CAT

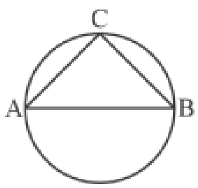
MBA PRO 2024

QUANTITATIVE APTITUDE

DPP:5

Circles 1

Q1 A circle of radius $5\ \mathrm{cm}$ is drawn as shown. $\triangle\mathrm{ABC}$ is drawn inside it such that $\angle \mathrm{C} = 90^{\circ}$ and each of the vertex touches the circle. What is the value of length AB ?



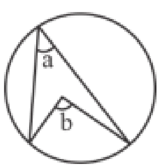
(A) $6\ \mathrm{cm}$

(B) $8\ \mathrm{cm}$

(C) $10\ \mathrm{cm}$

(D) Inadequate Data

Q2 In the figure of circle given, $\mathrm{a}+\mathrm{b}=120^{\circ}$. Find the value of b such that angle b is subtended at the centre of the circle



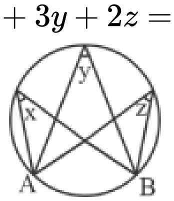
(A) 80°

(B) 60°

(C) 40°

(D) 30°

Q3 Are AB is taken to create different angles inside a circle, as shown. If it's known that $x+3y+2z=120^{\circ}$. Then $\mathrm{y}=$?



(A) 25°

(B) 23°

(C) 22°

(D) None of these

Q4 Chords AC and BC are drawn in a semicircle of diameter $\mathrm{AB}=8\ \mathrm{cm}$. Both the chord, meet each other at 90°. Find the length of AC if $\angle \mathrm{A}=60^{\circ}$.

(A) $\sqrt{3}\ \mathrm{cm}$

(B) $4\ \mathrm{cm}$

(C) $\sqrt{5}\ \mathrm{cm}$

(D) $5\ \mathrm{cm}$

Q5 A is the center of a circle and AB is it's radius such that $\mathrm{AB}=8\ \mathrm{cm}$. A tangent CB is drawn from the outside point C. If $\mathrm{AC}=17\ \mathrm{cm}$, then find the length of tangent.

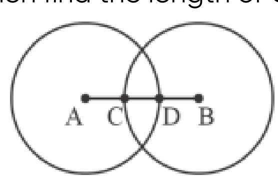
(A) $12\ \mathrm{cm}$

(B) $\sqrt{13}\ \mathrm{cm}$

(C) $15\ \mathrm{cm}$

(D) $\sqrt{14}\ \mathrm{cm}$

Q6 Two circle C_1 and C_2 of different radius intersect each other at two different points. A and B are the center of C_1 and C_2 respectively and $AD=4\ \mathrm{cm}$, $\mathrm{CB}=7\ \mathrm{cm}$. If $\mathrm{AB}=9\ \mathrm{cm}$, then find the length of CD.



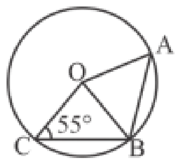
(A) $2\ \mathrm{cm}$

(B) $3\ \mathrm{cm}$

(C) $3.5\ \mathrm{cm}$

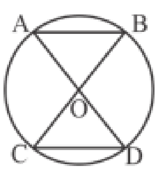
(D) Can't be determined

Q7 Chord AB is twice in length of chord BC as shown. If $\angle \mathrm{C}=55^{\circ}$, then find $\angle \mathrm{AOB}$ (Given O is the center)



(A) 100°
(B) 140°
(C) 160°
(D) 164°

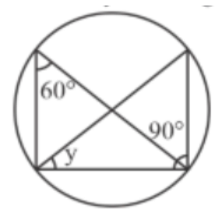
Q8 O is the center of circle and $\angle \mathrm{C}=40^{\circ}$. Find $\angle \mathrm{AOB}$ if AD and BC are line segments touching the circumference of circle from both side.



(A) 80°
(B) 90°
(C) 100°
(D) None of these

Q9 AB and CD are two chords parallel to each other. Both are on different sides of the center of a circle. The radius of circle with centre O is $10 \mathrm{~cm}$, length of $\mathrm{AB}=12 \mathrm{~cm}$ and length of $\mathrm{CD}=16 \mathrm{~cm}$. Find the least distance between the two chords.
(A) $14 \mathrm{~cm}$
(B) $15 \mathrm{~cm}$
(C) $12 \mathrm{~cm}$
(D) $16 \mathrm{~cm}$

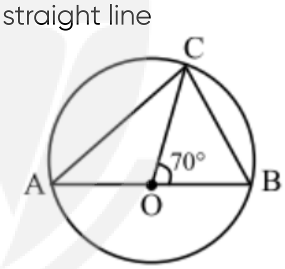
Q10 What is the value of y in the figure shown?



(A) 30°
(B) 35°
(C) 45°
(D) 50°

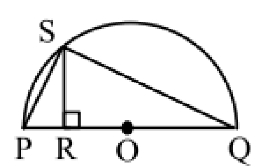
Q11 AB is a chord of length $7 \mathrm{~cm}$. Another chord CD of longest possible length, inside the same circle of radius $6 \mathrm{~cm}$ is drawn. Find the value of $(CD-AB)$.
(A) $4 \mathrm{~cm}$
(B) $5 \mathrm{~cm}$
(C) $6 \mathrm{~cm}$
(D) Inadequate data

Q12 In the figure drawn below, O is the center of circle. Find $(\angle B+\angle A)$ given that AB is a straight line



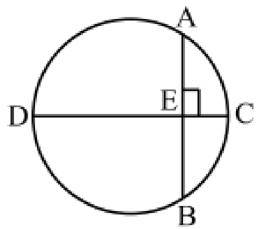
(A) 90°
(B) 70°
(C) 60°
(D) 50°

Q13 PQ is the diameter of semi-circle with center O. Radius is $6 \mathrm{~cm}$ and $OR=2 \mathrm{~cm}$. What is the value of SR?



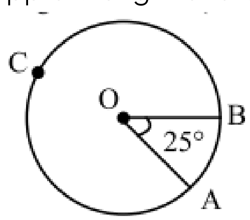
(A) $2\sqrt{3}$ cm
(B) $3\sqrt{4}$ cm
(C) $4\sqrt{2}$ cm
(D) $4\sqrt{3}$ cm

Q14 Two chords AB and CD intersect each other at 90° at E. If $AE = EB = 6$ cm and $EC = 4$ cm, then what is the value of DE?



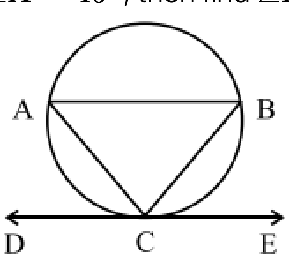
(A) 6 cm
(B) 9 cm
(C) 10 cm
(D) 10.5 cm

Q15 Circumference of a circle is 44 cm. Find the approx. length of arc ACB (Refer figure)



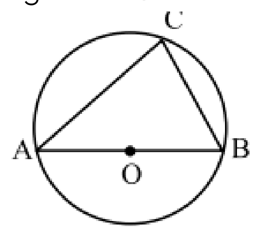
(A) 37.85 cm
(B) 38 cm
(C) 40 cm
(D) 40.95 cm

Q16 ABC is triangle inside a circle as shown. If $\angle A = 40^\circ$, then find $\angle BCE$



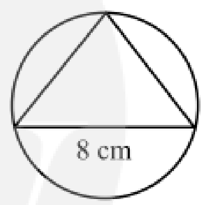
(A) 40°
(B) 30°
(C) 25°
(D) 20°

Q17 AB is the diameter of circle such that $AB = 17$ cm. If $BC = 8$ cm, then find the length of AC.



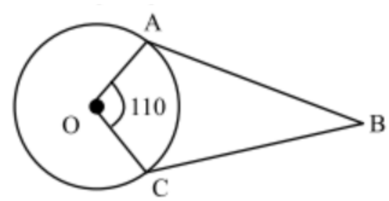
(A) 9 cm
(B) 11 cm
(C) 15 cm
(D) None of these

Q18 An equilateral triangle is inscribed in a circle as shown. Side of this triangle is 8 cm. Find the radius of circle.



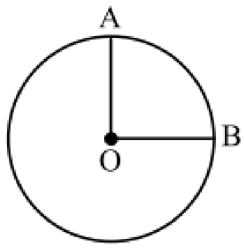
(A) $\frac{8}{\sqrt{3}}$ cm
(B) $\frac{6}{\sqrt{3}}$ cm
(C) 4 cm
(D) 2 cm

Q19 In the figure given, find the $\angle ABC$, if it is known that AB and BC are tangents to the circle



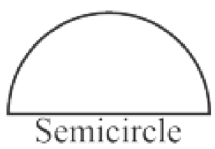
(A) 45°
(B) 65°
(C) 70°
(D) 80°

Q20 OA and OB are perpendicular to each other and O is the center of circle. The diameter of circle is 10 cm. Find the length of AB.



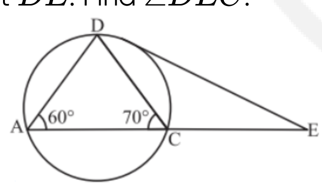
(A) $7 \mathrm{~cm}$
(B) $5 \sqrt{2} \mathrm{~cm}$
(C) $7 \sqrt{2} \mathrm{~cm}$
(D) $5 \mathrm{~cm}$

Q21 Circumference of circle is $88 \mathrm{~cm}$. What is the perimeter of semi circle of this circle?



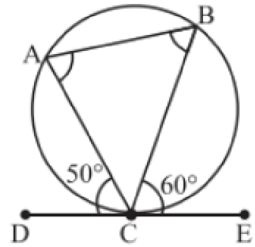
(A) $42 \mathrm{~cm}$
(B) $62 \mathrm{~cm}$
(C) $72 \mathrm{~cm}$
(D) $76 \mathrm{~cm}$

Q22 Side AC of $\triangle ADC$ (as shown) is extended to meet DE. Find $\angle DEC$.



(A) 20°
(B) 15°
(C) 12°
(D) 10°

Q23 DE is a line segment touching circle at $C. \angle ACD=50^{\circ}$ and $\angle BCE=60^{\circ}$. Find $(\angle A-\angle B)$.

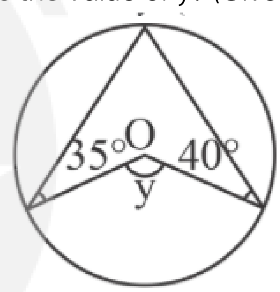


(A) 10°
(B) 20°
(C) 30°
(D) 35°

Q24 Radius of a wheel is $21 \mathrm{~cm}$. Find the number of revolution wheel has to complete to cover the distance of $1.32 \mathrm{~km}$.

(A) 100 (B) 1000
(C) 500 (D) 1500

Q25 What is the value of y? (Given O is the center)

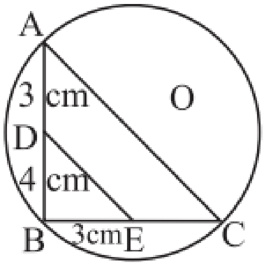


(A) 130°
(B) 140°
(C) 150°
(D) 160°

Q26 Inradius and circumradius of a right angled triangle is $1 \mathrm{~cm}$ and $2.5 \mathrm{~cm}$ respectively. Find the area of this triangle.

(A) $4 \mathrm{~cm}^{2}$
(B) $5 \mathrm{~cm}^{2}$
(C) $5.5 \mathrm{~cm}^{2}$
(D) $6 \mathrm{~cm}^{2}$

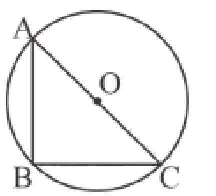
Q27 AC is the diameter of a circle $\mathrm{DB}=4 \mathrm{~cm}, \mathrm{AD}=3 \mathrm{~cm}$ and $\mathrm{BE}=3 \mathrm{~cm}$. What is the approx. radius of circle if $\mathrm{DE} \| \mathrm{AC}$?



(A) $5 \mathrm{~cm}$
(B) 4.375 cm
(C) $6 \mathrm{~cm}$
(D) $7 \mathrm{~cm}$

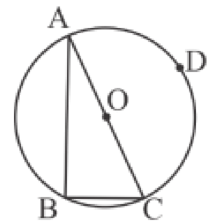
Q28 Wire is used to form an equilateral triangle of side $7 \mathrm{~cm}$. What is the approx. radius of circle formed by using the same wire? (Use $\pi=3.14$)
(A) $3.34 \mathrm{~cm}$
(B) $4.12 \mathrm{~cm}$
(C) $4.68 \mathrm{~cm}$
(D) $5.12 \mathrm{~cm}$

Q29 In the diagram given below, O is the center of circle. $\mathrm{BC}=1 \mathrm{~cm}$ and $\mathrm{AB}=\sqrt{3}$. Find $\angle \mathrm{A}$



(A) 20°
(B) 25°
(C) 30°
(D) 35°

Q30 A triangle ABC is drawn inside a circle (as shown) whose one side pass through the center O of circle. $\mathrm{AB}=12 \mathrm{~cm}$ and $\mathrm{BC}=5 \mathrm{~cm}$. Find the arc length ADC.



(A) $\frac{141}{7} \mathrm{~cm}$
(B) $\frac{143}{7} \mathrm{~cm}$
(C) $\frac{145}{7} \mathrm{~cm}$
(D) $\frac{148}{7} \mathrm{~cm}$

Answer Key

Q1	(C)	Q16	(A)
Q2	(A)	Q17	(C)
Q3	(D)	Q18	(A)
Q4	(B)	Q19	(C)
Q5	(C)	Q20	(B)
Q6	(A)	Q21	(C)
Q7	(B)	Q22	(D)
Q8	(C)	Q23	(A)
Q9	(A)	Q24	(B)
Q10	(A)	Q25	(C)
Q11	(B)	Q26	(D)
Q12	(A)	Q27	(B)
Q13	(C)	Q28	(A)
Q14	(B)	Q29	(C)
Q15	(D)	Q30	(B)

Hints & Solutions

Q1 Text Solution:

As $\angle C = 90^\circ$

We known that, angle inscribed in a semicircle is 90°.

Applying in reverse order, We get that AB is actually diameter of the circle.

So, $AB = (2 \times 5)\text{cm} = 10 \text{ cm}$

Ans:- c

Q2 Text Solution:

Applying central angle theorem,

$$b = 2a$$

And given,

$$a + b = 120^\circ$$

So, $a + 2a = 120^\circ$

Or $a = 40^\circ$

Therefore, $b = 2a = 80^\circ$

Ans:- a

Q3 Text Solution:

We know that,

Inscribed angles subtended by the same arc are equal

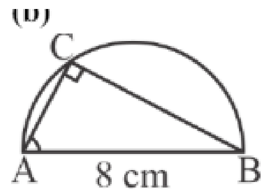
So, $x = y = z$

Now, $x + 3y + 2z = 120^\circ$

$$\Rightarrow y + 3y + 2y = 120^\circ$$
$$\Rightarrow y = 20^\circ$$

Ans.: d

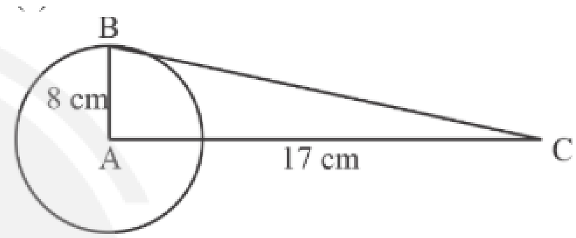
Q4 Text Solution:



As, $\triangle ACB$ is a right - angled triangle

$$\text{So, } \frac{AC}{AB} = \cos 60^\circ$$
$$AC = \left(\frac{1}{2} \times 8\right) \text{cm}$$
$$= 4 \text{ cm}$$

Q5 Text Solution:



We know that, radius from the center of the circle to the point of tangency is perpendicular to the tangent line

So, here $AB \perp BC$

This means, $\triangle ABC$ is a right - angled triangle and $\angle B = 90^\circ$

Applying Pythagoras theorem,

$$BC = \sqrt{17^2 - 8^2} \text{ cm}$$
$$= 15 \text{ cm}$$

Ans:- c

Q6 Text Solution:

As, $AD = 4$ cm and $BC = 7$ cm

Also, $AD + BC - CD = AB$

$\Rightarrow (4 + 7 - CD) = 9$

$Or CD = 2$ cm

Ans:- a

Q7 Text Solution:

Given, $\mathrm{AB} = 2\mathrm{BC}$

So, $\angle\mathrm{AOB} = 2\angle\mathrm{BOC}$

In $\triangle\mathrm{OCB}, \mathrm{OC} = \mathrm{OB}$ (radius)

This means, $\angle\mathrm{OCB} = \angle\mathrm{OBC}$

Or $\angle\mathrm{OBC} = 55^\circ$.

Then, $\angle\mathrm{COB} = [180^\circ - (2 \times 55^\circ)$

$= 70^\circ$

Thus, $\angle\mathrm{AOB} = (70^\circ \times 2)$

$= 140^\circ$

Ans. b

Q8 Text Solution:

Given, O is the center

This means,

$\mathrm{AO} = \mathrm{OB} = \mathrm{OC} = \mathrm{OD}$ (radius)

$\triangle\mathrm{OCD}$ is an isosceles triangle.

So, $\angle\mathrm{OCD} = \angle\mathrm{ODC}$

Then, $\angle\mathrm{COD} = (180^\circ - 40^\circ - 40^\circ)$

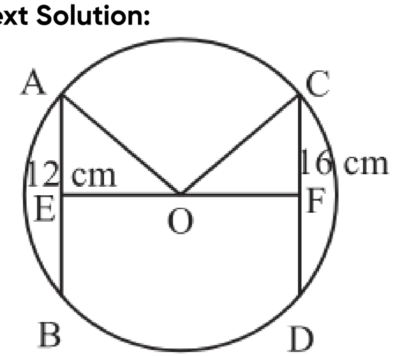
$$= 100^\circ$$

Also, $\angle\mathrm{AOB}$ and $\angle\mathrm{COD}$ are vertically opposite angles.

$$\text{Or } \angle\mathrm{AOB} = \angle\mathrm{COD} = 100^\circ$$

Ans:- c

Q9 Text Solution:



Let O be the center of circle and we draw a line segment EF (as shown) perpendicular to the chords. In $\triangle\mathrm{AEO}$,

$\mathrm{EO} = \sqrt{\mathrm{AO}^2 - \mathrm{AE}^2}$

$= \sqrt{10^2 - \left(\frac{12}{2}\right)^2}\ \mathrm{cm} = 8\ \mathrm{cm}$

and in $\triangle\mathrm{CFO}$,

$\mathrm{OF} = \sqrt{\mathrm{CO}^2 - \mathrm{CF}^2}\ \mathrm{cm}$

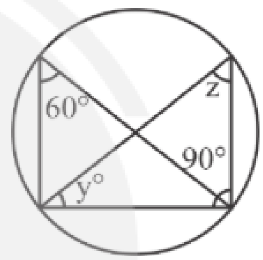
$= 6\ \mathrm{cm}$

Therefore, required length EF

$$= \mathrm{EO} + \mathrm{OF}$$
$$= (8 + 6)\mathrm{cm} = 14\ \mathrm{cm}.$$

Ans. a

Q10 Text Solution:



Let the angle drawn using same arc be z

Then, $\mathrm{z} = 60^\circ$

(Because angle subtended by same arc at the circumference are equal)

In the triangle containing angle y and z

$$y + z + 90^\circ = 180^\circ$$
$$\Rightarrow y + 60^\circ + 90^\circ = 180^\circ$$

y + 150 = 180

y = 30°

Q11 Text Solution:

Longest possible chord of a circle is nothing but the diameter of circle.

So, $CD = (2 \times 6)\mathrm{cm} = 12\ \mathrm{cm}$

thus, $(CD - AB) = (12 - 7)\mathrm{cm} = 5\ \mathrm{cm}$

Ans. b

Q12 Text Solution:

As, $\mathrm{OB} = \mathrm{OC}$ (radius)
So, $\angle \mathrm{OCB} = \angle \mathrm{OBC}$
Then, $\angle \mathrm{CBO} = \frac{180^\circ - 70^\circ}{2}$

$$= 55^\circ$$

$$\angle \mathrm{COA} = (180^\circ - 70^\circ) = 110^\circ$$

Now, $\angle \mathrm{OAC}$

$$= \frac{180^\circ - 110^\circ}{2}$$
$$= 35^\circ$$

Thus, $(\angle \mathrm{B} + \angle \mathrm{A}) = (55^\circ + 35^\circ)$

$$= 90^\circ.$$

Ans. a

Q13 Text Solution:

Angle made by two chords connecting the diameter $= 90^\circ$
So, $\triangle \mathrm{PSQ}$ is a right angled triangle and as
$\mathrm{SR} \perp \mathrm{PQ}$
As, $\frac{PR}{SR} = \frac{SR}{RQ}$

$$\text{Or} \quad \mathrm{SR}^2 = (\mathrm{PR} \times \mathrm{RQ})$$
$$= \sqrt{(6-2) \times 8} \text{ cm}$$
$$= \sqrt{32} \text{ cm}$$
$$= 4\sqrt{2} \text{ cm}$$

Ans.c

Q14 Text Solution:

In a circle if two chords are perpendicular to each other, then here

$$\mathrm{AE} \times \mathrm{EB} = \mathrm{EC} \times \mathrm{DE}$$

or $6 \times 6 = 4 \times \mathrm{DE}$
or

$$\mathrm{DE} = \frac{36}{4} = 9 \text{ cm}$$

Ans. b

Q15 Text Solution:

Length (Arc AB)

$$= \left(\frac{25^\circ}{360^\circ} \times 44\right) \text{cm}$$
$$\approx 3.052 \text{ cm}$$

So, length $(\text{Arc } ACB) = (44 - 3.05)$

$$= 40.95 \text{ cm}$$

Ans. d

Q16 Text Solution:

Using alternate segment theorem,

$$\angle \mathrm{BCE} = \angle \mathrm{BAC}$$
$$= 40^\circ$$

Ans. a

Q17 Text Solution:

As, AB is the diameter,
So, chords AC and BC meet at 90° on the circumference of circle
This means,
$\triangle \mathrm{ACB}$ is a right angled triangle
Applying Pythagoras theorem

$$\mathrm{AC} = \sqrt{(16)^2 - 8^2}$$
$$= 15$$

Ans. (c)

Q18 Text Solution:

Product of all three

$$\text{Circumradius} = \frac{\text{sides of a triangle}}{4\times \text{ Area of triangle}}$$

$$\Rightarrow \quad \mathrm{R}(\text{ say }) = \frac{(8\times 8\times 8)}{4\times \frac{\sqrt{3}}{4}\times (8)^2}$$

$$= \frac{(2\times 8\times 8)}{\left(\frac{\sqrt{3}}{4}\times 64\right)}\mathrm{cm}$$
$$= \left(2\times \frac{4}{\sqrt{3}}\right)\mathrm{cm}$$
$$= \frac{8}{\sqrt{3}}\mathrm{~cm}$$

Thus, radius of circle $= \frac{8}{\sqrt{3}}\mathrm{~cm}$

Ans. a

Q19 Text Solution:

As point A and C is on the circumference of circle.

So, radius $\mathrm{OA}\perp$ tangent AB

and also radius $\mathrm{OC}\perp$ tangent BC

So, $\angle\mathrm{ABC} = [360^\circ - (90^\circ + 90^\circ + 110^\circ)]$

$$= 70^\circ$$

Ans. c

Q20 Text Solution:

Point A and B is on the circumference of circle

This means OA and OB are the radius of circle

$$\mathrm{OA} = \mathrm{OB} = \frac{10}{2}\mathrm{~cm} = 5\mathrm{~cm}$$

Also, $\mathrm{OA}\perp\mathrm{OB}$

Applying Pythagoras Theorem,

$$\mathrm{AB} = \sqrt{5^2+5^2}\mathrm{~cm}$$
$$= \sqrt{50}\mathrm{~cm}$$
$$= 5\sqrt{2}\mathrm{~cm}$$

Ans. b

Q21 Text Solution:

$$\text{Radius of circle} = \frac{88}{2\times\pi}\mathrm{cm}$$
$$= \left(44\times\frac{7}{22}\right)\mathrm{cm}$$
$$= 14\mathrm{~cm}$$

So, perimeter of

$$\text{f semi circle} = \left[(14\times 2) + \tfrac{88}{2}\right]\mathrm{cm}$$
$$= (28+44)\mathrm{cm}$$
$$= 72\mathrm{~cm}$$

Ans. (c)

Q22 Text Solution:

Using alternate segment theorem,

$$\angle\mathrm{EDC} = \angle\mathrm{DAC}$$

or $\angle\mathrm{EDC} = 60^\circ$

Also, $\angle\mathrm{ADC} = [180^\circ - (60^\circ + 70^\circ)]$

$$= 50^\circ$$

Now, in $\triangle\mathrm{EDC}$,

$$\angle\mathrm{DEC} = [180^\circ - (60^\circ + 50^\circ + 60^\circ)]$$
$$= 10^\circ$$

Ans (d)

Q23 Text Solution:

According to the alternate segment theorem,

$$\angle A = 60^\circ$$
$$\text{and } \angle B = 50^\circ$$
$$\text{So, } \angle A - \angle B = 10^\circ$$
$$\text{Ans (a)}$$

Q24 Text Solution:

Circumference of wheel

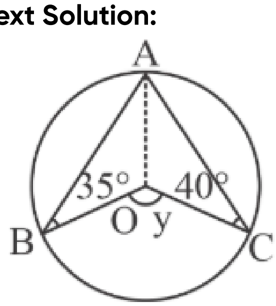
$$= (2 \times \pi \times 21)\text{cm}$$
$$= 132 \text{ cm}$$

So, Number of revolutions

$$= \frac{(1.32 \times 1000 \times 100)\text{cm}}{132 \text{ cm}}$$
$$= \frac{1320 \times 100}{132}$$
$$= 1000$$

Ans. (b)

Q25 Text Solution:



Let's name them as shown and connect A and O. Then, $\angle\text{OAB} = 35^\circ(\text{Because} \text{OB} = \text{OA})$ And $\angle\text{OAC} = 40^\circ(\text{Because} \text{AO} = \text{OC})$ Now, Applying central angle theoram,

$$\text{y} = 2\angle\text{A}$$
$$= 2\left(35^\circ + 40^\circ\right)$$
$$= 150^\circ$$

Ans. (c)

Q26 Text Solution:

Area of right angled triangle

$$= \text{Inradius (Inradius } + 2 \times \text{Circumradius)}$$
$$= 1(1 + 2 \times 2.5)\text{cm}^2$$
$$= 6 \text{ cm}^2$$

Ans. (d)

Q27 Text Solution:

$\text{DE} \| \text{AC}$ and AC is the diameter Also, $\text{AB} \perp \text{BC}$ (Diameter AC)

$$\frac{\text{DB}}{\text{BE}} = \frac{\text{AB}}{\text{BC}}(\because \text{DE} \| \text{BC})$$
$$\text{or } \frac{4}{3} = \frac{4+3}{\text{BC}}$$
$$\text{or BC} = \frac{21}{4} \text{ cm.}$$

AC = $\sqrt{49 + \frac{441}{16}}$

$$= \sqrt{\frac{1225}{16}}$$
$$= \frac{35}{4}$$
$$Therefore,\ AC/2 \text{ } or\ radius = \frac{35}{8}$$
$$= 4.375\ cm$$

Q28 Text Solution:

Total length of wire $= (7 \times 3)\text{cm}$

$$= 21 \text{ cm}$$

Circumference of circle $= 21 \text{ cm}$ or $2 \times \pi \times$ Radius $= 21 \text{ cm}$

$$\text{or Radius } = \frac{21}{2\pi}$$
$$\approx 3.34 \text{ cm}$$

Ans. (a)

Q29 Text Solution:

Angle formed by the two chords whose one end point meet the diameter $= 90^\circ$

$$\text{or } \angle \mathrm{B} = 90^\circ$$

So, $\triangle \mathrm{ABC}$ is a right angled triangle

Now, $\frac{\mathrm{CB}}{\mathrm{AB}} = \tan \mathrm{A}$

Or $\frac{1}{\sqrt{3}} = \tan \mathrm{A}$

So, $\angle \mathrm{A} = 30^\circ$

Ans. (c)

Q30 Text Solution:

We know that angle inscribed in a semicircle is 90° or $\angle \mathrm{B} = 90^\circ$

Applying Pythagoras Theorem

$$\mathrm{AC} = \sqrt{12^2 + 5^2} \text{ cm}$$
$$= 13 \text{ cm}$$

So, Length of arc ADC

$$= \pi \times \text{ radius}$$
$$= \left(\frac{22}{7} \times \frac{13}{2}\right) \text{ cm}$$
$$= \frac{143}{7} \text{ cm}$$

Ans. b