

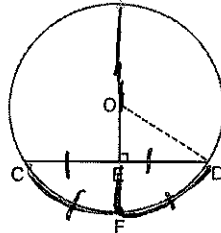
Geometry
Arcs and Chords

Name: _____

Date: _____

In a circle, if a diameter ^{→ also radius} is perpendicular to a chord, then it bisects the chord and its arc.

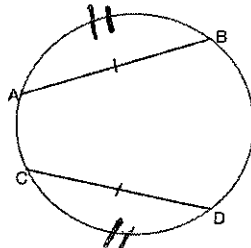
$$\begin{aligned} m\widehat{CF} &\cong m\widehat{FD} \\ \text{and} \\ \overline{CE} &\cong \overline{ED} \end{aligned}$$



★ Look for Pythagorean Thm★

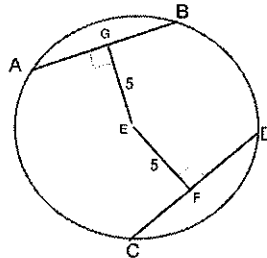
In a circle or in congruent circles, 2 minor arcs are congruent if and only if their corresponding chords are congruent.

$$\begin{aligned} \text{Given } \overline{AB} &\cong \overline{CD} \\ \text{then } \widehat{AB} &\cong \widehat{CD} \end{aligned}$$



In a circle or in congruent circles, two chords are congruent if and only if they are equidistant from center.

$$\begin{aligned} \text{Since } EG &= EF, \\ \text{then } \overline{AB} &\cong \overline{CD} \\ \text{and } \widehat{AB} &\cong \widehat{CD} \end{aligned}$$



Examples

①

$360 - 120 = 240$
 $\frac{240}{3} = 80^\circ$

$\widehat{NP} = 80^\circ$

②

perpendicular
if perpendicular, then bisects
 $KM = 24$

3.

$a^2 + 12^2 = 20^2$
 $a = 16$
 $XY = 32$

4.

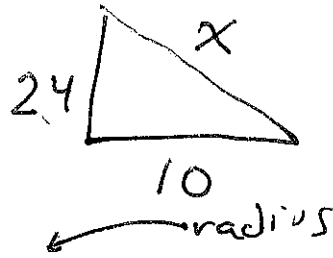
$m\widehat{BC} = 67.5^\circ$
 $360 - 110 = 250$
 $\frac{250}{4} = 67.5$

5. Suppose a chord is 20 inches long and is 24 inches from the center of the circle. Find the length of the radius.

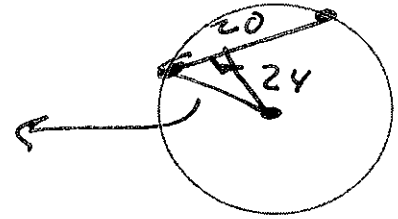
$$10^2 + 24^2 = x^2$$

$$100 + 576 = x^2$$

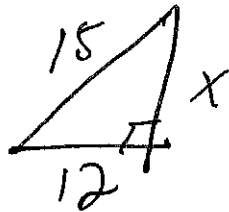
$$\sqrt{676} = \sqrt{x^2}$$



$$x = 26 \text{ in. } r = 15$$



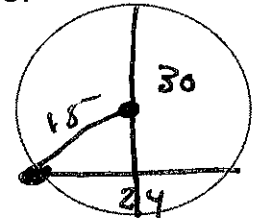
6. Suppose the diameter of a circle is 30 centimeters long and a chord is 24 centimeters long. Find the distance between the chord and the center of the circle.



$$12^2 + x^2 = 15^2$$

$$x^2 + 144 = 225$$

$$x = 9 \text{ cm}$$



7. Find the length of a chord that is 5 inches from the center of a circle with a radius of 13 inches.

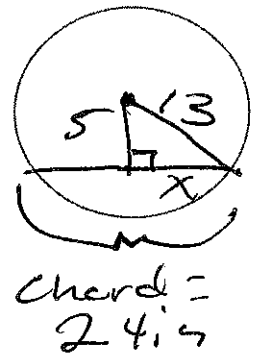
$$5^2 + x^2 = 13^2$$

$$25 + x^2 = 169$$

$$\begin{array}{r} 25 + x^2 = 169 \\ -25 \quad -25 \\ \hline x^2 = 144 \end{array}$$

$$\sqrt{x^2} = \sqrt{144}$$

$$x = 12 \text{ in}$$



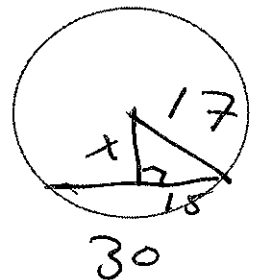
8. Suppose a radius of a circle is 17 units and a chord is 30 units long. Find the distance from the center of the circle to the chord.

$$x^2 + 15^2 = 17^2$$

$$x^2 + 225 = 289$$

$$x^2 = 64$$

$$x = 8 \text{ units!}$$



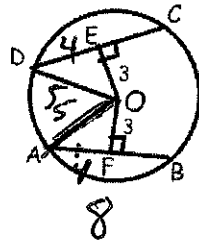
Geometry
Homework: Arcs and Chords

Name: _____

Date: _____

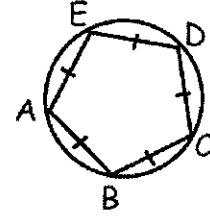
Find the indicated value.

1. $AB = 8$
 $DE = 4, AO = 5$
 $3^2 + 4^2 = 5^2$



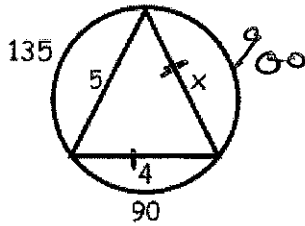
2. $m\widehat{BC} = 72^\circ$

$\frac{360}{5} =$

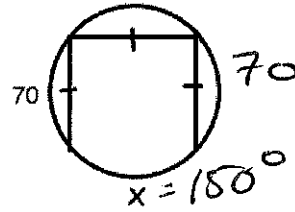


3. $x = 41$

$360 - 135 - 90 = 90^\circ$

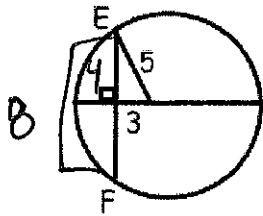


4. $x = 150^\circ$



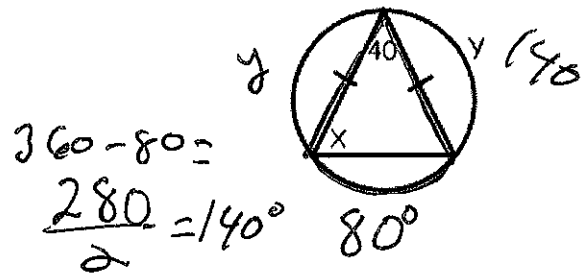
$360 - 210 =$

5. $EF = 8$



Pyth
them!

6. $x = 150^\circ, y = 140^\circ$

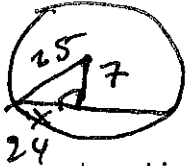


$360 - 80 =$

$\frac{280}{2} = 140^\circ$

80°

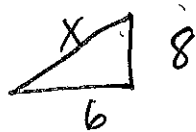
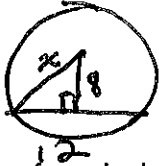
7. A chord is 7cm from the center. The diameter is 50 cm. Find the length of the chord.



$7^2 + x^2 = 25^2$
 $49 + x^2 = 625$

$x^2 = 576$
 $x = 24$ so length = 48 cm

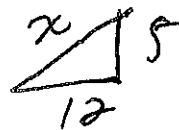
8. A 12 cm chord is 8 cm from the center. Find the length of the radius of the circle.



$8^2 + 6^2 = x^2$

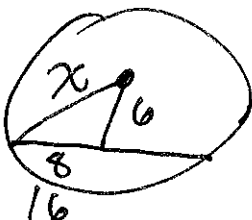
$x = 10$ cm

9. A chord of a circle is 5 in. from the center and is 24 in. long. Find the length of the radius.



$5^2 + 12^2 = x^2$
 $x = 13$

10. A chord is 16 in. long and is 6 in. from the center. Find the length of the radius.



$6^2 + 8^2 = x^2$

$x = 10$