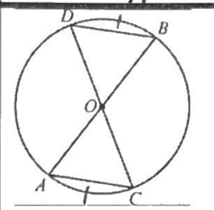
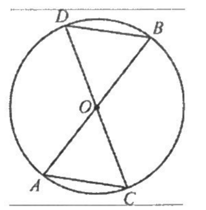
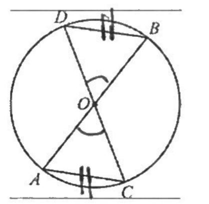
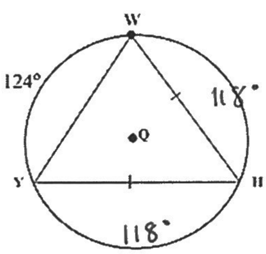
Chord Properties

Name	Theorem	Hypothesis	Conclusion
Congruent Angle-Congruent Chord Theorem	Congruent central angles have congruent chords.		$\overset{\frown}{DB} \cong \overset{\frown}{AC}$ therefore $\overline{DB} \cong \overline{AC}$
Congruent Chord-Congruent Arc Theorem	Congruent chords have congruent arcs.		$\overline{DB} \cong \overline{AC}$ therefore $\overset{\frown}{DB} \cong \overset{\frown}{AC}$
Congruent Arc-Congruent Angle Theorem	Congruent arcs have congruent central angles.		$\angle DOB \cong \overset{\frown}{DB}$ $\angle AOC \cong \overset{\frown}{AC}$

Example: Find the measure of arc HY and HYW.

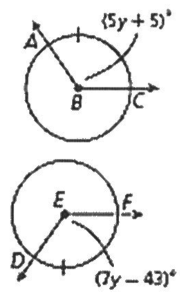


$360 - 124 =$
$236/2$

$\overset{\frown}{HY} = 118°$

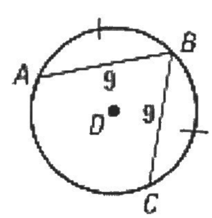
$\overset{\frown}{HYW} = 118 + 124 = 242°$

Example: Find the measure of angle DEF.



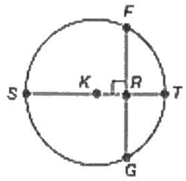
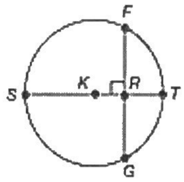
$5y + 5 = 7y - 43$
$48 = 2y$
$24 = y$

Example: Answer the following:

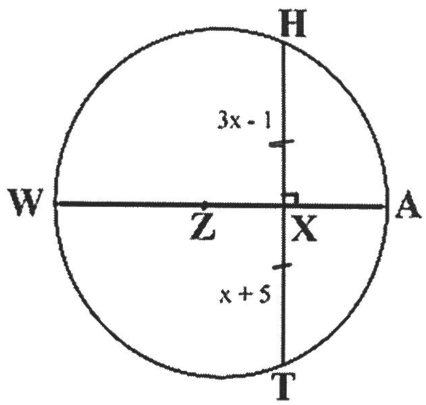


1. If $m\overset{\frown}{AB} = 110°$, find $m\overset{\frown}{BC}$ $= 110°$
2. If $m\overset{\frown}{AC} = 150°$, find $m\overset{\frown}{AB}$. $= 105°$

$360 - 150 = 210/2$

Name	Theorem	Hypothesis	Conclusion
Diameter-Chord Theorem	If a radius or diameter is perpendicular to a chord, then it bisects the chord and its arc.		$\overline{FR} \cong \overline{RG}$
Converse of Diameter-Chord Theorem	If a segment is the perpendicular bisector of a chord, then it is the radius or diameter.		$\overline{ST}$ is a diameter b/c is a $\overline{FG}$ is a $\perp$ bisector

Example: Find the measure of HT. Then find the measure of WA if you know XZ = 6.



$3x-1 = x+5$

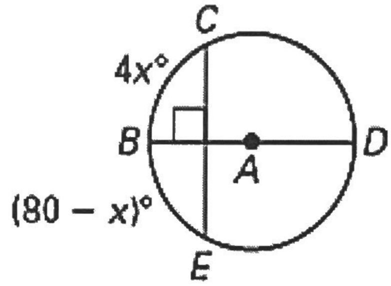
$2x = 6$

$x = 3$

$HT = 3(\cancel{x}3) - 1 = 8$

$8 + 8 = \boxed{16}$

Example: Find the measures of arc CB, BE, and CE.



$4x = 80 - x$

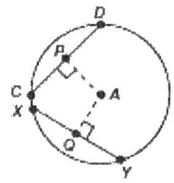
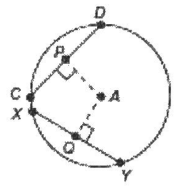
$5x = 80$

$x = 16$

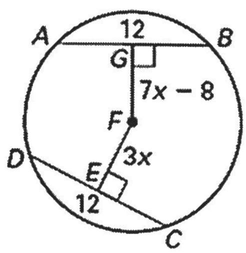
$\overset{\frown}{CB} = 4(16) = 64°$

$\overset{\frown}{BE} = 64°$

$\overset{\frown}{CE} = 64 + 64 = 128°$

Name	Theorem	Hypothesis	Conclusion
Equidistant Chord Theorem	If two chords are congruent, then they are equidistant from the center.		If $\overline{CD} \cong \overline{XY}$ then $\overline{PA} \cong \overline{AQ}$
Converse of Equidistant Chord Theorem	If two chords are equidistant from the center, then the chords are congruent.		If $\overline{PA} \cong \overline{AQ}$ Then $\overline{CD} \cong \overline{XY}$

Example: Find EF.



$7x-8=3x$

$-8=-4x$

$2=x$

$EF=3(2)=6$

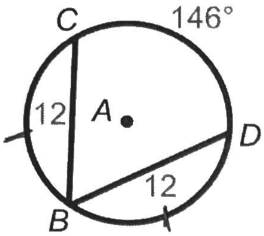
Geometry
Homework

Name Key

Find the value of the indicated arc in ⊙A.

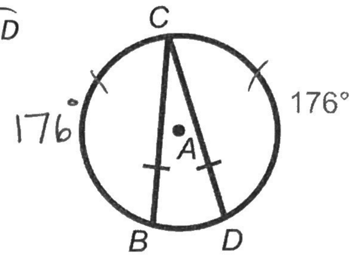
1. $m\overset{\frown}{BC}$

$\boxed{107°}$



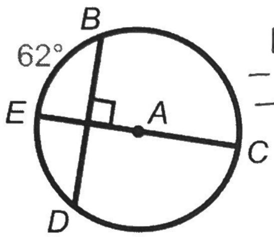
$$\begin{array}{r} 360 \\ -146 \\ \hline 214/2 \end{array}$$

2. $m\overset{\frown}{BD}$



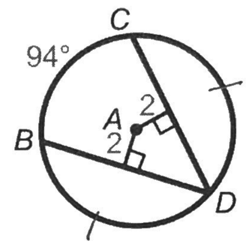
$$\begin{array}{r} 360 \\ -352 \\ \hline \boxed{8°} \end{array}$$

3. $m\overset{\frown}{BC}$



$$\begin{array}{r} 180 \\ -62 \\ \hline \boxed{118°} \end{array}$$

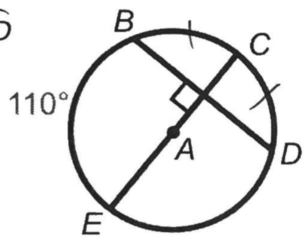
4. $m\overset{\frown}{BD}$



$$\begin{array}{r} 360 \\ -94 \\ \hline 266/2 \end{array}$$

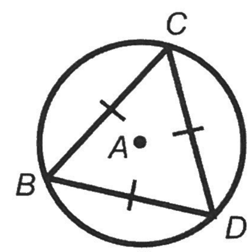
$\boxed{133°}$

5. $m\overset{\frown}{BD}$



$$\begin{array}{r} 180 \\ -110 \\ \hline 70 \\ +70 \\ \hline \boxed{140°} \end{array}$$

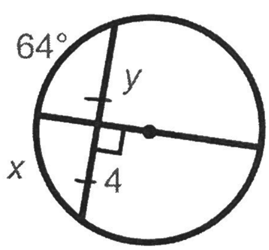
6. $m\overset{\frown}{BD}$



$360/3 = \boxed{120°}$

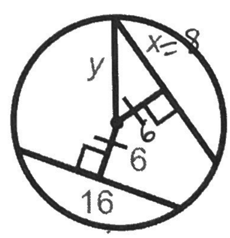
Find the value of *x* and/or *y*.

7.

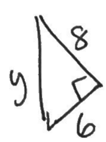


$\boxed{\begin{array}{l} y = 4 \\ x = 64° \end{array}}$

8.



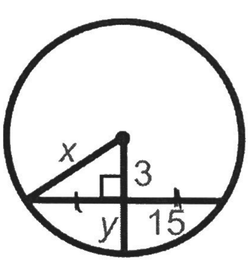
$\boxed{x = 8}$

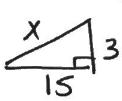


$6^2 + 8^2 = y^2$

$\boxed{10 = y}$

9.





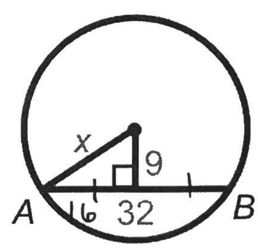
$3^2 + 15^2 = x^2$

$234 = x^2$

$\boxed{15.3 = x}$

$y = 15.3 - 3 = \boxed{12.3}$

10. AB = 32



$16^2 + 9^2 = x^2$

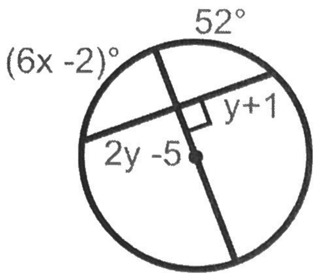
$337 = x^2$

$\boxed{x \approx 18.4}$

Geometry
Homework

Name ______________________

11.



$52 = 6x - 2$

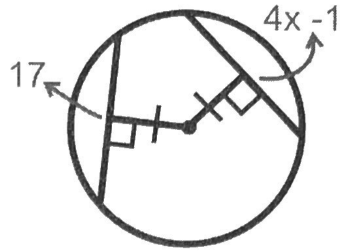
$54 = 6x$

$\boxed{9 = x}$

$y + 1 = 2y - 5$

$\boxed{6 = y}$

12.

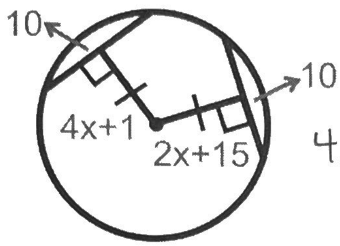


$17 = 4x - 1$

$18 = 4x$

$\boxed{4.5 = x}$

13.

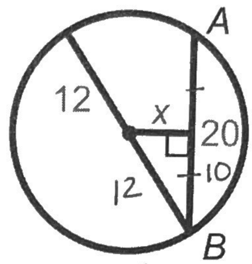


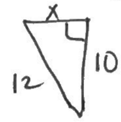
$4x + 1 = 2x + 15$

$2x = 14$

$\boxed{x = 7}$

14.



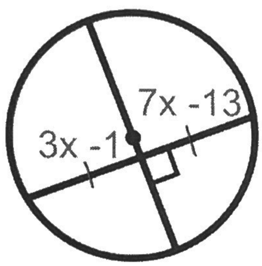


$12^2 = x^2 + 10^2$

$44 = x^2$

$\boxed{6.6 \approx x}$

15.



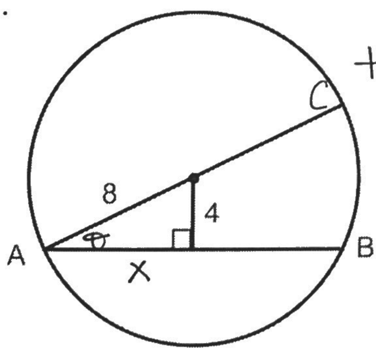
$3x - 1 = 7x - 13$

$12 = 4x$

$\boxed{3 = x}$

16. Find the measure of $\overset{\frown}{AB}$ in each diagram below.

a.



$\tan\theta = \frac{4}{8}$

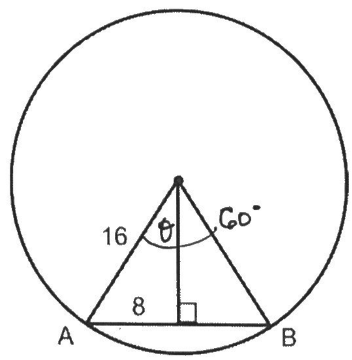
$\theta \approx 26.6$

$\overset{\frown}{BC} = 53.1°$

$\overset{\frown}{AB} = 180 - 53.1$

$\boxed{126.9°}$

b.

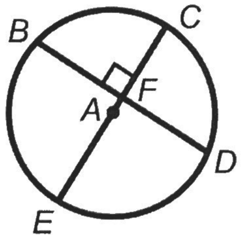


$\sin\theta = \frac{8}{16} = 30$

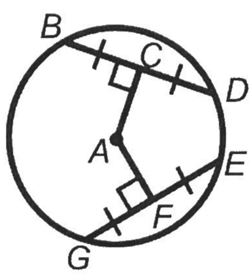
$\boxed{\overset{\frown}{AB} = 60°}$

In problems 17-19, what can you conclude about the picture? State a theorem that justifies your answer. You may assume that A is the center of the circle.

17.



18.



19.