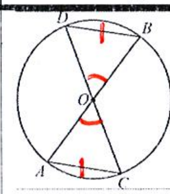
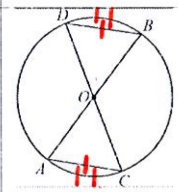
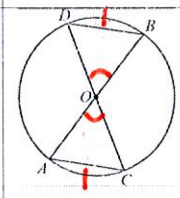
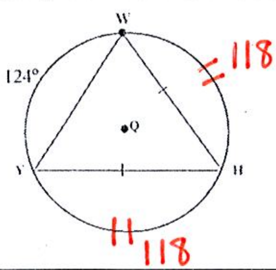
Name ______________________________ Date ______________________

Day 1 - Chord Properties and Segment Lengths

Name	Theorem	Hypothesis	Conclusion
Congruent Angle-Congruent Chord Theorem	Congruent central angles have congruent chords.		If $\angle DOB \cong \angle COA$, then $\overline{DB} \cong \overline{CA}$
Congruent Chord-Congruent Arc Theorem	Congruent chords have congruent arcs.		If $\overline{DB} \cong \overline{CA}$, then $\overset{\frown}{DB} \cong \overset{\frown}{CA}$
Congruent Arc-Congruent Angle Theorem	Congruent arcs have congruent central angles.		If $\overset{\frown}{DB} \cong \overset{\frown}{CA}$, then $\angle DOB \cong \angle COA$

Example: Find the measure of arc HY and HYW.



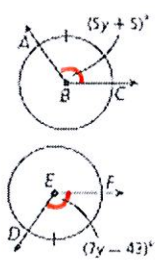
$360-124=236$

$236/2=118$

$360-118=242$

$\boxed{m\overset{\frown}{HY}=118^\circ \quad m\overset{\frown}{HYW}=242^\circ}$

Example: Find the measure of angle DEF.



$5y+5=7y-43$

$-2y=-48$

$y=24$

$m\angle DEF = 7y-43$

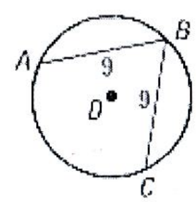
$= 168-43$

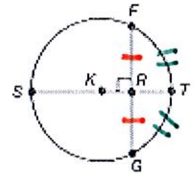
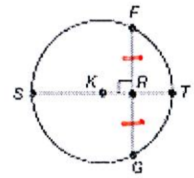
$\boxed{m\angle DEF = 125^\circ}$

Example: Answer the following:

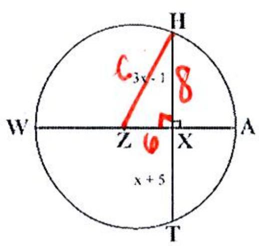
1. If $m\overset{\frown}{AB} = 110^\circ$, find $\boxed{m\overset{\frown}{BC}. = 110^\circ}$
2. If $m\overset{\frown}{AC} = 150^\circ$, find $\boxed{m\overset{\frown}{AB}. = 105^\circ}$

$210/2 = 105^\circ$



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. *Sometimes, this creates a right triangle & you'll use Pythagorean Theorem.*		If $\overline{ST} \perp \overline{FG}$, then $\overline{FR} \cong \overline{RG}$ and $\overset{\frown}{FT} \cong \overset{\frown}{TG}$
Converse of Diameter-Chord Theorem	If a segment is the perpendicular bisector of a chord, then it is the radius or diameter.		If $\overline{ST}$ bisects $\overline{FG}$, then $\overline{ST}$ is the diameter (or radius depending)

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

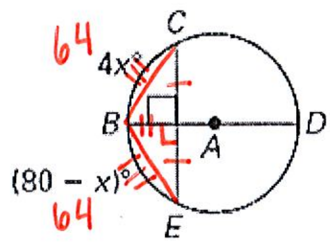


$3x-1=x+5$
$2x=6$
$x=3$

$6^2+8^2=c^2$
$c=10$

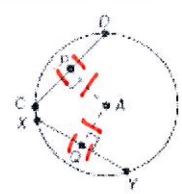
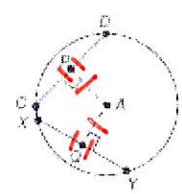
$\boxed{HT=16 \quad WA=20}$

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

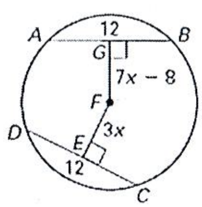


$4x=80-x$
$5x=80$
$x=16$

$\boxed{m\overset{\frown}{CB}=64 \quad m\overset{\frown}{BE}=64 \quad m\overset{\frown}{CE}=128}$

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 they are equidistant from the center.
Converse of Equidistant Chord Theorem	If two chords are equidistant from the center, then the chords are congruent.		If $\overline{CD}$ and $\overline{XY}$ are equidistant from the center, then $\overline{CD} \cong \overline{XY}$

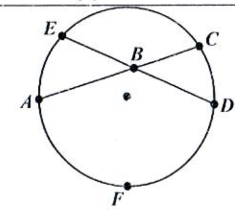
Example: Find EF.



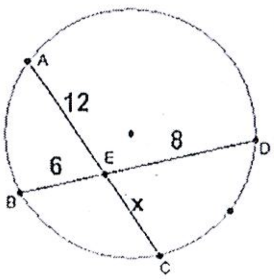
$3x=7x-8$
$-4x=-8$
$x=2$

$m\overline{EF}=3x$
$m\overline{EF}=3(2)$
$\boxed{m\overline{EF}=6}$

Segment Lengths

Name	Theorem	Hypothesis	Conclusion
Segment Chord Theorem	If two chords in a circle ~~interest,~~ intersect, then the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the second chord.		If $\overline{ED}$ and $\overline{AC}$ intersect, then (EB)(BD) = (AB)(BC) $\underbrace{(part)(part)}_{\text{segment 1}} = \underbrace{(part)(part)}_{\text{segment 2}}$

Example: Find x.

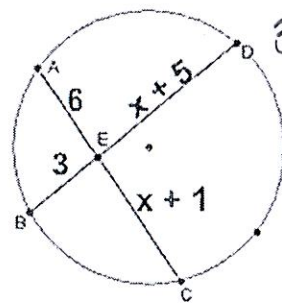


$12 \cdot x = 6 \cdot 8$

$12x = 48$

$\boxed{x = 4}$

Example: Find x.



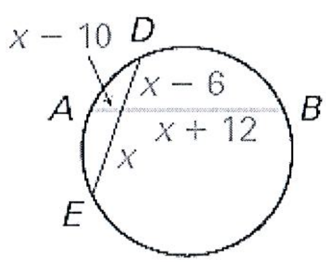
$3(x+5) = 6(x+1)$

$3x + 15 = 6x + 6$

$-3x = -9$

$\boxed{x = 3}$

Example: Find x.



$x(x-6) = (x-10)(x+12)$

$x^2 - 6x = x^2 + 12x - 10x - 120$

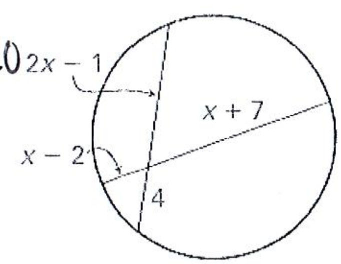
$x^2 - 6x = x^2 + 2x - 120$

$-6x = 2x - 120$

$-8x = -120$

$\boxed{x = 15}$

Example: Find x.



$4(2x-1) = (x-2)(x+7)$

$8x - 4 = x^2 + 7x - 2x - 14$

$8x - 4 = x^2 + 5x - 14$

$-4 = x^2 - 3x - 14$

$0 = x^2 - 3x - 10$

$0 = (x-5)(x+2)$

$x = 5$ and $\cancel{x = -2}$

* can't have negative length

$\boxed{x = 5}$