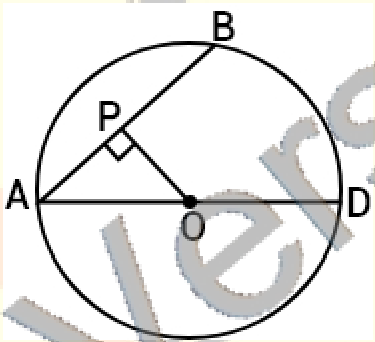
Exercise No. 10.1

Multiple Choice Questions:

1. AD is a diameter of a circle and AB is a chord. If AD = 34 cm, AB = 30 cm, the distance of AB from the centre of the circle is:
(A) 17 cm
(B) 15 cm
(C) 4 cm
(D) 8 cm

Solution:
Construction: Draw OP $\perp$ AB.



As perpendicular from the center to a chord bisect. So,

$$AP = \frac{1}{2} \times AB = \frac{1}{2} \times 30 = 15\text{cm}$$

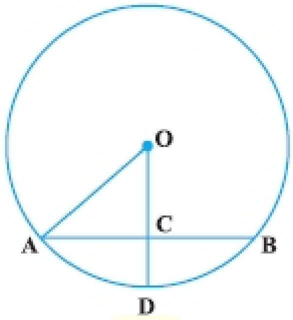
$$\text{Radius} = OA = \frac{1}{2} \times 34 = 17\text{cm}$$

Now, in right triangle OPA,

$$\begin{aligned} OP &= \sqrt{OA^2 - AP^2} \\ &= \sqrt{(17)^2 - (15)^2} \\ &= \sqrt{289 - 225} \\ &= \sqrt{64} \\ &= 8\text{cm} \end{aligned}$$

Hence, the correct option is (D).

2. In Fig., if OA = 5 cm, AB = 8 cm and OD is perpendicular to AB, then CD is equal to:



(A) 2 cm
(B) 3 cm
(C) 4 cm
(D) 5 cm

Solution:
As the perpendicular from the centre of a circle to a chord bisects the chord.
AC = CB = $\frac{1}{2}$ x AB = $\frac{1}{2}$ x 8 = 4 cm
Given OA = 5 cm
$AO^2 = AC^2 + OC^2$
$(5)^2 = (4)^2 + OC^2$
$25 = 16 + OC^2$
$OC^2 = 25 - 16$
$= 9$
So, OC = 3 cm [Length is always positive]
OA = OD [same radius of a circle]
OD = 5 cm
CD = OD – OC
= 5 – 3
= 2 cm
Hence, the correct option is (A).

3. If AB = 12 cm, BC = 16 cm and AB is perpendicular to BC, then the radius of the circle passing through the points A, B and C is :
(A) 6 cm
(B) 8 cm
(C) 10 cm
(D) 12 cm

Solution:
Given in the question, AB = 12 cm and BC = 16 cm.
In a circle, $BC \perp AB$. So, that means AC will be a diameter of circle.

Now, by using Pythagoras theorem in right angled triangle ABC.

$AC^2 = AB^2 + BC^2$

$AC^2 = (12)^2 + (16)^2$

$AC^2 = 144 + 256$

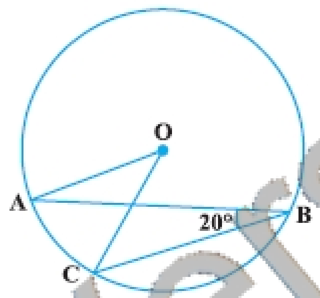
$AC^2 = 400$

$AC = 20\text{cm}$

So, radius of circle = $\frac{1}{2} \times AC = \frac{1}{2} \times 20 = 10\text{cm}$.

Therefore, the radius of circle is 10cm.
Hence, the correct option is (C).

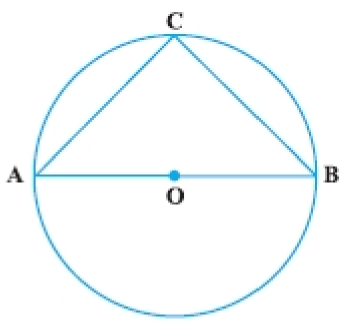
4. In Fig., if ∠ABC = 20º, then ∠AOC is equal to:



(A) 20º
(B) 40º
(C) 60º
(D) 10º

Solution:
Given: $\angle ABC = 20°$
As angle subtended at the centre by an arc is twice the angle subtended by it at the remaining part of circle. So,
$\angle AOC = 2\angle ABC = 2 \times 20° = 40°$.
Hence, the correct option is (B).

5. In Fig., if AOB is a diameter of the circle and AC = BC, then ∠CAB is equal to:



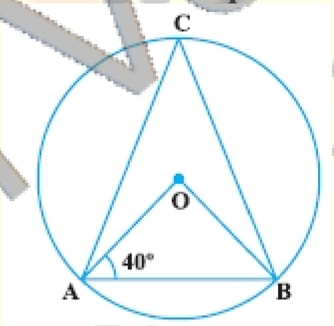
(A) 30º

(B) 60º
(C) 90º
(D) 45º

Solution:
Given: AOB is a diameter of the circle and AC = BC.
So, $\angle C = 90°$ [Angle on the semicircle is $90°$]
Now, AC = BC
So, $\angle A = \angle B$ [Angles opposite to equal sides of triangle are equal]

Now, by using the sum property of a triangle,
$\angle A + \angle B + \angle C = 180°$
$2\angle A + 90° = 180°$
$2\angle A = 180° - 90°$
$2\angle A = 90°$
$\angle A = \frac{90°}{2}$
$\angle A = 45°$
Hence, the correct option is (D).

6. In Fig., if ∠OAB = 40º, then ∠ACB is equal to:



(A) 50º
(B) 40º
(C) 60º
(D) 70°

Solution:
Given: ∠OAB = 40º

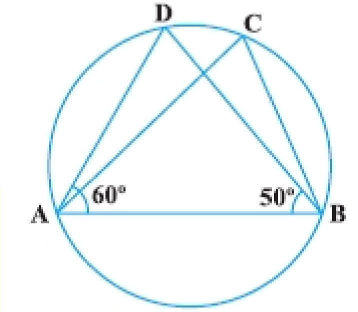
Now, in triangle OAB,
OA = OB [Radii of circle]
So, $\angle OAB = \angle OBA = 40°$ [Angle opposite to equal sides are equal]
So,
$\angle AOB = 180° - (40° + 40°)$
$= 100°$

As we know that angle subtended by an arc of a circle at the center is double the angle subtended by it at any point on the remaining part of the circle. So,

$\angle ACB = \frac{1}{2}\angle AOB = \frac{1}{2}\times 100° = 50°$

Hence, the correct option is (A).

7. In Fig., if ∠DAB = 60º, ∠ABD = 50º, then ∠ACB is equal to:



(A) 60º
(B) 50º
(C) 70º
(D) 80º

Solution:

In triangle ABC,

$\angle A + \angle B + \angle D = 180°$ [Angle sum property of a triangle]

$60° + 50° + \angle D = 180°$

$\angle D = 180° - 110°$

$\angle D = 70°$

That is $\angle ABD = 70°$

Now, $\angle ACB = \angle ADB = 70°$ [Angle in the same segment of a circle are equal]

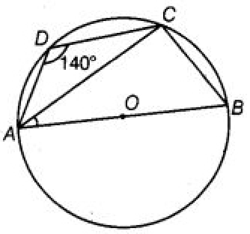
Hence, the correct option is (C).

8. ABCD is a cyclic quadrilateral such that AB is a diameter of the circle circumscribing it and
∠ADC = 140º, then ∠BAC is equal to:
(A) 80º
(B) 50º
(C) 40º
(D) 30º

Solution:

Given: ABCD is a cyclic quadrilateral such that AB is a diameter of the circle circumscribing it and ∠ADC = 140º.

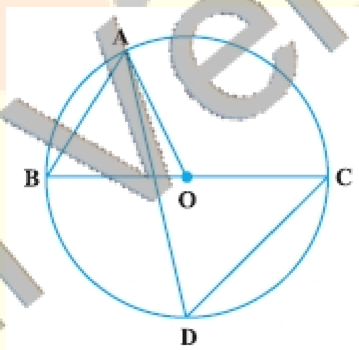
Construction: Join AC.



See in the figure,
$\angle ADC + \angle ABC = 180°$ [Given]
$140° + \angle ABC = 180°$
So, $\angle ABC = 180° - 140° = 40°$
Now, $\angle C = 90°$ [Angle in semicircle is a right angle]

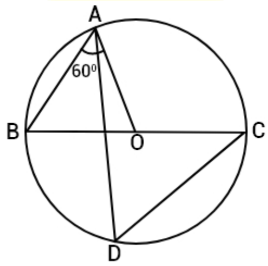
In triangle ABC,
$\angle BAC = 180° - (90° + 40°)$
$= 50°$
Hence, the correct option is (B).

9. In Fig., BC is a diameter of the circle and ∠BAO = 60º. Then ∠ADC is equal to:



(A) 30º
(B) 45º
(C) 60º
(D) 120º

Solution:
Given: BC is a diameter of the circle and ∠BAO = 60º.

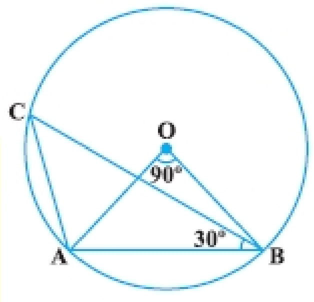


Now, in triangle OAB,
OA = OB [Radii of the same circle]
So, $\angle ABO = \angle BAO$ [Angle opposite to equal sides are equal]

$\angle ABO = \angle BAO = 60°$ [Given]

Now, $\angle ADC = \angle ABC = 60°$ [$\angle ADC$ and $\angle ABC$ are angles in the same segment of a circle are equal]
Therefore, $\angle ADC = 60°$.
Hence, the correct option is (C).

10. In Fig. 10.9, ∠AOB = 90º and ∠ABC = 30º, then ∠CAO is equal to:



(A) 30º
(B) 45º
(C) 90º
(D) 60º

Solution:
In triangle OAB,
OA = OB [Radii of the same circle]
So, $\angle OAB = \angle OBA$

Now, in triangle OAB,
$\angle OAB + \angle OBA + \angle AOB = 180°$
So,
$2\angle OAB = 180° - \angle AOB$
$= (180° - 90°)$
$= 90°$ [Sum of angle of triangle is $180°$]
So, $\angle OAB = \frac{1}{2} \times 90° = 45°$

Also, $\angle ACB = \frac{1}{2}\angle AOB = \frac{1}{2} \times 90° = 45°$

Now, in triangle CAB,
$\angle CAB = 180° - (\angle ABC + \angle ACB)$
$= 180° - (30° + 45°) = 105°$

Now, $\angle CAO = \angle CAB - \angle OAB$
$\angle CAO = 105° - 45°$
Hence, the correct option is (D).