

18. In the circle shown, \overline{BC} is the diameter and $m\widehat{AB} = 120^\circ$.
What is the measure of $\angle ABC$?

- A. 15° C. 60°
B. 30° D. 120°



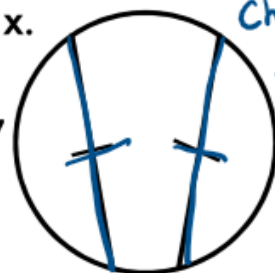
Chord Properties and Segments Lengths in Circles

If two chords are congruent, then their corresponding arcs are congruent.



Solve for x.

$$8x - 7$$

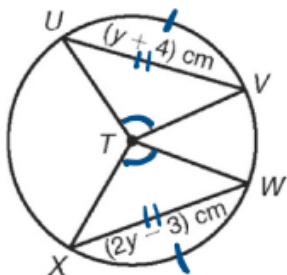


Chords \cong
So arcs \cong

$$3x + 3$$

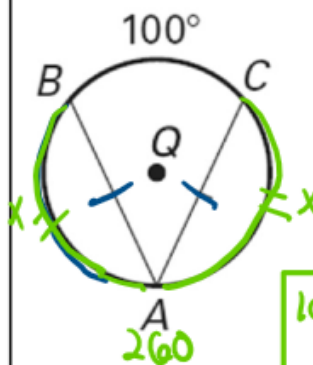
$$\begin{aligned} 8x - 7 &= 3x + 3 \\ -3x \quad +7 &\quad -3x \quad +7 \\ \hline 5x &= 10 \\ x &= 2 \end{aligned}$$

Find the length of WX.



$$\begin{aligned} y + 4 &= 2y - 3 \\ 7 &= y \end{aligned}$$

Find $m\widehat{AB}$



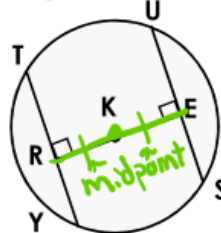
$$\begin{aligned} 360 - 100 &= 260 \\ \frac{260}{2} &= 130 \end{aligned}$$

$$\begin{aligned} 100 + 2x &= 360 \\ x &= 130 \end{aligned}$$

If two chords are congruent, then they are equidistant from the center.



In $\odot K$, K is the midpoint of RE. If $TY = -3x + 56$ and $US = 4x$, find the length of TY.



$$\begin{aligned} -3x + 56 &= 4x \\ 56 &= 7x \\ \frac{56}{7} &= \frac{7x}{7} \\ 8 &= x \end{aligned}$$

Chord \cong bc
Same distance from Center.

$$\begin{aligned} TY &= -3(8) + 56 \\ TY &= 32 \end{aligned}$$

If a diameter is perpendicular to a chord, then it also bisects the chord.

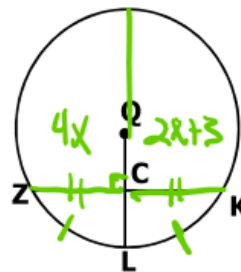
right angle

2 equal parts

This results in congruent arcs too.

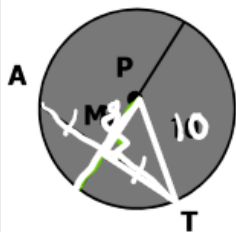
Sometimes, this creates a right triangle & you'll use Pythagorean theorem

In $\odot Q$, $\widehat{KL} \cong \widehat{LZ}$. If $CK = 2x + 3$ and $CZ = 4x$, find x.



$$\begin{aligned} 4x &= 2x + 3 \\ 2x &= 3 \\ x &= \frac{3}{2} = 1.5 \end{aligned}$$

In $\odot P$, if $PM \perp AT$, $PT = 10$, and $PM = 8$, find AT.



$$\begin{aligned} 8^2 + x^2 &= 10^2 \\ 64 + x^2 &= 100 \\ x^2 &= 36 \\ x &= 6 \end{aligned}$$

$$x = 6$$

Find the length of CE

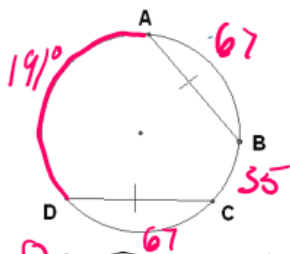


$$\begin{aligned} 20^2 + x^2 &= 25^2 \\ 400 + x^2 &= 625 \\ x^2 &= 225 \\ x &= 15 \end{aligned}$$

$$CE = 30$$

Properties of Chords

Use the following image for problems 1 and 2.



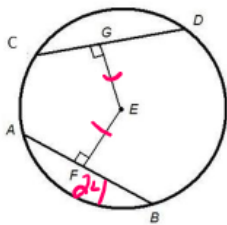
1. If $m\widehat{AB} = 100^\circ$, what is $m\widehat{DC}$?

100

2. If $m\widehat{AB} = 67^\circ$ and $m\widehat{BC} = 35^\circ$. What is the $m\widehat{AD}$?

$67 + 35 + 67 + m\widehat{AD} = 360$
 $m\widehat{AD} = 191$

Use the following image for questions 3 and 4.



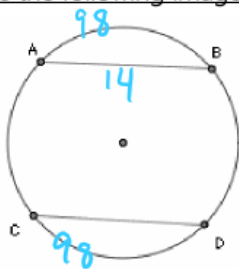
3. If $\widehat{CD} \cong \widehat{AB}$, $m\widehat{EG} = 12$ yd., what is the $m\widehat{EF}$?

12

4. If $\widehat{EG} \cong \widehat{EF}$ and $m\widehat{AB} = 24$ m, what is the $m\widehat{CD}$?

$\widehat{CD} = 24$ $\widehat{GD} = 12$

Use the following image for questions 5 and 6.



5. If $m\widehat{AB} = 98^\circ$, $m\widehat{AB} = 14$ ft. and $m\widehat{CD} = 98^\circ$, what is the $m\widehat{CD}$?

14

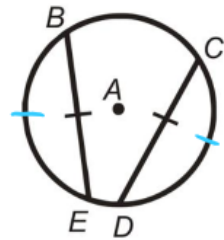
6. If $m\widehat{AB} \cong m\widehat{CD}$, $m\widehat{AC} = 104^\circ$, and $m\widehat{BD} = 100^\circ$ what is the $m\widehat{AB}$?

congruent arcs $\widehat{AB} + \widehat{CD}$
 $104 + 100 + 2x = 360$
 $204 + 2x = 360$
 $2x = 154$
 $x = 77$

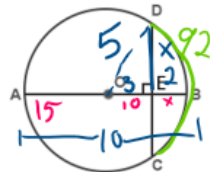
Name _____ Date _____

7. How could you determine that $\widehat{BE} \cong \widehat{CD}$ in the following image?

Because congruent chords form them



Use the following image for the problems 8, 9 and 10.



8. If $m\widehat{DB} = 92^\circ$, what is $m\widehat{DC}$?

$\widehat{DB} \cong \widehat{CB}$ so $m\widehat{DC} = 2(92) = 184^\circ$

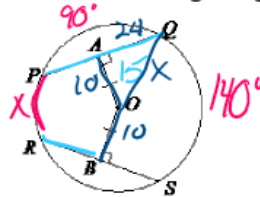
9. If the $m\widehat{OE} = 10$ cm and $m\widehat{OA} = 15$ cm, what is the $m\widehat{BE}$?

$15 - 10 = 5 \text{ cm} = m\widehat{BE}$

10. If $m\widehat{AB} = 10$ in., $m\widehat{EB} = 2$ in., what is the $m\widehat{DE}$?

5 x 3 $x=4$ or $3^2 + x^2 = 5^2$
 Pyth. trip. $9 + x^2 = 25$
 $x = 4$ in

Use the following image for problems 11, 12 and 13.



11. If $m\widehat{PQ} = 15$ in., what is the $m\widehat{RB}$?

The chords are \cong and bisected so $m\widehat{RB}$ is half $m\widehat{PQ}$. $m\widehat{RB} = 7.5$ in

12. If $m\widehat{PQ} = 90^\circ$, $m\widehat{QS} = 140^\circ$, what is the $m\widehat{RP}$?

$90 + 140 + 90 + x = 360$
 $320 + x = 360$
 $x = 40^\circ = m\widehat{RP}$

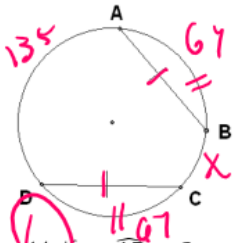
13. If $m\widehat{OB} = 10$ cm and $m\widehat{AQ} = 24$ cm, what is $m\widehat{OQ}$? (note: \widehat{OQ} is not drawn, but you may draw it in.)

$10^2 + 24^2 = x^2$
 $100 + 576 = x^2$
 $26 \text{ cm} = x$

Properties of Chords

Name _____ Date _____

Use the following image for problems 14 and 15.



14. If $m\widehat{AB} = 2x + 27$ and $m\widehat{DC} = 4x - 39$ What is the value of x ?

$$2x + 27 = 4x - 39$$

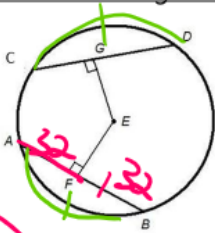
$$x = 33$$

15. If $m\widehat{AB} = 67^\circ$ and $m\widehat{AD} = 135^\circ$. What is the $m\widehat{BC}$?

$$135 + 67 + 67 + x = 360$$

$$x = 91^\circ$$

Use the following image for questions 16-18.



16. If $\widehat{CD} \cong \widehat{AB}$, $m\widehat{EG} = x + 9$, and $m\widehat{EF} = 9x - 7$ What is the value of x ?

$$x + 9 = 9x - 7$$

$$x = 2$$

17. If $m\widehat{AF} = 10x + 2$ and $m\widehat{BF} = 8x + 8$, what is the $m\widehat{AB}$?

$$10x + 2 = 8x + 8$$

$$10(3) + 2 = 32$$

$$x = 3$$

$$AB = 64$$

18. If $\widehat{EG} \cong \widehat{EF}$ and $m\widehat{CD} = 4x + 15$ and

$m\widehat{AB} = 6x - 21$, what is the value of x ?

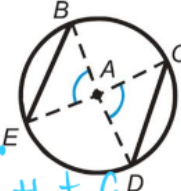
$$4x + 15 = 6x - 21$$

$$36 = 2x$$

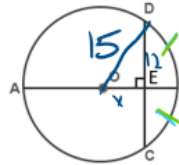
$$18 = x$$

19. How could you determine that $\widehat{BE} \cong \widehat{CD}$ in the following image?

The central angles are \cong so their corresponding arcs \cong .
The chords \widehat{BE} and \widehat{CD} that forms the arcs.



Use the following image for the problems 20-22.



20. If $m\widehat{DB} = 14x - 12$ and $m\widehat{CB} = 2x + 36$, what is $m\widehat{DC}$?

$$14x - 12 = 2x + 36$$

$$12x = 48$$

$$x = 4$$

$$m\widehat{DC} = 88$$

21. If the radius of the circle is 15 m and $m\widehat{DE} = 12m$, what is the $m\widehat{OE}$?

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

$$144 + x^2 = 225$$

$$x^2 = 81$$

$$x = 9$$

22. If $m\widehat{OE} = 5$ and $m\widehat{OA} = 13$, what is the $m\widehat{DC}$?

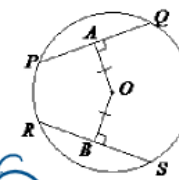
$$5^2 + m\widehat{DE}^2 = 13^2$$

$$m\widehat{DE}^2 = 144$$

$$m\widehat{DE} = 12$$

$$m\widehat{OC} = 24$$

Use the following image for problems 23 and 24.



HW

23. If $m\widehat{PQ} = 5x + 2$ and $m\widehat{RS} = 3x + 12$ what is the $m\widehat{RB}$?

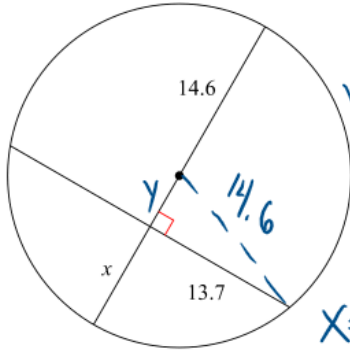
24.

If $m\widehat{PQ} = 87^\circ$, $m\widehat{RP} = 43^\circ$ and $m\widehat{QS} = 7x + 3$ What is the value of x ?

Radius and Chord

Find the length of the segment indicated. Round your answer to the nearest tenth if necessary.

1)



$$y^2 + 13.7^2 = 14.6^2$$

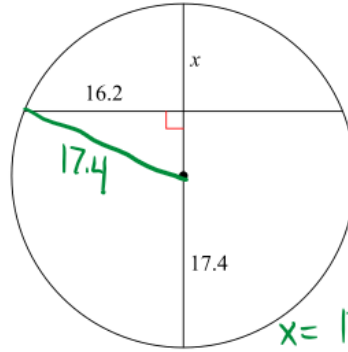
$$y^2 + 187.69 = 213.16$$

$$y^2 = 25.47$$

$$y = 5.05$$

$$x = 14.6 - 5.05 = 9.6$$

2)



$$y^2 + 16.2^2 = 17.4^2$$

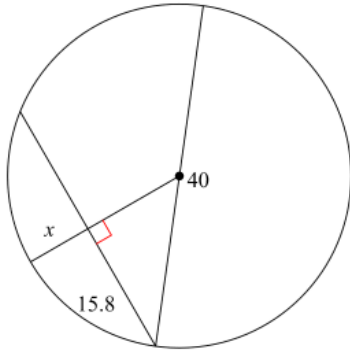
$$y^2 + 262.44 = 302.76$$

$$y^2 = 40.32$$

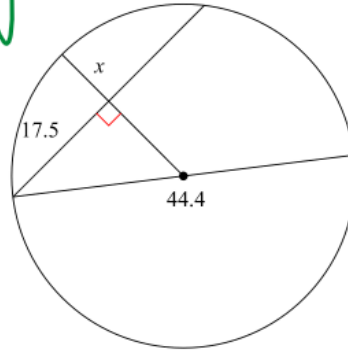
$$y = 6.35$$

$$x = 17.4 - 6.35 = 11.1$$

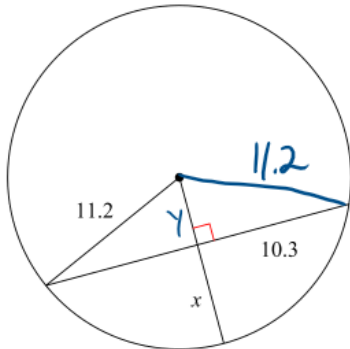
HW³⁾



HW⁴⁾



5)



$$x = 11.2 - 4.4$$

$$x = 6.8$$

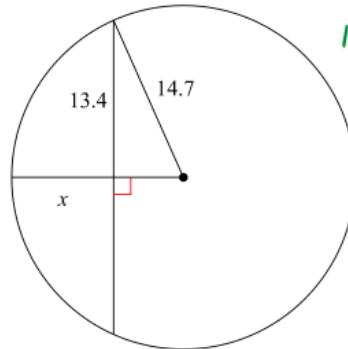
$$y^2 + 10.3^2 = 11.2^2$$

$$y^2 + 106.09 = 125.44$$

$$y^2 = 19.35$$

$$y = 4.399$$

6)



$$13.4^2 + y^2 = 14.7^2$$

$$179.6 + y^2 = 216.09$$

$$y^2 = 36.43$$

$$y = 6.04$$

$$14.7 - 6.04 = x$$

$$8.66 = x$$

