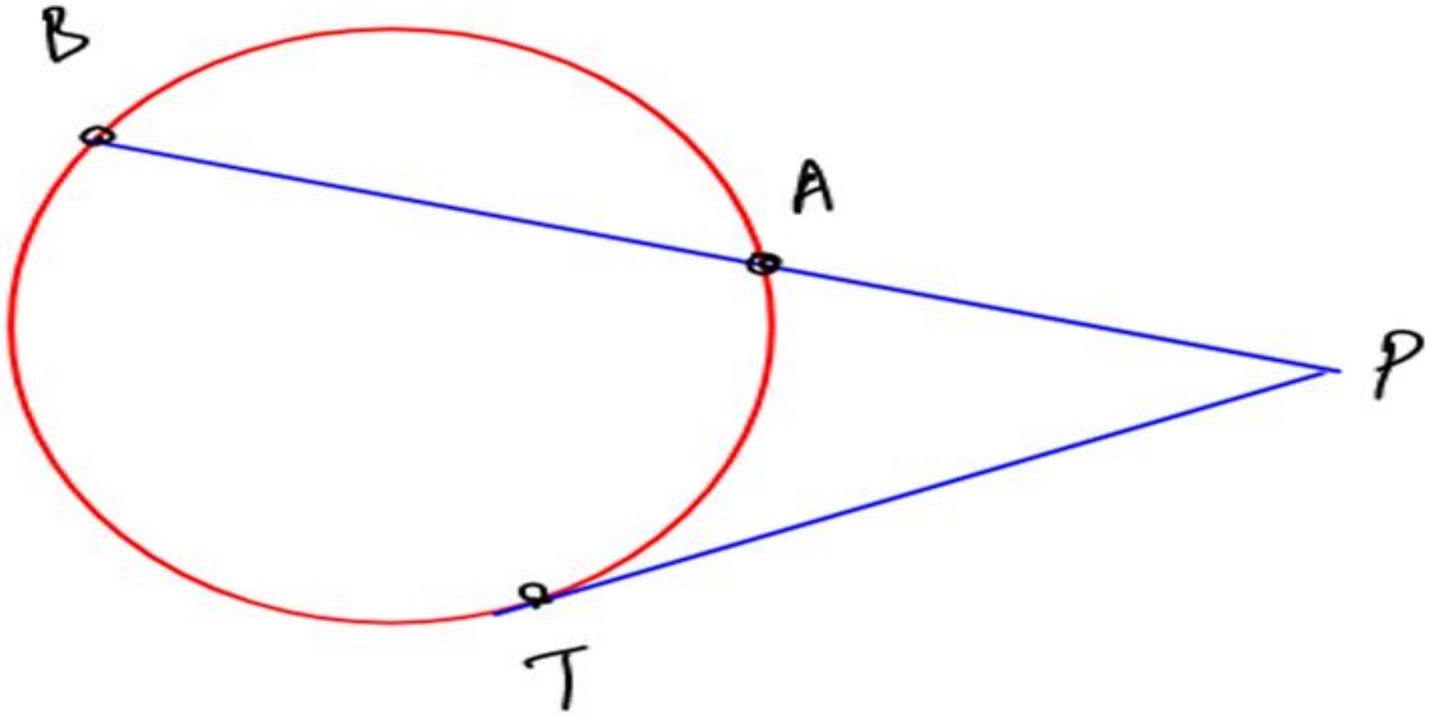
(5)







$$AP \times BP = CP \times DP$$



$$\boxed{PA \times PB = PT^2}$$

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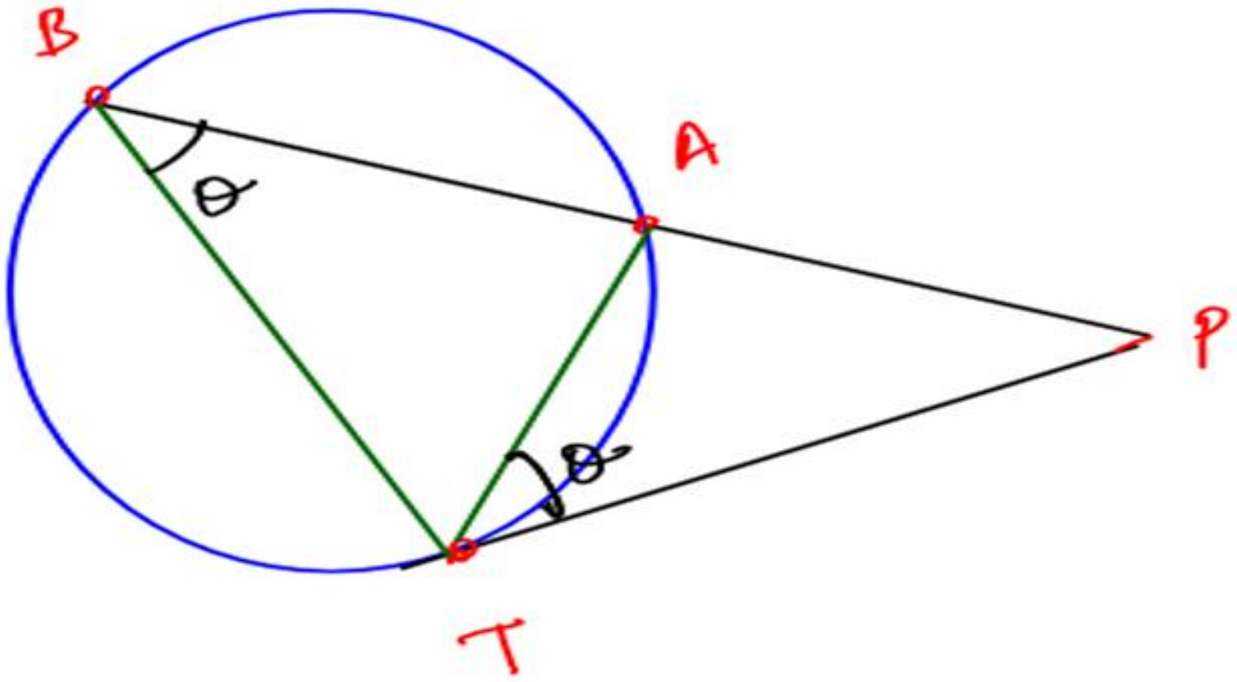


To prove $PA \times PB = PT^2$

Proof

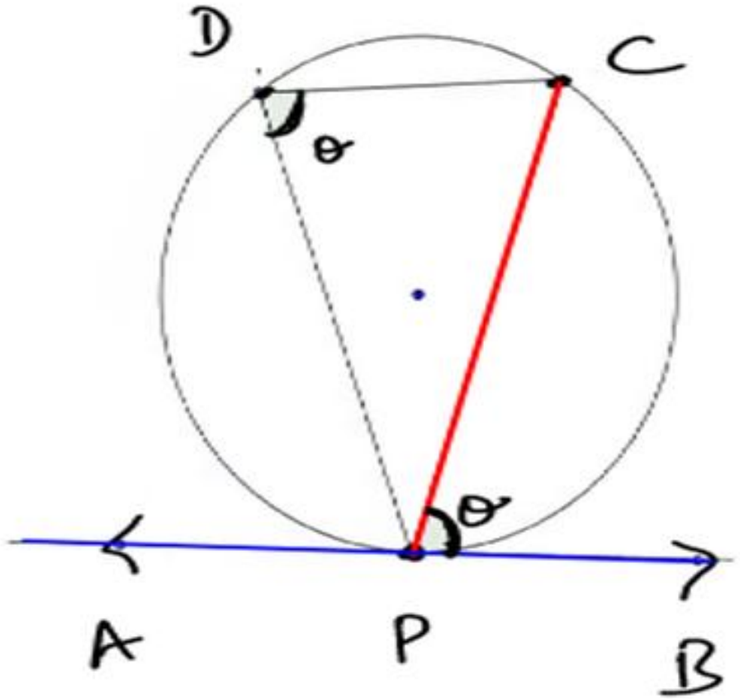
$\Delta PAT \sim \Delta PBT$

$\Delta \overset{\frown}{PAT} \sim \Delta \overset{\frown}{PTB}$

$$\frac{PA}{PT} = \frac{PT}{PB}$$

$$\underline{(PA)(PB) = (PT)^2}$$

7. Alternate segment theorem

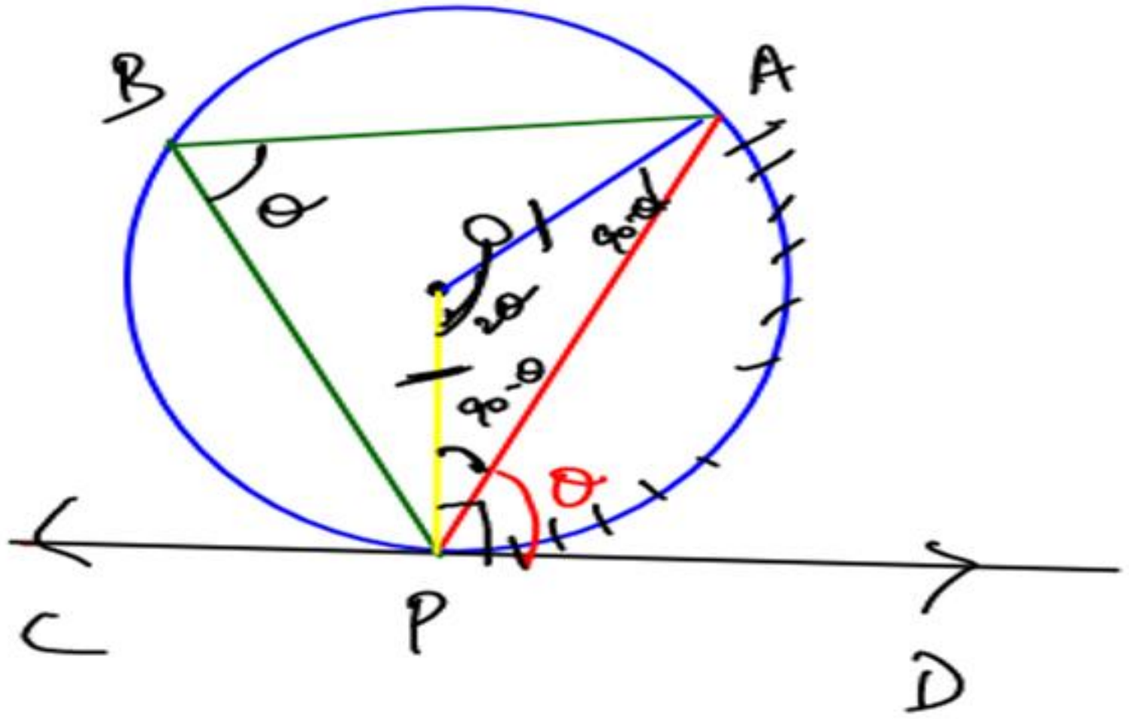


Angle made by a chord with the tangent of a circle is always equal the angle made by the same chord in alternate segment.

PC → chord

$\angle CPB = \theta$

$\angle PDC = \theta$



Given $\angle APD = \theta$

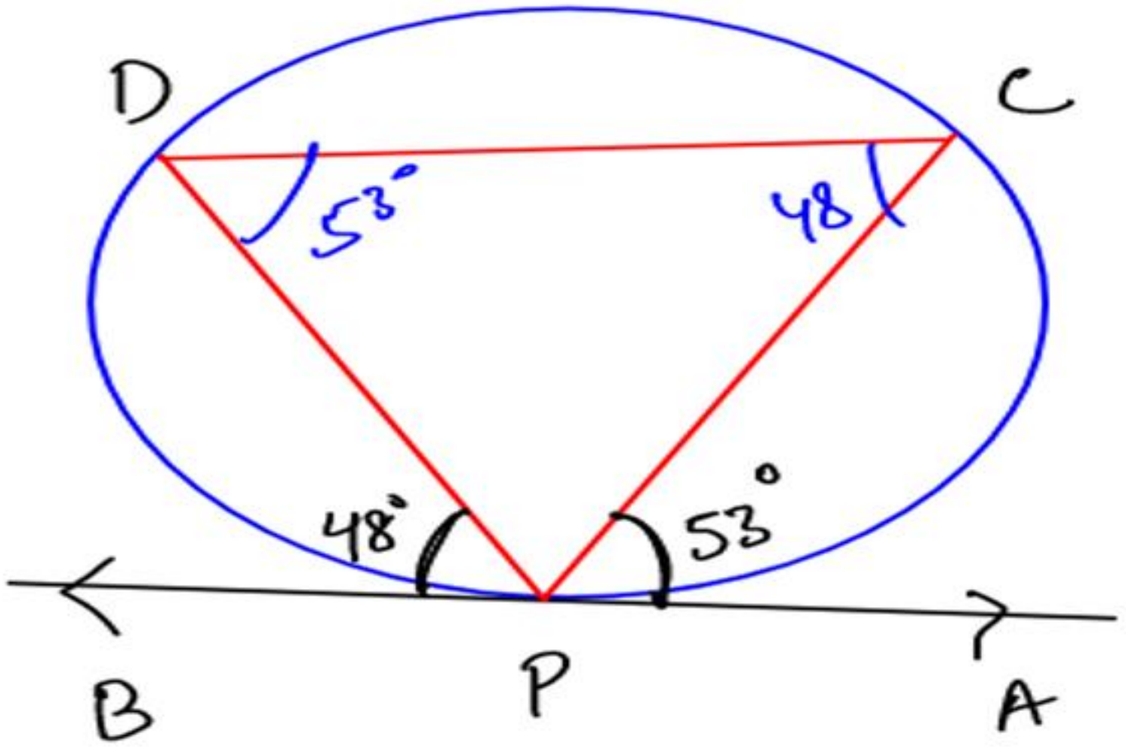
To prove :- $\angle PBA = \theta$

Proof

$\angle OPA = 90 - \theta$

$\triangle OPA$

$\angle PBA = \theta$



(i) $\angle PDC = ??$

53°

(ii) $\angle PCD = 48^\circ$

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Practice Questions

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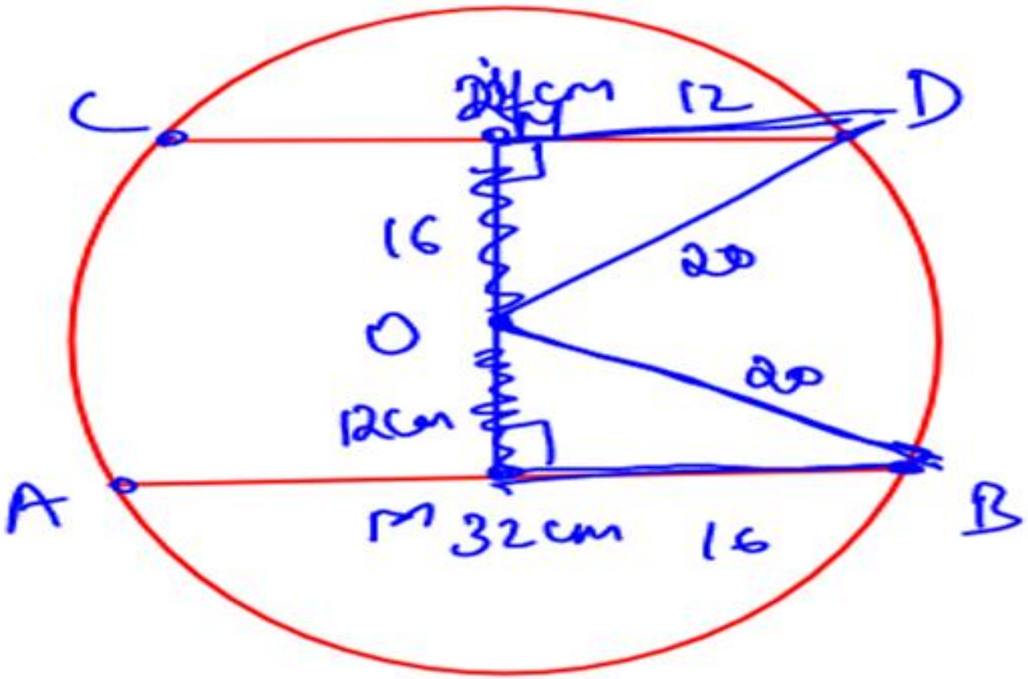
Q1. Find the distance between 2 parallel chords of length 24 cm and 32 cm. If both the chords lie on opposite side of centre and radius of circle is 20 cm.

V.Imp

Sol^M



MN = 28 cm

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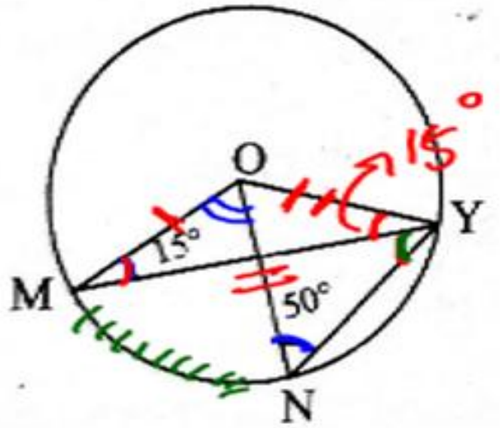
Ans. 28 cm

gradeup

Q2. In the given figure, $\angle ONY = 50°$ and $\angle OMY = 15°$, then the value of the $\angle MON$ is:

(a) 30° (b) 40°

(c) 20° (d) 70°



$\triangle OMY$

$OM = OY$

$\angle OYM = 15°$

$\triangle ONY \quad (OY = ON)$

$\angle OYN = 50°$

$15 + \angle NYM = 50$

$\angle NYM = 35°$

$\angle MON = 70°$

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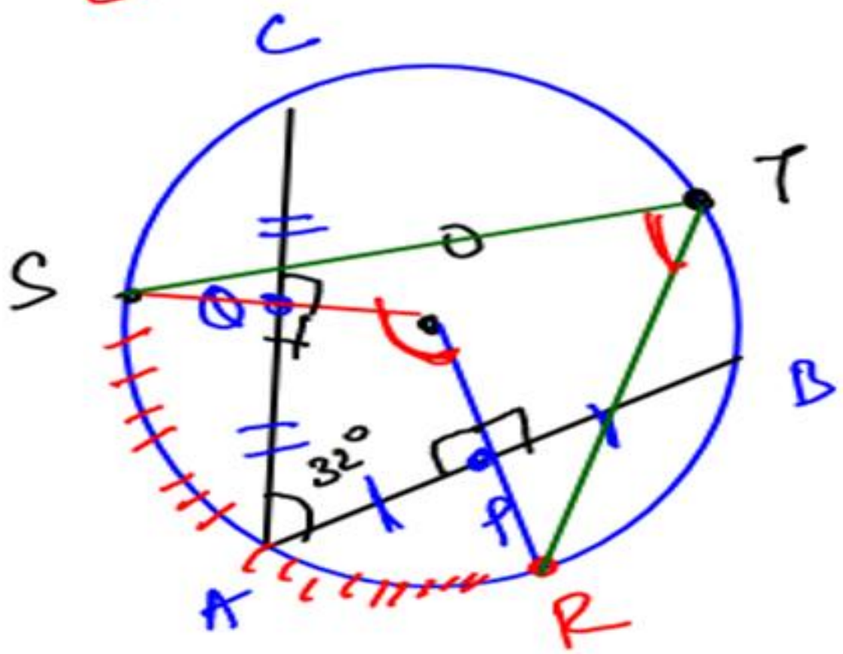
Ans. (d)

gradeup

Q3. P and Q are the mid-points of two chords (not diameters) AB and AC, respectively of the circle with centre at a point O. The line OP and OQ are produced to meet the circle, respectively, at the points R and S. T is any point on the major arc between the points R and S of the circle. If $\angle BAC = 32°$, $\angle RTS = ?$

(a) 32°
(b) 64°
(c) 74°
(d) 106°



Quad QOPA

$90 + \angle QOP + 90 + 32$

$= 360$

$\angle QOP = 148$

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Ans. (c)

gradeup

Q4. P and Q are two points on a circle with centre at O. R is a point on the minor arc at the circle between the points P and Q. The tangents to the circle at the points P and Q meet each other at the point S. If ∠PSQ = 20°, then ∠PRQ = ?

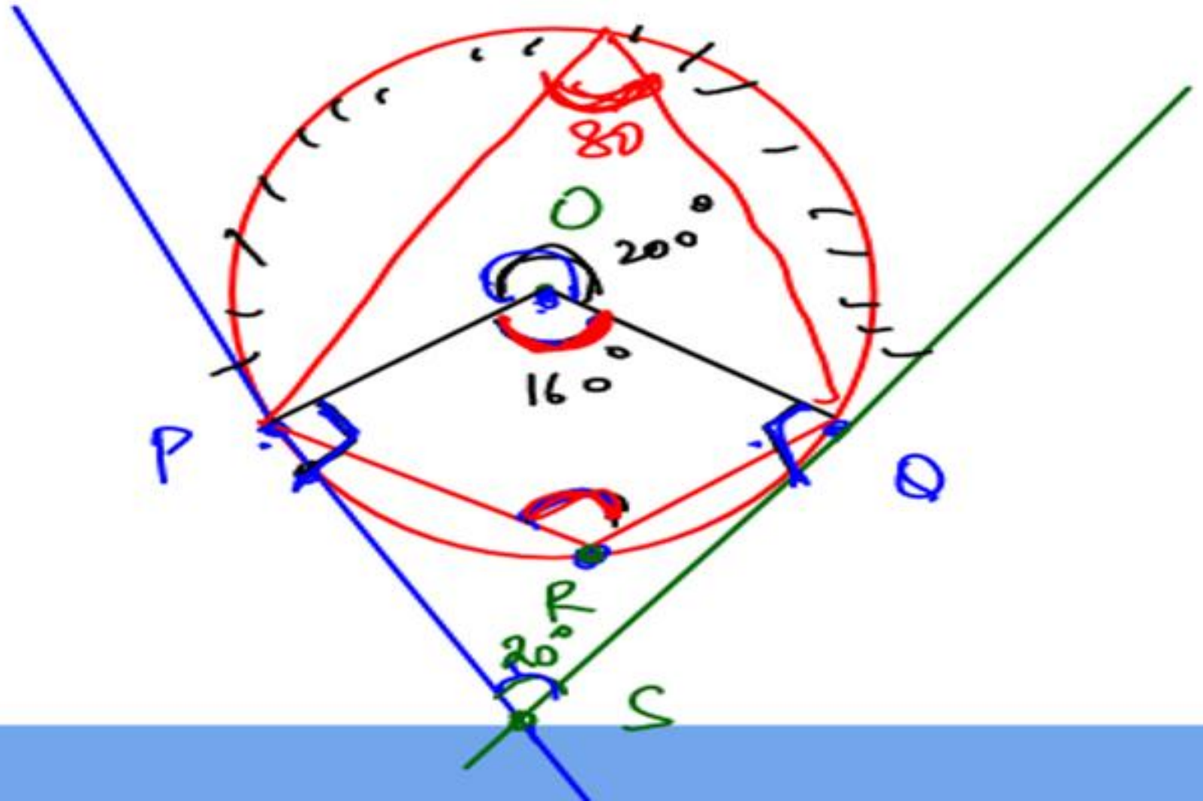
75sec

(a) 80°

(b) 200°

(c) 160°

(d) 100°



Quad OPSQ

$90 + \angle POQ + 90 + 20 = 360$

$\angle POQ = 160$

$\frac{200}{2} = 100$

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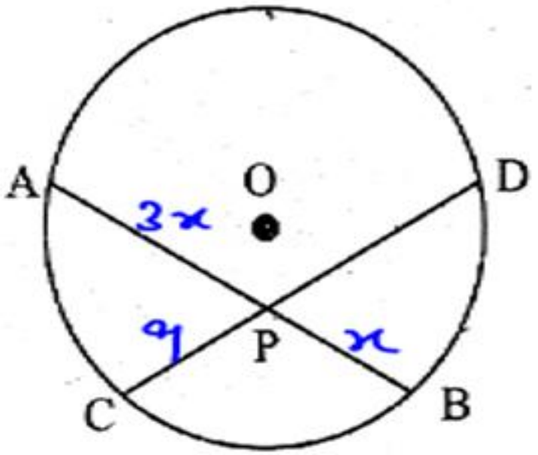
Ans. (d)

gradeup

Q5. In the given figure, two chords AB and CD intersects at point P and O is the centre of the circle. If AP = 3 PB, AB = 24 cm and CP = 9 cm, then CD is

(a) 10 cm (b) 12 cm

(c) 15 cm (d) 21 cm



$4x = 24 \quad x = 6$

$AP = 18 \quad BP = 6$

$AP \times BP = CP \times DP$

$18 \times 6 = 9 \times DP$

$DP = 12$

$CD = 9 + 12$

$= 21$

gradeup

Ans. (d)

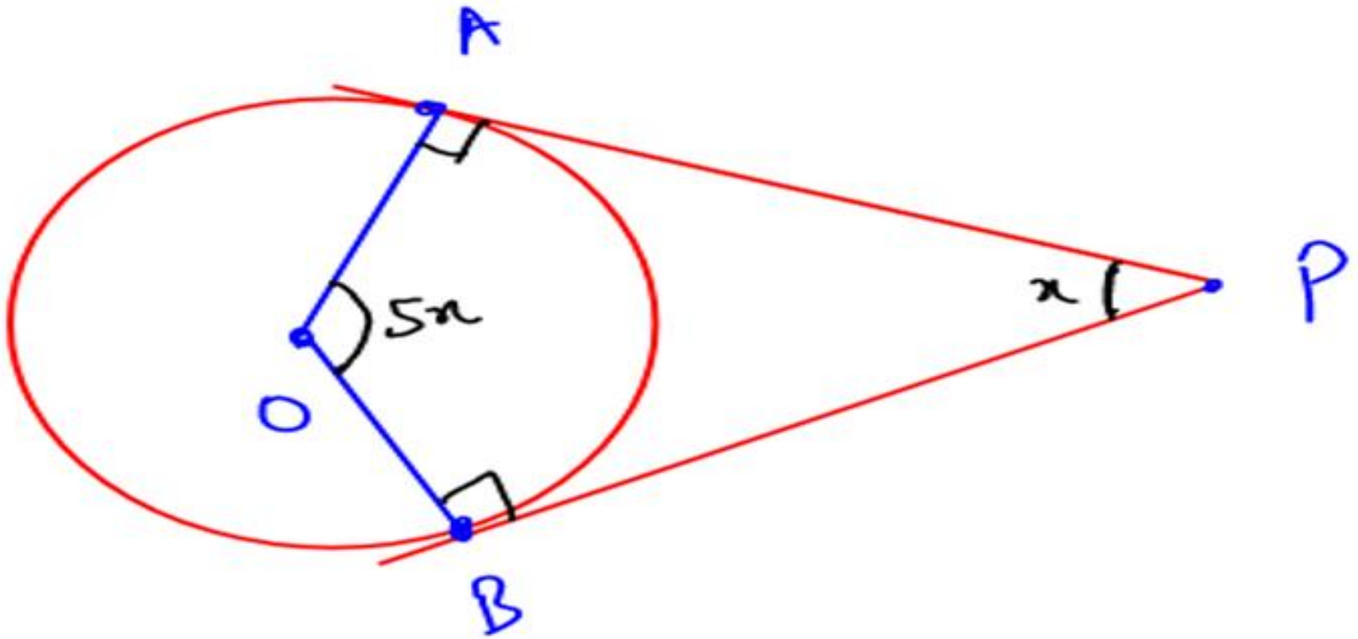
gradeup

Q6. The tangents at two points A and B on the circle with the centre O intersects at P. If in quadrilateral PAOB, $\angle AOB : \angle APB = 5 : 1$, the measure of $\angle APB$ is:

(a) 30°
(b) 15°
(c) 45°
(d) 60°

$180 + 6x = 360$

$x = 30$



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Ans. (a)

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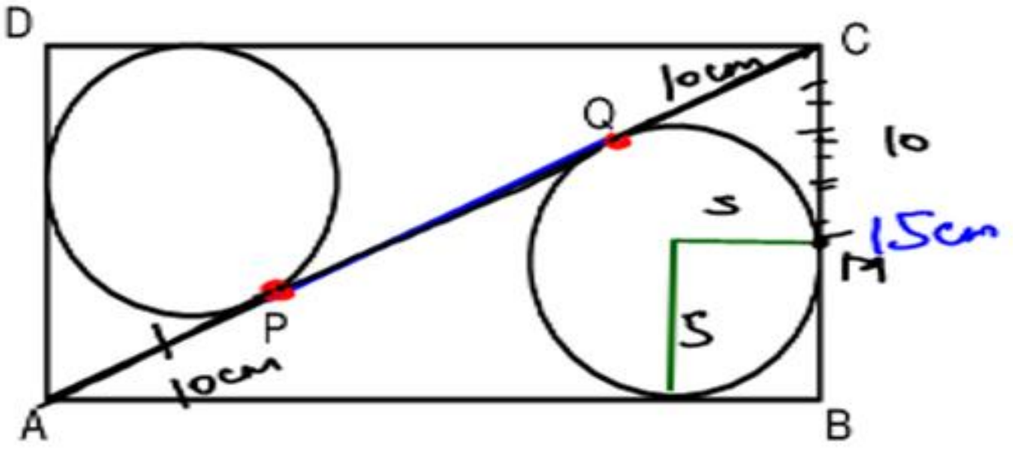
Q7. **ABCD is a rectangle.**

BC = 15 cm, AB = 20 cm

Find PQ.

V.Imp

2 Min



20 cm

$AC = \sqrt{20^2 + 15^2} = 25\text{ cm}$

$\Delta ABC \longrightarrow$ Right angled Δ

$r = \frac{b + p - h}{2} \Rightarrow 5\text{ cm}$

$10 + 10 + PQ = 25$

$PQ = 5\text{cm}$

Ans. 5 cm

Shortcut: $PQ = l - b$

where, l = length of rectangle

b = breadth of rectangle

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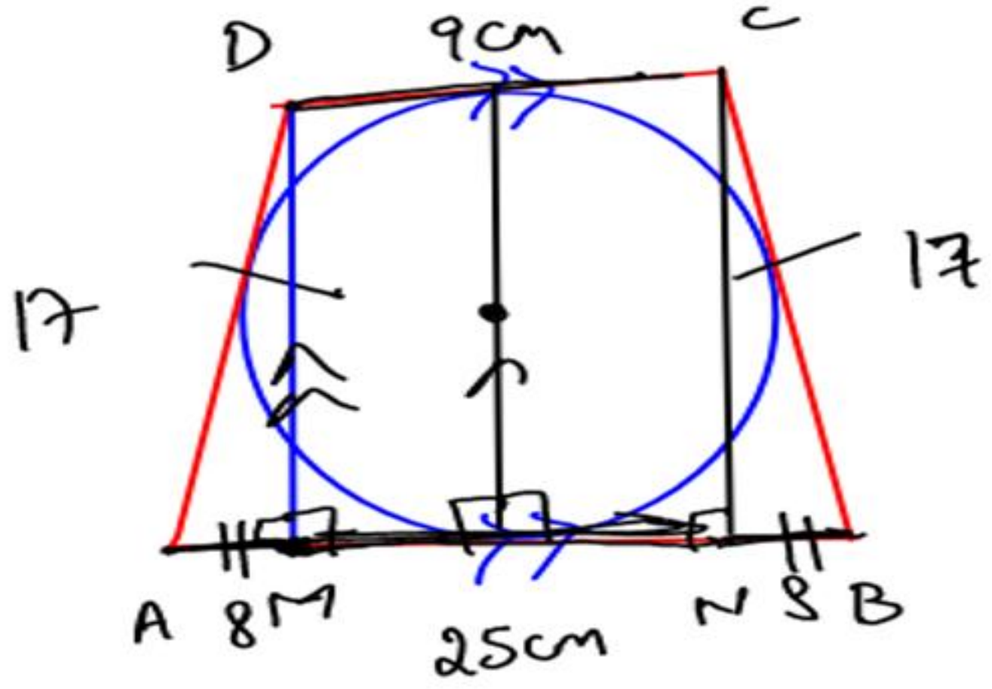
Q8. ABCD is an isosceles trapezium with parallel sides AB = 25 cm and CD = 9 cm. A circle is inscribed in ABCD. Find diameter of inscribed circle.

V. Imp



* Isosceles Trapezium

$AD + BC = AB + CD$

$2AD = 34$

$AD = 17$

$MN = 9cm$

$AM + BN = 16$

$MD = 15cm$

$\triangle AMD$

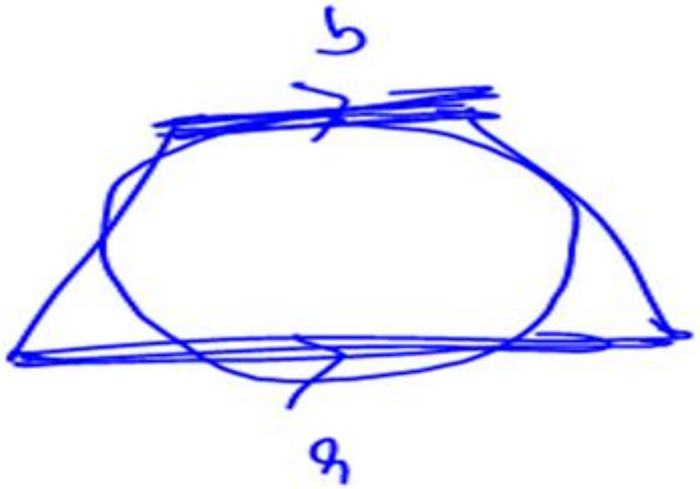
Diameter → 15cm

Ans. 15 cm

Shortcut:

Diameter = $\sqrt{ab}$

where, a and b are parallel sides of isosceles trapezium.



Diameter $= \sqrt{9b}$

$\sqrt{25 \cdot 9}$

$= 15$ cm

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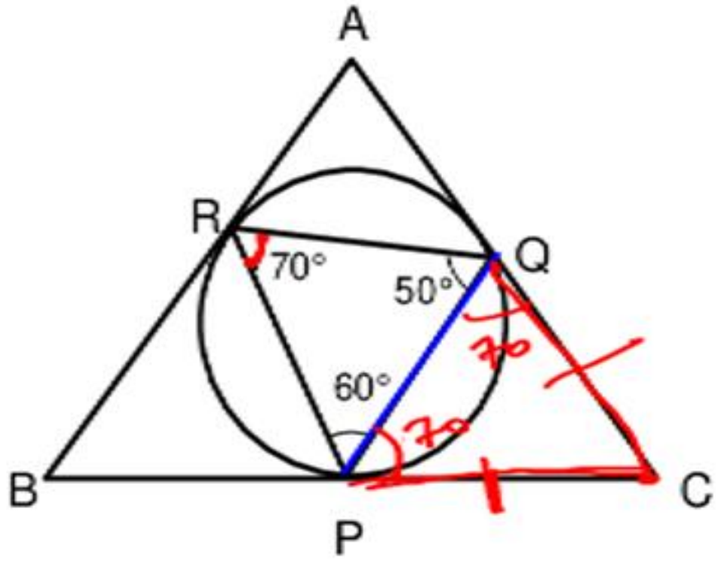
Q9. Find ∠A, ∠B and ∠C.



Hint Alternate segment

ΔCQP

ΔPQC

$\angle C = 40$

$\angle B = 80$

$\angle A = 60^\circ$

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Ans. $\angle A = 60°$

$\angle B = 80°$

$\angle C = 40°$

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Q10. P and Q are two points on a circle with centre at O. R is a point on the minor arc of the circle, between the points P and Q. The tangents to the circle at the points. P and Q meet each other at the point S. If $\angle PSQ = 20°$, then $\angle PRQ = ?$

(a) 80°
(b) 200°
(c) 160°
(d) 100°

Homework

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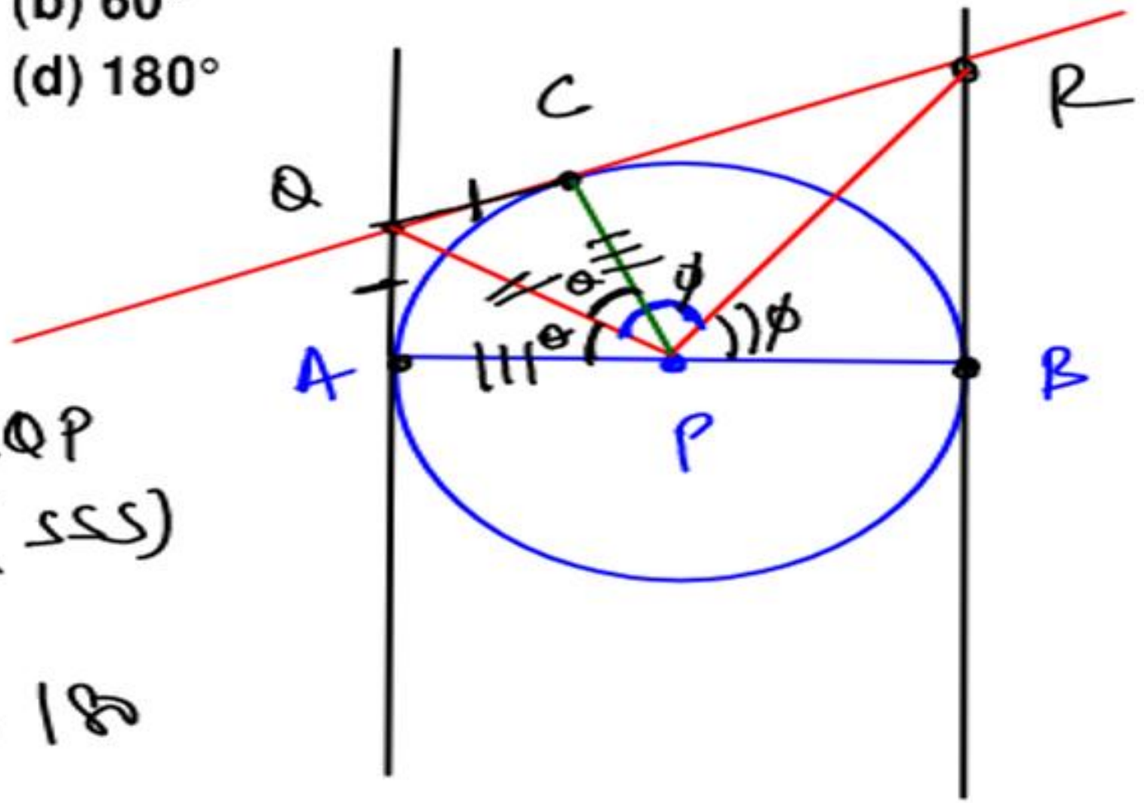
Ans. (d)

Q11. The tangents are drawn at the extremities of diameter AB of a circle with centre P. If a tangent to the circle at the point C intersects the other two tangents at Q and R then the measure of the ∠QPR is:

(a) 45°
(b) 60°
(c) 90°
(d) 180°



$\triangle AQP \cong \triangle CQP$

$\triangle AQP \cong \triangle CQP$ (SSS)

$2\theta + 2\phi = 180$

$\theta + \phi = 90$

$\angle QPR = 90^\circ$

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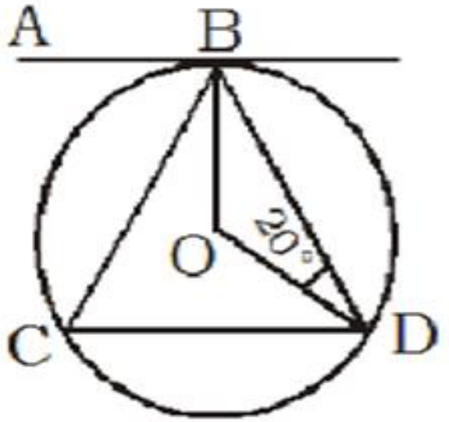
Ans. (c)

Q12. In the given figure, O is the centre of the circle and AB is tangent $\angle ODB = 20°$ and $\angle BDC$ and $\angle ABD$ are supplementary to each other then find $\angle OBC = ?$



A. 20°
B. 30°
C. 60°
D. 70°

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Ans. (a)

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Q13. A, B and C are three points on a circle with centre O. The tangent at C meets BA produced to T. If $\angle ATC = 30°$ and $\angle ACT = 48°$, then what is the value of $\angle AOB$?

(a) 78°
(b) 96°
(c) 102°
(d) 108°

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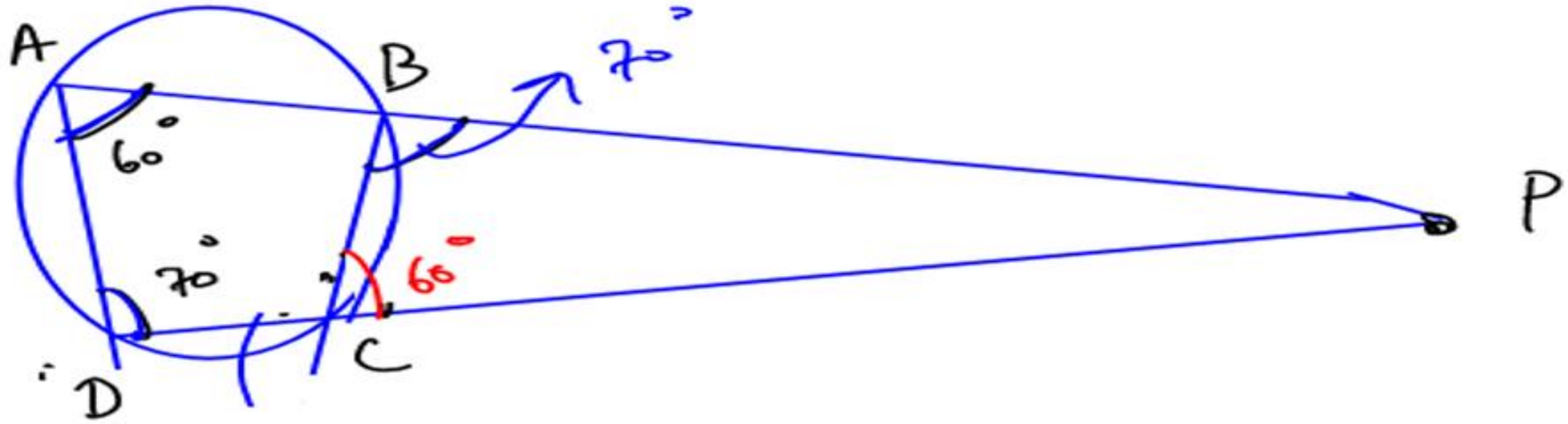
Ans. (d)

Q14. ABCD is a cyclic quadrilateral AB and DC are produced to meet at P. If $\angle ADC = 70°$ and $\angle DAB = 60°$, then the $\angle PBC + \angle PCB$ is:

(a) 130°
(b) 150°
(c) 155°
(d) 180°



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Ans. (a)

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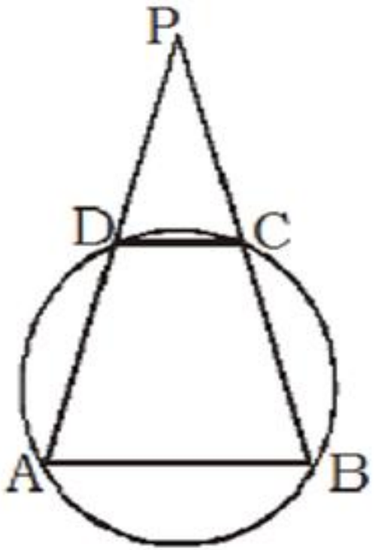
Q15. In the figure given above, if ∠BAD = 60°, ∠ADC = 105°, then what is ∠DPC equal to?



(a) 40° **(b) 45°**

(d) 60° **(c) 50°**

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Ans. (b)

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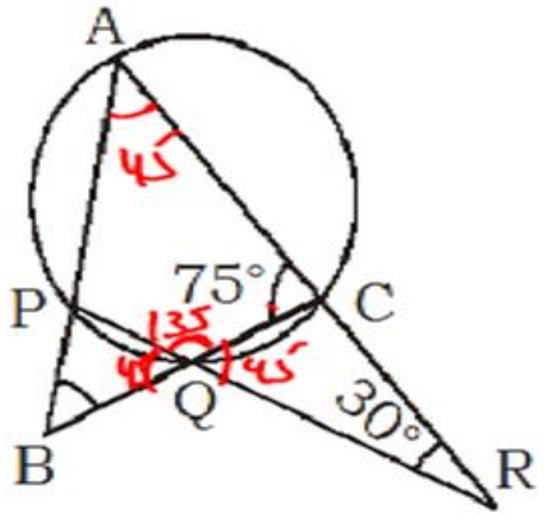
Q16. In the given figure, what is ∠CBA?



(a) 30°
(b) 45°
(d) 50°
(c) 60°

$45 + 75 + \angle B = 180$

$\angle B = 60°$

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Ans. (d)

gradeup

Q17. ABCD is a cyclic quadrilateral. The tangents at A and C intersect each other at P. If $\angle ABC = 100°$, then what is $\angle APC$ equal to?

(a) 10° (b) 20°

(d) 30° (c) 40°

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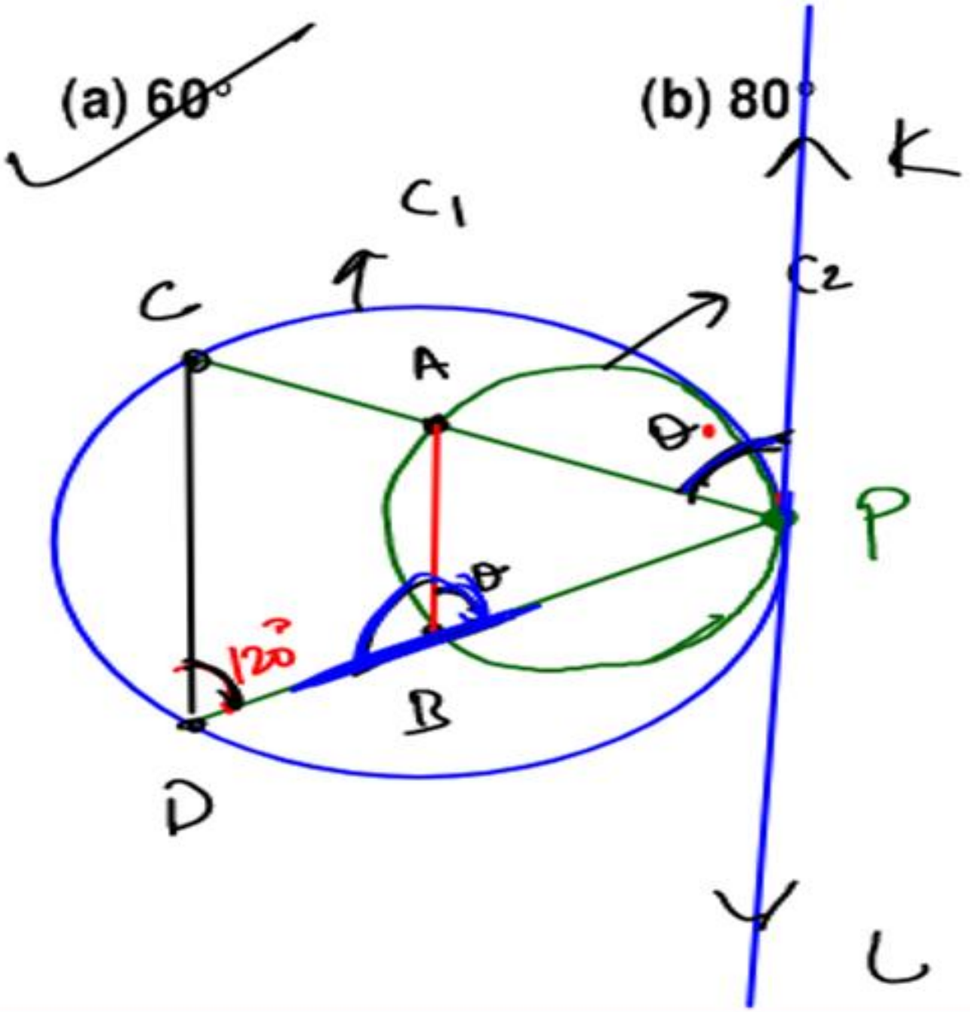
Ans. (b)

Q18. Two circles C_1 and C_2 touch each other internally at P. Two lines PCA and PDB meet the circles C_1, in C, D and C_2 in A, B respectively. If $\angle BDC = 120°$, the value of $\angle ABD$ is equal to:

(a) 60° (b) 80° (c) 100° (d) 120°



9 sec

$\theta = 120°$

$120 + \angle ABD = 180$

$\angle ABD = 60°$

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Ans. (a)

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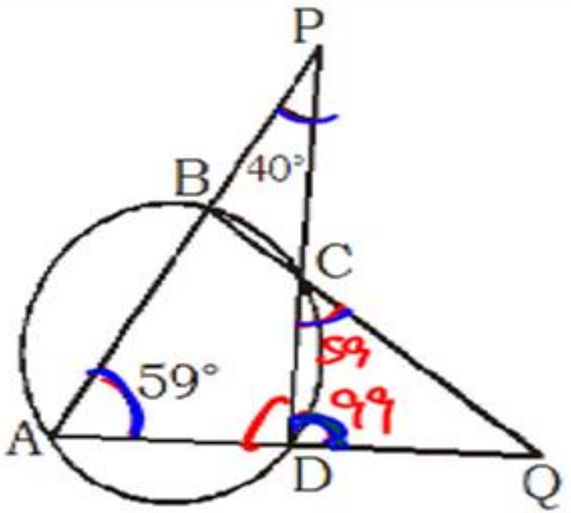
Q19. In the given figure, if ∠PAQ = 59°, ∠APD = 40°, then what is ∠AQB?



(a) 19°
(b) 20°
(c) 22°
(d) 27°

$99 + 59 + \angle Q = 180$

$\angle Q = 22$

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Ans. (c)

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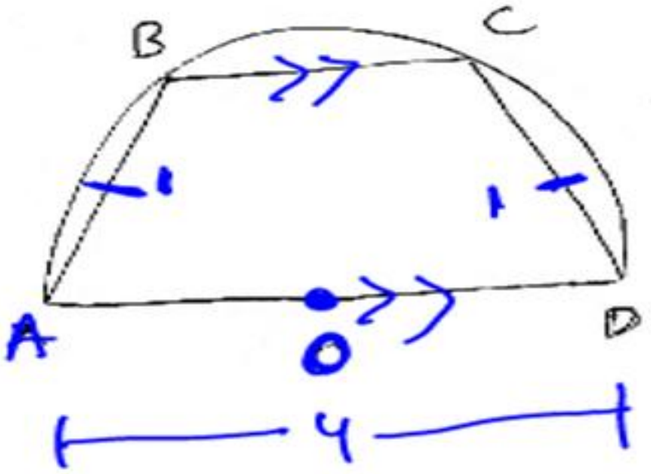
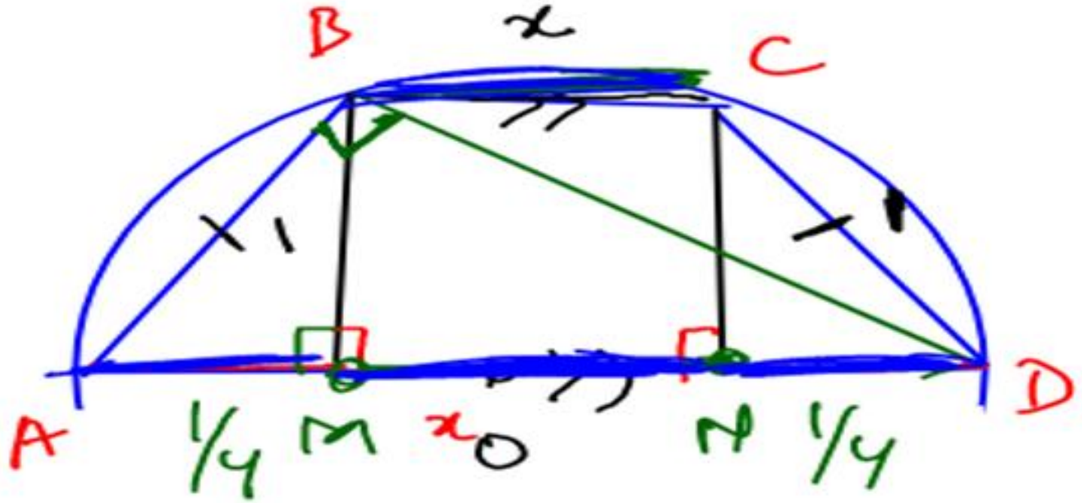
Q20. If AD || BC, AB = CD = 1 cm and AD = 4 cm

Find BC. (O is centre of semicircle)





$\triangle ABD$

$(BA)^2 = (AM)(AD)$

$1 = (AM) \cdot 4$

$AM = 1/4$

$4 - \frac{1}{2} \Rightarrow \frac{7}{2}$

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Ans. 3.5 cm

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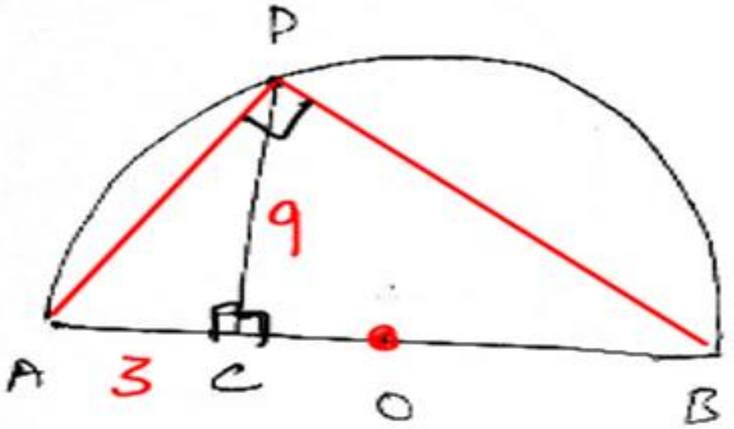
Q21. If AC = 3 cm, CD = 9 cm

(O is centre of semicircle)

Find area of semi-circle.

यदि AC = 3 cm, CD = 9 cm



O → centre

$DC^2 = CA \times CB$

$81 = 3 \times CB$

$CB = 27$

$AB = 30$

Diameter = 30

Radius = 15

$\frac{\pi (15)^2}{2} = \frac{225}{2}\pi \text{ cm}^2$

gradeup

Ans. $\frac{225\pi}{2}$

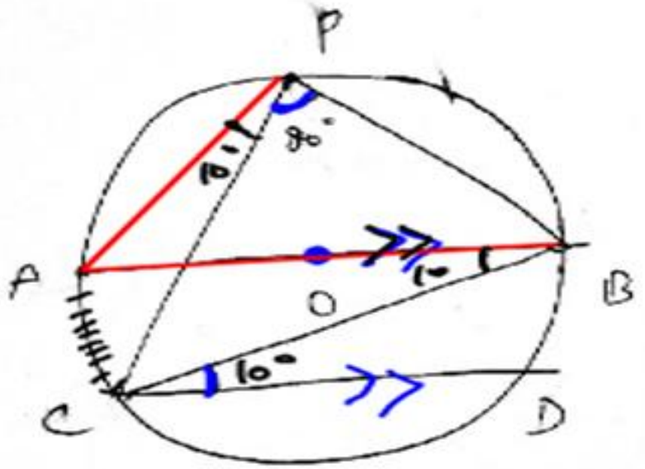
gradeup

Q22. If AB || CD

$\angle CPB = 80°$

(O is centre of circle)

Find $\angle BCD$.



O → centre of circle

I^st

$\angle BCD = 10°$

gradeup

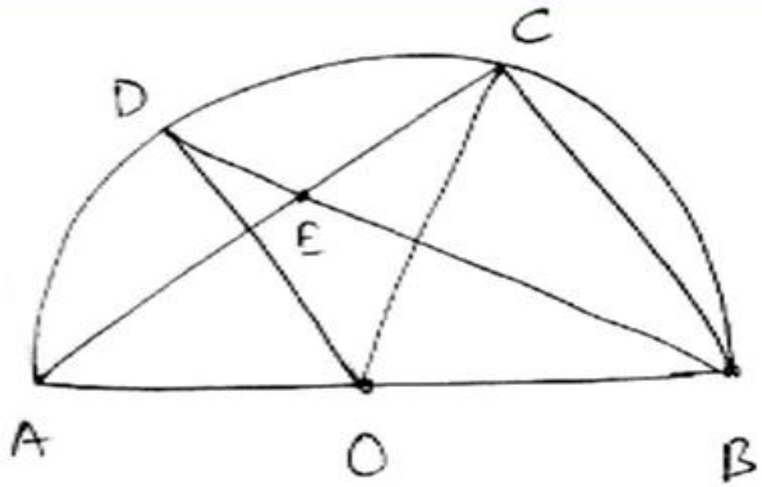
Ans. 10°

gradeup

Q23. **AB is diameter**

$\angle DOC = 80°$ (O is centre of circle)

Find $\angle DEC$.



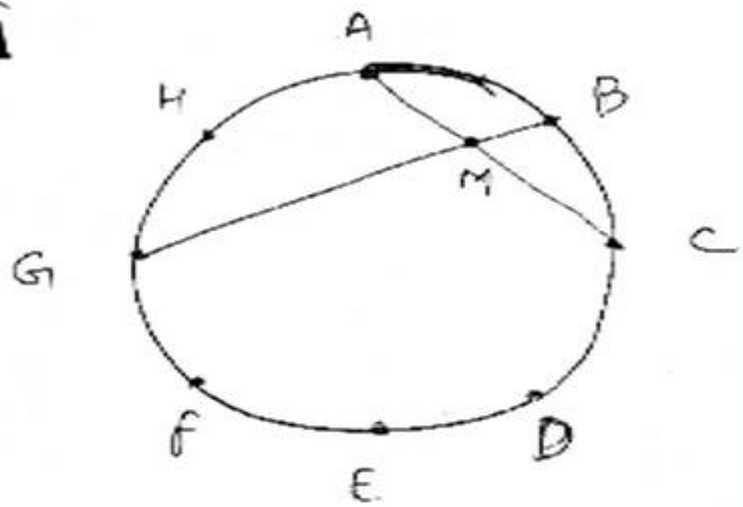
gradeup

Ans. 130°

gradeup

Q24. *If* $\overset{\frown}{AB} = \overset{\frown}{BC} = \overset{\frown}{CD} = \overset{\frown}{DE} = \overset{\frown}{EF} = \overset{\frown}{FG} = \overset{\frown}{GH} = \overset{\frown}{HA}$

Find $\angle AMB$.

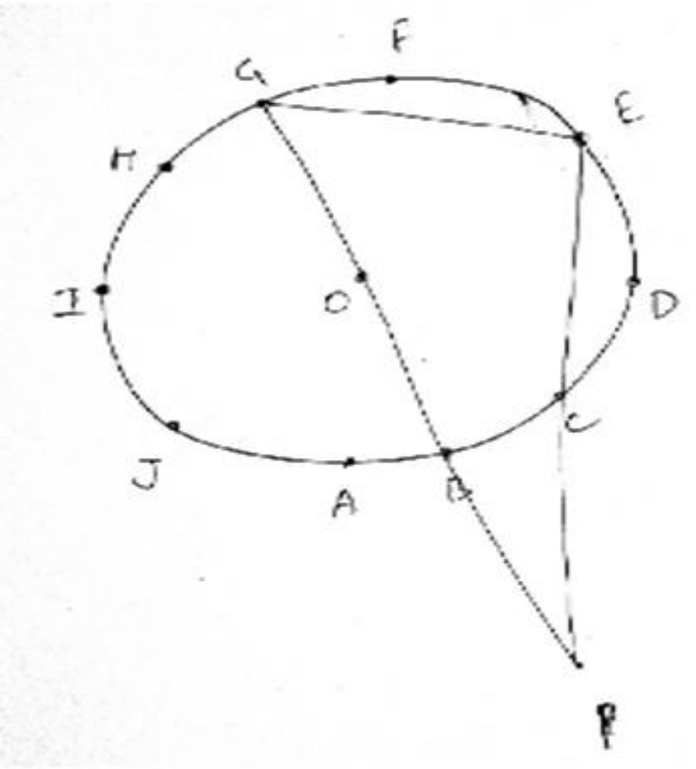


gradeup

Ans. 112.5°

Q25. *If* $\widehat{AB} = \widehat{BC} = \widehat{CD} = \widehat{DE} = \widehat{EF} = \widehat{FG} = \widehat{GH} = \widehat{HI} = \widehat{IJ} = \widehat{JA}$

Find $\angle EPG$.



gradeup

Ans. 18°

gradeup

gradeup

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