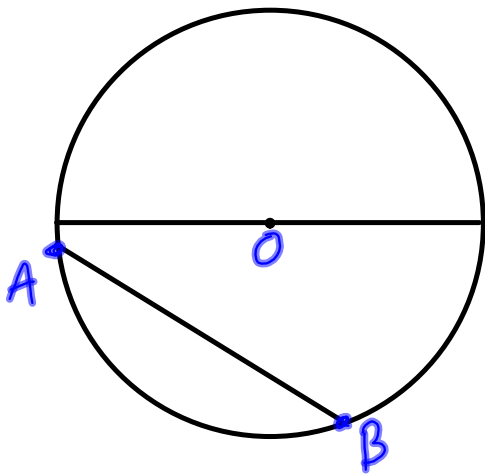


Section 8.2: Properties of Chords in a Circle

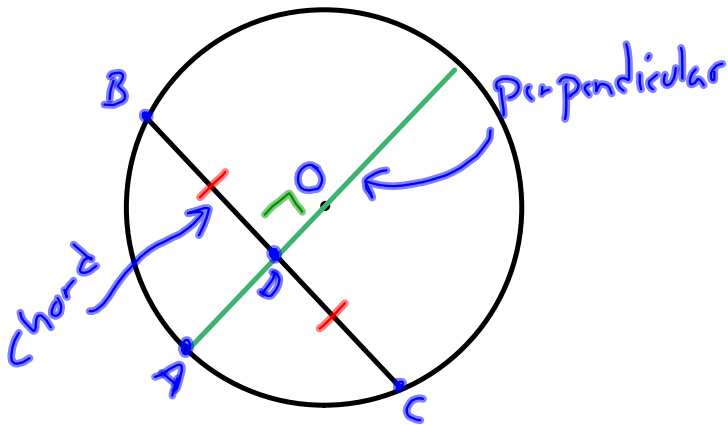


* A chord is a line connecting any two points on a circle.

* The diameter is a chord that passes through the center of a circle.

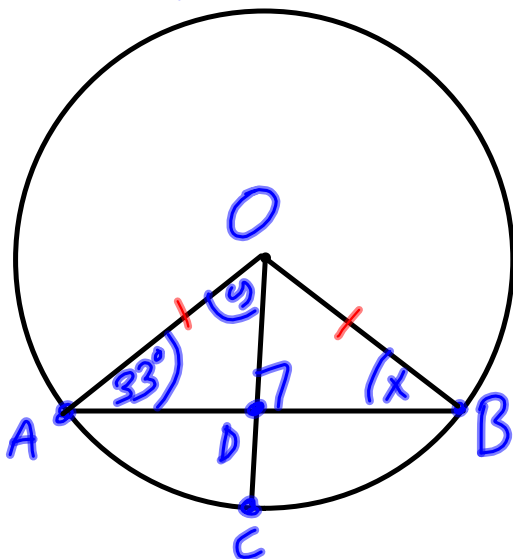
Property #1: Perpendicular to Chord Property:

The perpendicular from the center of a circle to a chord bisects the chord.



OA and BC are \perp
 $\therefore BD = CD$

(Ex #1) Point O is the center of a circle and line segment OC bisects chord AB. Determine the value of x and y.

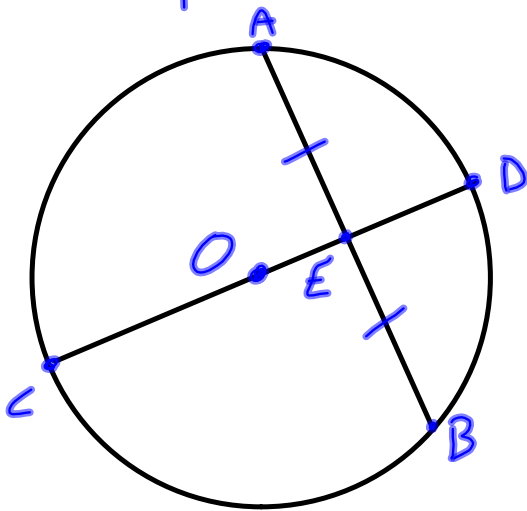


* $OA = OB$ (radii)
 $\therefore \triangle ABO$ is isosceles
 $\therefore \angle A = \angle B = 33^\circ$
 $\therefore x = 33^\circ$

 * $OC \perp AB$
 $\therefore \triangle ADO$ is a right \triangle
 $\therefore 33 + 90 = 123^\circ$
 $\therefore y = 180 - 123 = 57^\circ$

Property #2: Perpendicular to Chord Property 2

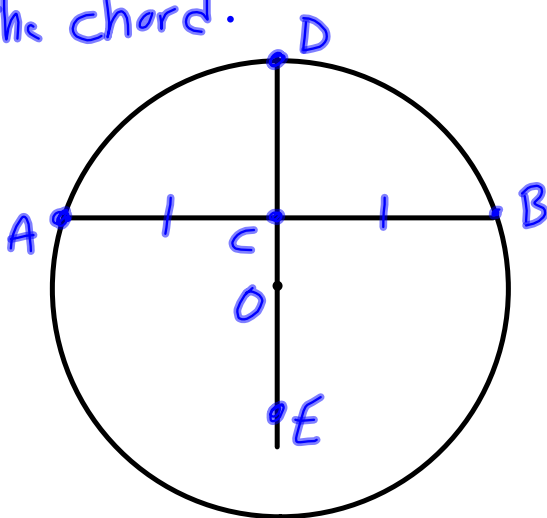
The perpendicular bisector of a chord in a circle passes through the center of a circle.



- * AB is a chord
- * CD is a \perp bisector
- o CD passes through the center of a circle.

Property #3: Perpendicular to chord Property 3

A line that joins the center of a circle and a midpoint of a chord is perpendicular to the chord.

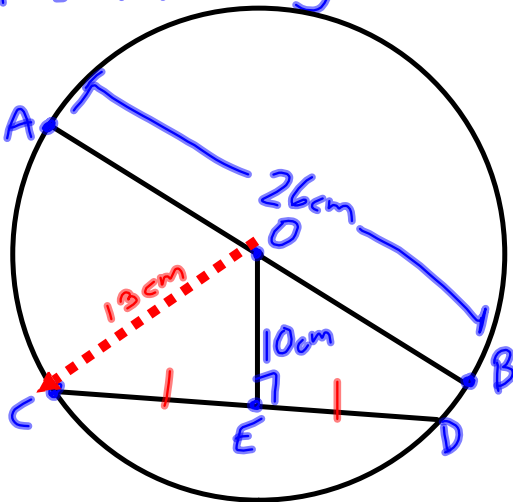


* C is the midpoint of chord AB

* ED passes through the chord AB at point C.

∠ ABL ED

Ex #2: Point O is the center of a circle. AB is a diameter with length 26cm. CD is a chord which is 10cm from the center of a circle. What is the length of chord CD . ($OE \perp CD$)



$\triangle CEO$ is a rt. \triangle

$$a^2 = c^2 - b^2$$

$$a^2 = 13^2 - 10^2$$

$$a^2 = 169 - 100$$

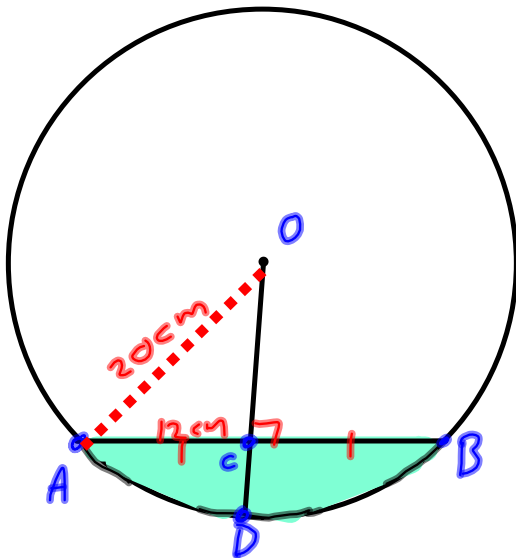
$$a^2 = 69$$

$$\therefore a = \sqrt{69} \approx 8.3 \text{ cm}$$

$$\therefore CE = 8.3 \text{ cm}$$

$$\therefore CD = 2 \times 8.3 = 16.6 \text{ cm}$$

Ex #3: A horizontal pipe has a circular cross section with center O . Its radius is 20 cm. Water fills less than $\frac{1}{2}$ of the pipe. The surface of the water is 24 cm wide. Determine the depth of the water, (D) .



$\triangle ACO$ is a rt. \triangle

$$a^2 = c^2 - b^2$$

$$a^2 = 20^2 - 12^2$$

$$a^2 = 400 - 144$$

$$a^2 = 256$$

$$\therefore a = \sqrt{256} = 16 \text{ cm}$$

∴ The depth of the water is

$$20 - 16 = 4 \text{ cm}$$

Questions:

P397-399

#5, 10, 18