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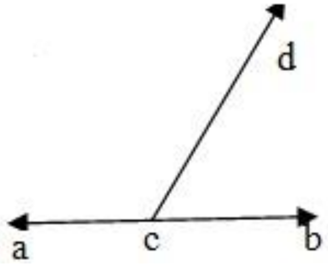
GEOMETRY

Introduction

- Geometry is a subject in mathematics that focuses on the study of shapes, sizes, relative configurations, and spatial properties.
- It is one of the oldest branches of mathematics, having arisen in response to such practical problems as those found in surveying.
- Geometry will guide you through points, lines, planes, angles, parallel lines, triangles, similarity, trigonometry, quadrilaterals, transformations, circles and area.

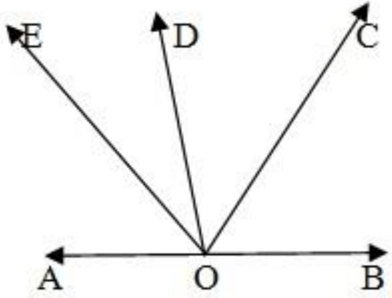
Important results:

1.If a ray stands on a line , than the sum of two adjacent angle so formed is 180° In the given figure , ray CP stands on line AB.∠ACD + ∠BCD = 180°.



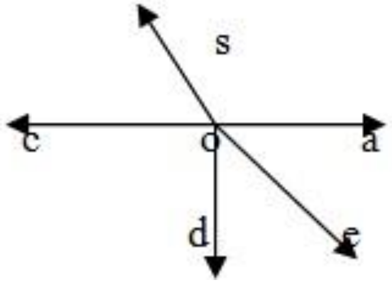
2. The sum of all angle formed on the same side of a line at a given point on the line is 180°. In the given figure four angle are formed on the same side of AOB.

∠AOE + ∠EOD + ∠DOC + ∠COD = 180°.



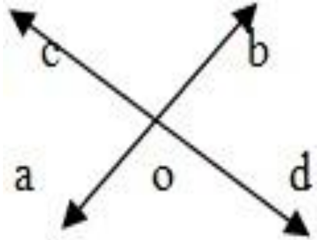
Important results:

3.The sum of all angle around a point is 360° In the given figure five angle are formed around a point O.



$\angle AOB + \angle BOC + \angle COD + \angle DOE + \angle EOA = 360°$.

4. If two lines A Band CD intersect at a point O, then AOC , BOD and BOC , AOD are two pair of vertically opposites angle Vertically opposite angle are always equal.



$\angle AOC = \angle BOD$ and $\angle AOD = \angle BOC$

Important results:

Traversal line cutting parallel lines:

1. Let two parallel lines AB and CD be cut by a transversal EF. Then Corresponding angle are equal.

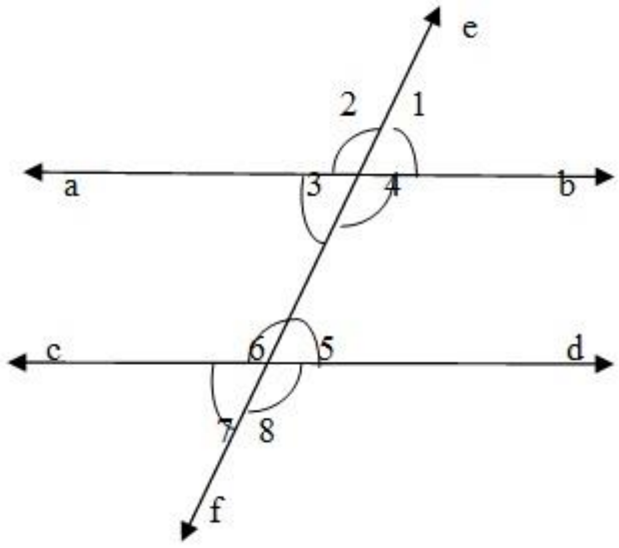
$\angle 1 = \angle 5$, $\angle 2 = \angle 6$, $\angle 3 = \angle 7$, $\angle 4 = \angle 8$.

2. Alternate interior angles are equal.

$\angle 3 = \angle 5$, $\angle 4 = \angle 6$

3. Consective interior angles are supplementary

$\angle 4 + \angle 5 = 180°$, $\angle 3 + \angle 6 = 180°$.

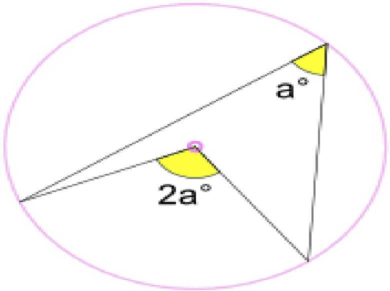


Important results:

1. Inscribed Angle Theorems

Angle at the Center Theorem:

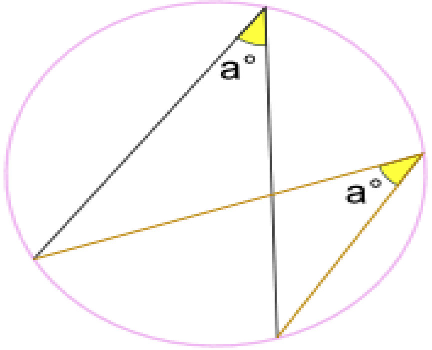
An inscribed angle a° is half of the central angle 2a°



2. Angles Subtended by Same Arc Theorem:

The angle a° is always the same,

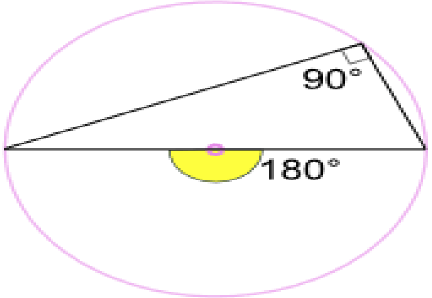
no matter where it is on the same arc between end points



Important results:

Angle at the Center Theorem:

An angle inscribed across a circle's diameter is always a right angle:

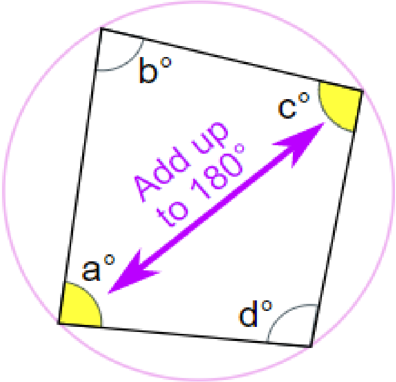


Cyclic Quadrilateral:

A Cyclic Quadrilateral's opposite angles add to 180°:

$a + c = 180°$

$b + d = 180°$



Question 01:

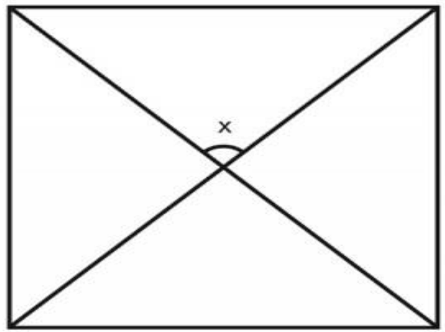
What is measurement of the indicated angle assuming the figure is a square?

A. 45º

B. 90º

C. 60º

D. 30º



Answer: B

Explanation:

B

The diagonals of a square intersect perpendicularly with each other so each angle measures 90^o

$x = 90^o$

Question 02:

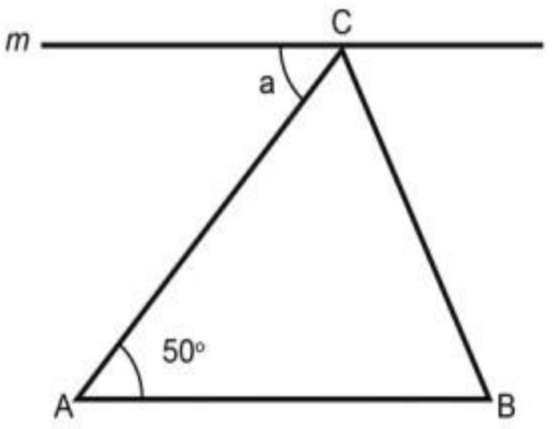
If the line m is parallel to the side AB of ?ABC, what is angle a?

A. 125^o

B. 25^o

C. 65^o

D. 50^o



Answer: D

Explanation:

D

Two parallel lines(*m* & side AB) intersected by side AC

a= 50^{o} (interior angles)

Question 03:

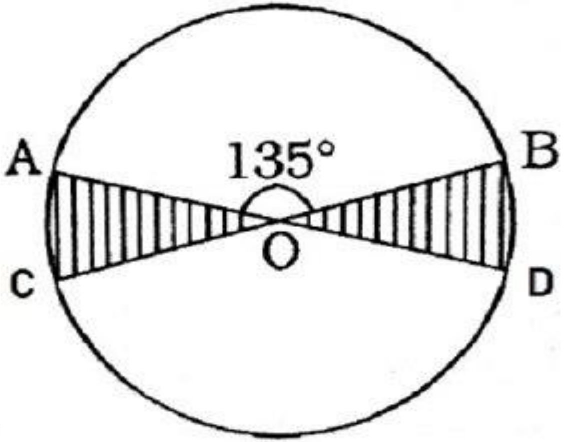
Consider the circle shown below having angle AOB as 135º and the shaded portion is the x part of the circular region. Calculate the value of x.

A. 1/12

B. 1/9

C. 1/6

D. 1/4



Answer: D

Explanation:

1/4

Explanation:

$\angle AOC = 180^o - 135^o = 45$

$\angle AOC = \angle BOD = 45^o$

Shaded part is xth part of circular region.

$\therefore x = 90/360$

$= 1/4$

Therefore, value of x is 1/4.

Question 04:

AB and CD are two parallel chords on the opposite sides of the center of the circle. If AB = 10 cm, CD = 24 cm and the radius of the circle is 13 cm, the distance between the chords is

A. 16cm

B. 18cm

C. 15cm

D. 17cm

Answer: D

Explanation:

Explanation:

From O, draw OL perpendicular to AB and OM perpendicular to CD.

Then, join OA and OC.

AL = (1/2)AB = (1/2)10;AL = 5 cm

OA = radius of the circle = 13 cm

From Δ OAL, $(OL)^2 = (OA)^2 - (AL)^2$

$= (13)^2 - (5)^2 = 169 - 25$

$(OL)^2 = 144$;OL = 12 cm

Then, CM = (1/2)*CD = (1/2)*24 = 12 cm

And OC = radius of the circle = 13 cm

From Δ OMC, $(OM)^2 = (OC)^2 - (CM)^2$

$= (13)^2 - (12)^2 = 169 – 144$;$(OM)^2 = 25$;OM = 5 cm

Therefore, distance between the chords, ML = OM + OL

ML = 5+ 12

ML = 17 cm.

Question 05:

In a triangle ABC, a circle which touches the edges of all three sides is called

A. In circle

B. Circumcircle

C. Out circle

D. Edge circle

Answer: A

Question 09:

In a triangle a circle passes through the vertices of the triangle, then the circle is called as

A. In circle

B. Circumcircle

C. Out circle

D. Edge circle

Answer: B

Question 06:

Which of the following is a Pythagorean triplet ?

A. 11 , 40 , 21

B. 3,4,8

C. 25,24,7

D. 26,25,31

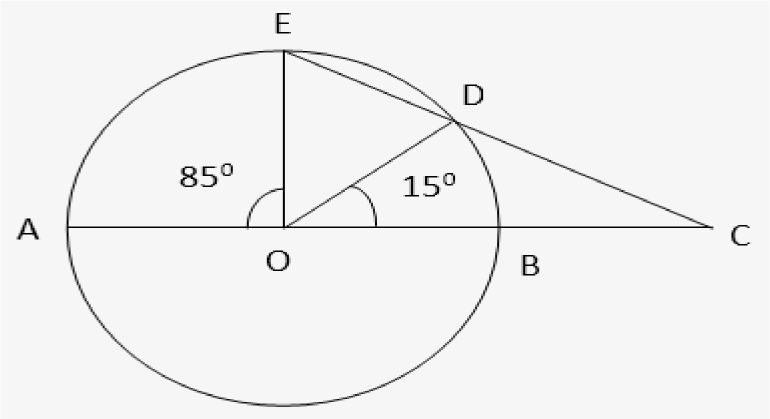
Answer: C

Explanation:

$24^2=576$
$7^2=49$
$576+49 = 625$
Sq.root of 25

Question 07:

In the given figure, AB is the diameter of the circle with center O. If ∠BOD = 15° & ∠EOA = 85°, then find the value of ∠ECA.



A. 45°

B. 25°

C. 30°

D. 35°

Answer: D

Explanation:

Answer : Option D

$\angle EOA = 85°$, $\angle BOD = 15°$

$\angle EOD = 180° - (85° + 15°) = 80°$

In Δ OED, OE = OD (radii)

$\angle OED = \angle ODE = 50°$

In Δ OEC, $\angle EOC = 80° + 15°$

$= 95° + \angle OEC = 50°$

$\Rightarrow \angle ECA = 180° - (95 + 50°) = 35°$

Question 08:

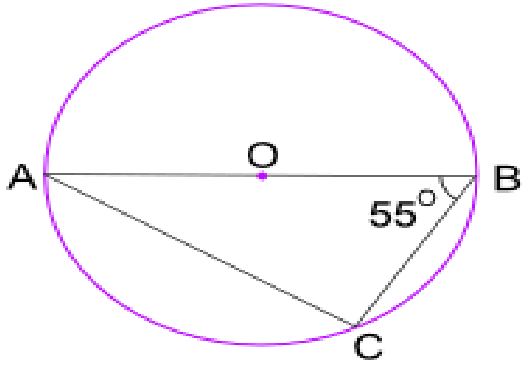
What is the size of Angle BAC?

A. 45^o

B. 35^o

C. 60^o

D. 30^o



Answer: B

Explanation:

The Angle in the Semicircle Theorem tells us that Angle ACB = 90°
Now use angles of a triangle add to 180° to find Angle BAC:
Angle BAC + 55° + 90° = 180°
Angle BAC = 35°

Question 09:

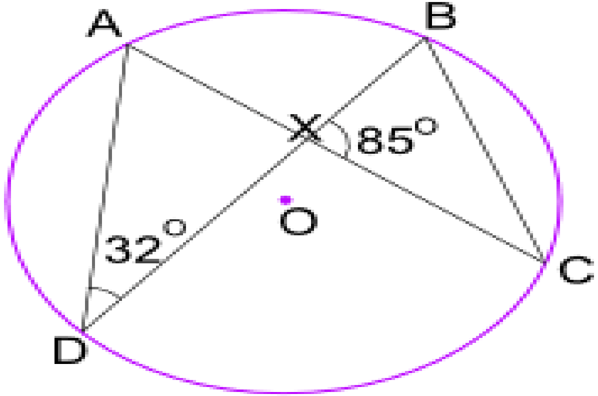
What is the size of Angle CBX?

A. 45º

B. 90º

C. 60º

D. 30º



Answer: C

Explanation:

Angle ADB = 32° also equals Angle ACB.
And Angle ACB also equals Angle XCB.
So in triangle BXC we know Angle BXC = 85°, and Angle XCB = 32°

Now use angles of a triangle add to 180° :
Angle CBX + Angle BXC + Angle XCB = 180°
Angle CBX + 85° + 32° = 180°
Angle CBX = 63°

Question 10:

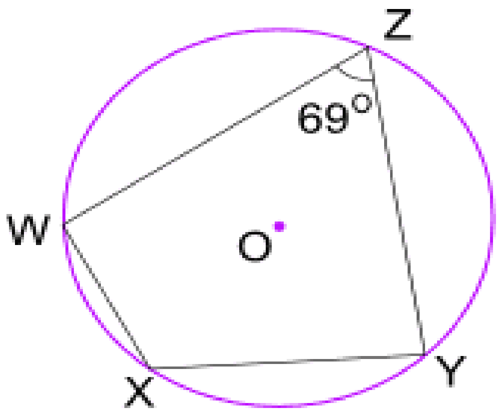
What is the size of Angle WXY?

A. 96º

B. 291º

C. 21º

D. 111º



Answer: D

Explanation:

Opposite angles of a cyclic quadrilateral add to 180°

Angle WZY + Angle WXY = 180°

69° + Angle WXY = 180°

Angle WXY = 111°