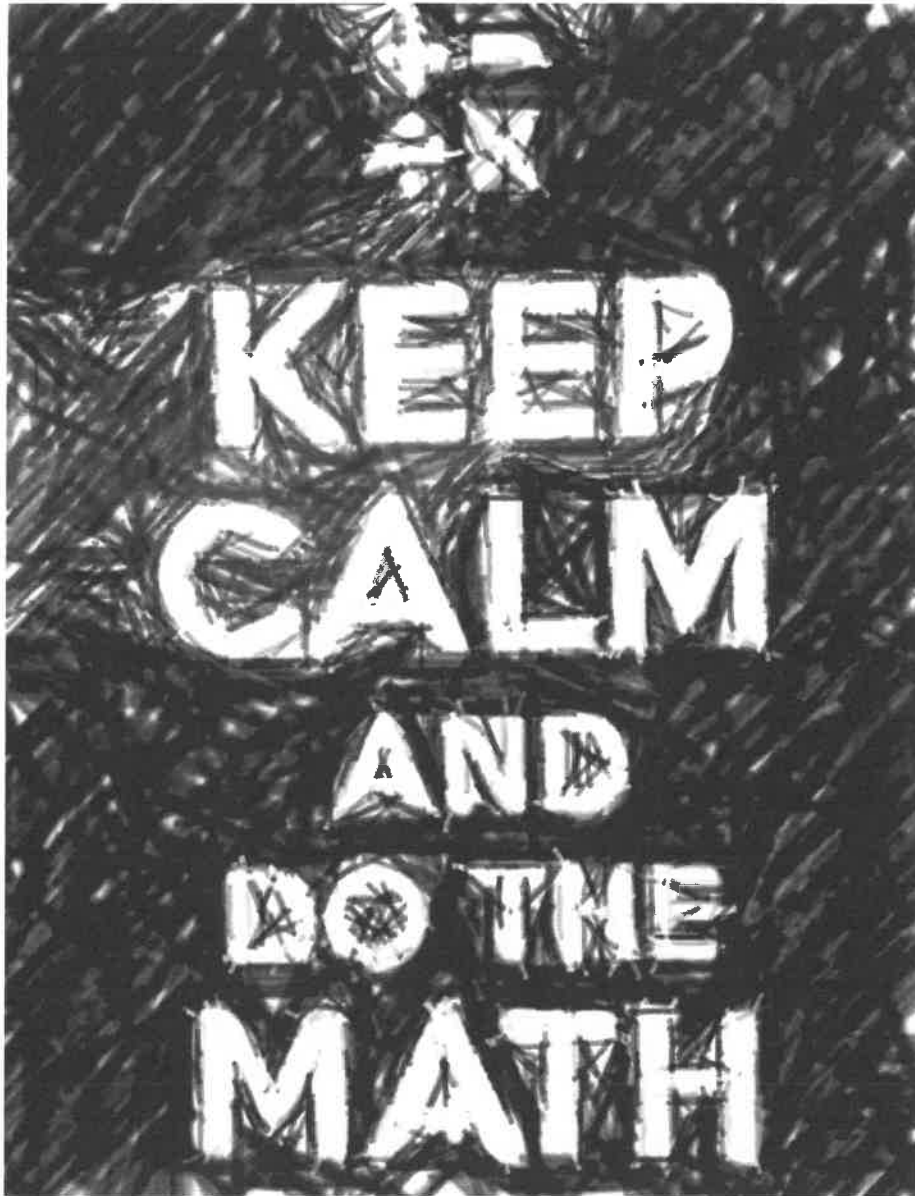


NAME: _____

Math P.A.T. Prep

Circle Geometry - SOLUTIONS



St. Brendan School
Mr. Martínez

CIRCLE Geometry

• Every P.A.T.

↳ ✓ INSCRIBED / central angle problem
↳ ✓ PROBLEM INVOLVING A CHORD

INSCRIBED / Central angle → MUST come from same minor arch.

• Remember :



→ 360°

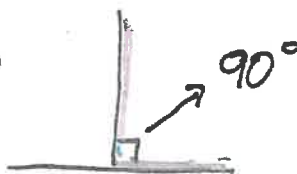


→ 180°

Also:

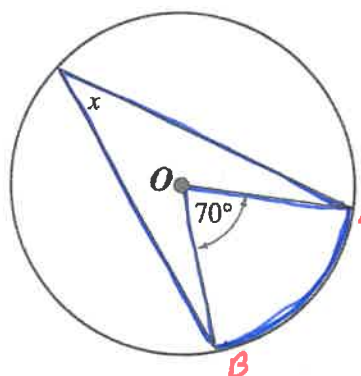
• Isosceles triangles → 2 equal sides → 2 equal angles

• Equilateral triangles → 3 equal sides → 3 equal angles



Strategy tip:

• The Radius is always involved, and you most likely will have an Isosceles triangle by 2-radii



• Central angle is bigger

$\angle AOB = 70^\circ$

$\angle A \times B = 70 \times 2 = 140^\circ$

Numerical Response

5. If O is the centre of the circle, the measure of x is 140°.

they are Related by same small arc

"same parents"

Point O in the diagram below represents the centre of the circle. (numerical-response section on the answer sheet.)

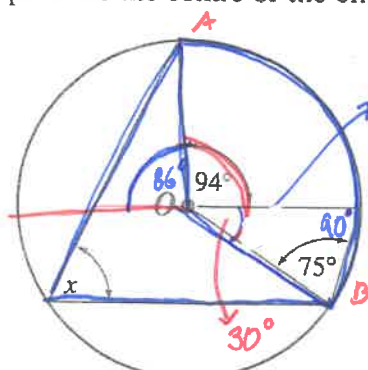
27. The value of angle x is

~~A.~~ 47°

B. 62°

75°

~~C.~~ 90° can't be



$\angle AOB = 124^\circ$ $\angle A \times B = \frac{124^\circ}{2}$

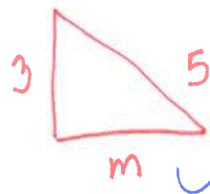
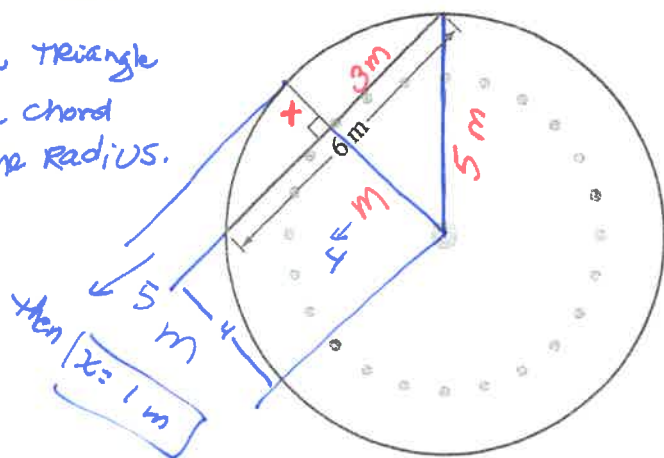
Since $\angle AOB$ and $\angle A \times B$ are subtended by same minor arc, they are Related!

• If we find $\angle AOB$, we find x

Half of 94 is 47° → so x has to be bigger than 47° since

A diagram of a swimming pool is shown below. The dotted circle represents floating buoys. The pool has a diameter of 10 metres. → radius 5

• Make a triangle using the chord and the radius.

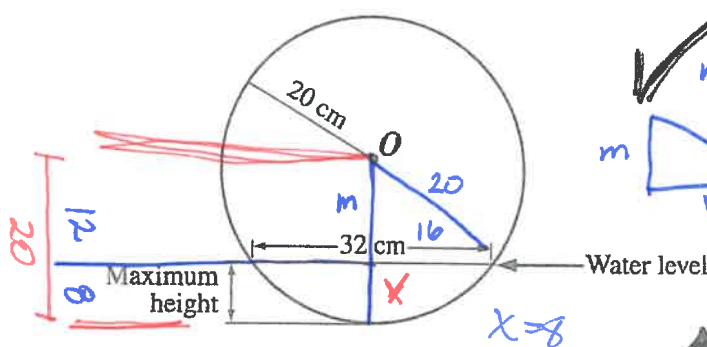


$$m = \sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$$

6. The shortest distance from the buoys to the edge of the pool is (X)

- A. 1 m
- B. 2 m
- C. 3 m
- D. 4 m

The diagram below shows a circular pipe that has O as its centre. The radius of the pipe is 20 cm.



$$m = \sqrt{20^2 - 16^2} = \sqrt{400 - 256} = \sqrt{144} = 12$$

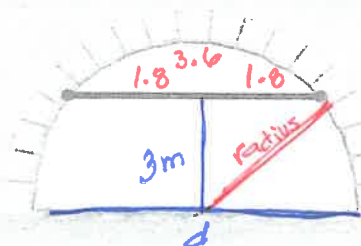
Numerical Response

2. The maximum depth of the water in the pipe is 8 cm.

The arch in the diagram below forms a complete half-circle. The black support beam in the diagram is 3.6 m in length and is 3.0 m above the surface of the water.

Since you have to find the diameter

• Draw a bisector
• Draw the triangle



If the radius is 3.5, Then the diameter = 3.5 x 2 = 7

8. To the nearest tenth of a metre, the diameter of the arch is

• If you find the radius, you find the diameter

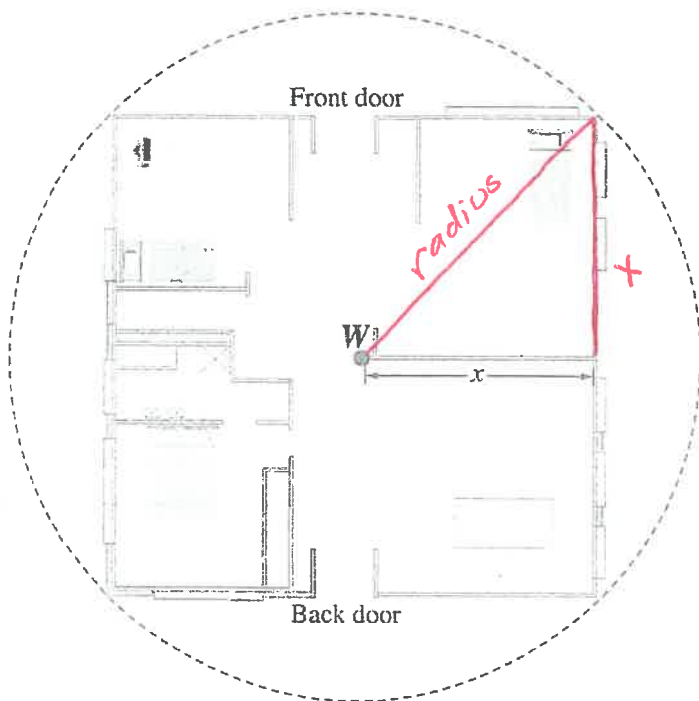
$$\begin{aligned} \text{radius} &= \sqrt{(3)^2 + (1.8)^2} \\ &= \sqrt{9 + 3.24} \\ &= \sqrt{12.24} \\ \text{radius} &= 3.50 \end{aligned}$$

- A. 3.5 m
- B. 4.7 m
- C. 7.0 m
- D. 9.4 m

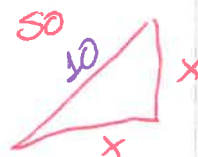
Too small

Note: The diagram shown above has not been drawn to scale.

The letter W is in the centre of the diagram below and represents the location of a wireless router for Internet access in a square house. The router provides access to the area represented by the dotted circle in the diagram below. This circular area has a diameter of 20 m.



Radius = 10 m



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

$$100 = 2x^2$$

$$x^2 = \frac{100}{2} \Rightarrow x = \sqrt{50}$$

$$x = 7.1 \text{ m}$$

1. To the nearest tenth of a metre, the distance, x , from the router, W, to the middle of one outside wall is

- A. 7.1 m
- B. 8.9 m
- C. 10.0 m
- D. 14.1 m

Strategy

- always make a triangle with:
- Radius
- half of the chord

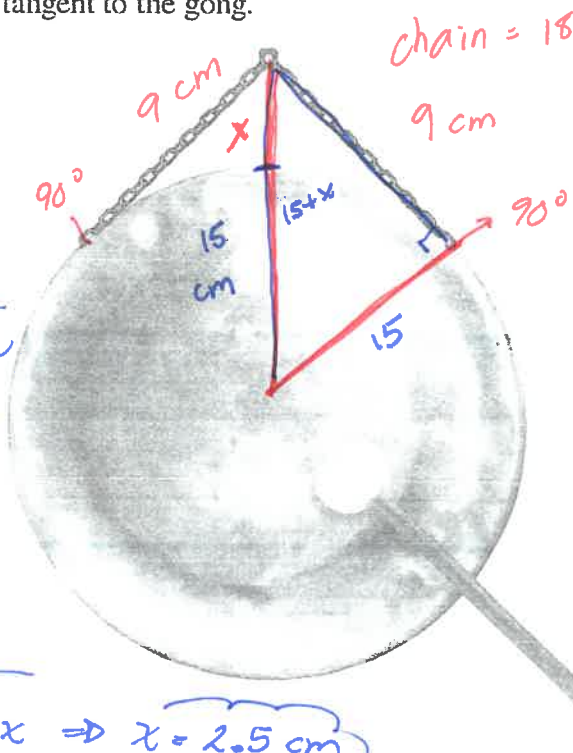
So

• notice that the hypotenuse is the radius + x

$$\begin{aligned} \text{hypotenuse} &= \sqrt{9^2 + 15^2} \\ &= \sqrt{81 + 225} \\ &= \sqrt{306} \\ &\approx 17.50 \end{aligned}$$

$$17.50 = 15 \text{ cm} + x \Rightarrow x = 2.5 \text{ cm}$$

The gong shown below is 30 cm in diameter and hangs by a chain from a nail. The total length of the chain is 18 cm. The lengths of chain on each side of the nail are equal and form a tangent to the gong.



Strategy

- Angle at Tangent is 90°

- A. 2.3 cm
- B. 2.5 cm
- C. 12.0 cm
- D. 17.5 cm

10. How far above the top of the gong is the nail, to the nearest tenth of a centimetre?

CHORDS IN a Circle . Safe bet: you'll get one Problem involving CHORDS

So, follow this:

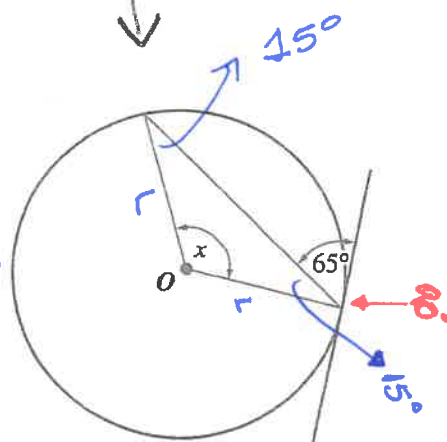
- 1.) Determine the Radius
- 2.) Draw a Radius from center to edge of CHORD.
this will be your hypotenuse.
- 3.) ask yourself: • which 2 measurements do I have?
• What you need to find has to do with the one length you do not have!

26. If the line shown ~~as~~ is a tangent to the circle, then the measure of angle x is

- A. 110°
- B. 115°
- C. 130°
- D. 155°

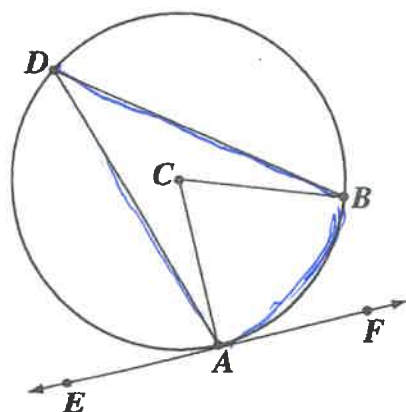
$$x = 180^\circ - (15^\circ + 15^\circ)$$

• Since this triangle is an isosceles triangle, 2 angles are equal



Point of Tangency
↳ always 90°

Note: The diagram shown above has **not** been drawn to scale. The letter O represents the centre of the circle.



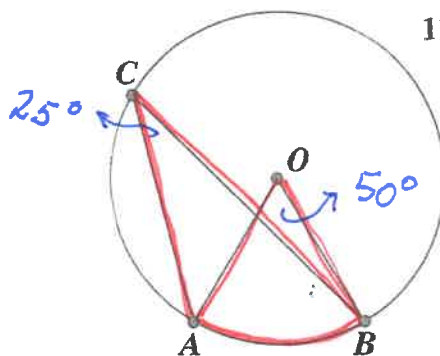
$\angle ACB \rightarrow$ central angle
 $\angle ADB \rightarrow$ inscribed angle
 $AD \rightarrow$ chord (side to side, not through center)
 $\overleftrightarrow{EP} \rightarrow$ Tangent (outside, Touches the circle in 1 spot)

In this diagram, point C represents the centre of the circle.

2. Which of the following rows of terms correctly labels the parts of the diagram above?

Row	$\angle ADB$	\overline{AD}	$\angle ACB$	\overleftrightarrow{EF}
A.	Inscribed angle	Tangent line ✗	Central angle ✓	Chord ✗
B.	Inscribed angle	Chord ✓	Central angle ✓	Tangent line ✓
C.	Central angle	Tangent line ✗	Inscribed angle ✗	Chord ✗
D.	Central angle	Chord ✗	Inscribed angle ✗	Tangent line ✓

The letter *O* in the diagram below represents the centre of the circle.



11. If the sum of $\angle AOB$ and $\angle ACB$ is 75° , then $\angle ACB$ equals

- B.** 25°

$$\angle AOB = \cancel{\angle ACB} \times 2$$

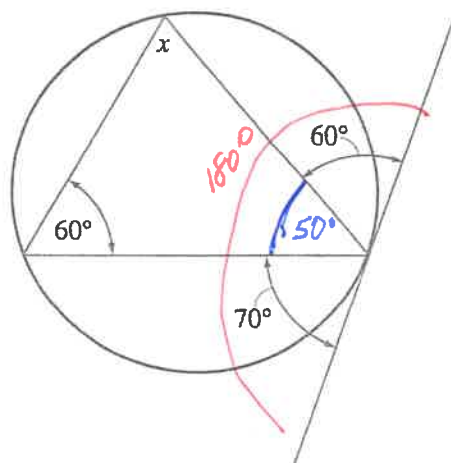
$$\angle AOB + \angle ACB = 75^\circ$$

$$2\angle ACB + \angle ACB = 75^\circ$$

$$3 \angle ACB = 75^\circ$$

$$\angle ACB = 25^\circ$$

Note: The diagram shown above has **not** been drawn to scale.



$$60^\circ + 50^\circ + x = 180^\circ$$

$$110^\circ + x = 180^\circ$$

$$\angle x = 70^\circ$$

38. The measure of x in the diagram above is

- A.** 50°
B. 60°
C. 65°
D. 70°