Try:

1. $\overline{JM}$ and $\overline{MK}$ are tangent to circle L.
   Find the value of x.
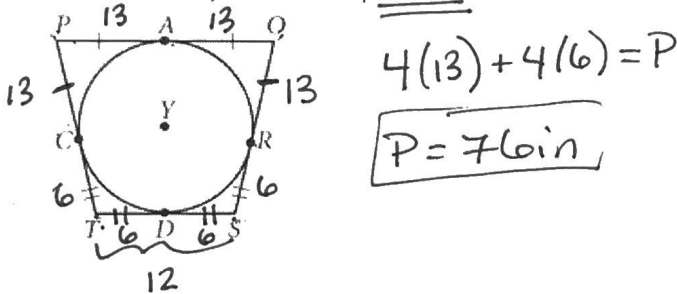

$x + 8 = 44$
$ -8 \quad -8$
$x = \boxed{36}$

✓ $\cancel{8} + (36) = 44$
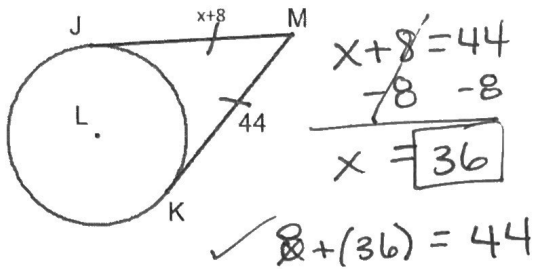
2. $\overline{NA}$ and $\overline{NO}$ are tangent to circle G.
   Find the value of x.

$7x - 20 = 2x - 5$
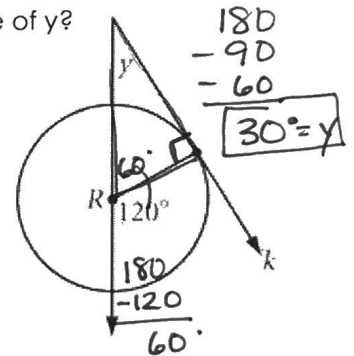$-2x \qquad -2x$
$5x - 20 = -5$
$ +20 \quad +20$
$5x = 15 \quad \boxed{x = 3}$
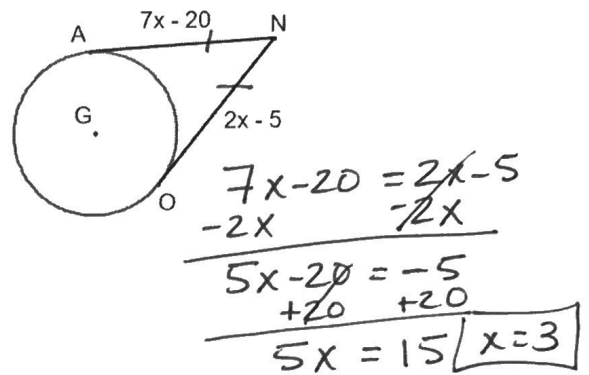
3. Quadrilateral POST is circumscribed about circle Y.
   OR = 13 in. and ST = 12 in. Find the perimeter of POST.

$4(13) + 4(6) = P$
$\boxed{P = 76 \text{ in}}$

4. Ray k is tangent to circle R.
   What is the value of y?

180
-90
-60
$\boxed{30° = y}$

180
-120
$60°$

Chord Properties

| Name	Theorem	Hypothesis	Conclusion
Congruent Angle-Congruent Chord Theorem	Congruent central angles have congruent chords.		$\angle DOB \cong \angle AOC$ $\overline{DB} \cong \overline{AC}$
Congruent Chord-Congruent Arc Theorem	Congruent chords have congruent arcs.		$\overline{DB} \cong \overline{AC}$ $\overarc{DB} \cong \overarc{AC}$
Congruent Arc-Congruent Angle Theorem	Congruent arcs have congruent central angles.		$\overarc{DB} \cong \overarc{AC}$ $\angle DOB \cong \angle AOC$ $\overline{BC} \cong \overline{DA}$ $\angle DOA \cong \angle BOC$

3

Example: Find the measure of arc HY and HYW.
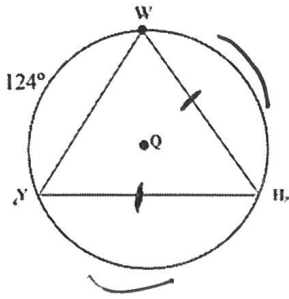
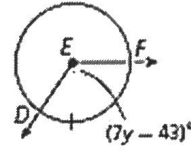$$\begin{array}{r} 360 \\ -124 \\ \hline 236 \\ \div 2 \end{array}$$

$$\widehat{HY} \cong \widehat{HW} = m\angle = \boxed{118°}$$

$$m\widehat{HYW} = 118° + 124° = \boxed{242°}$$

Example: Find the measure of angle DEF.
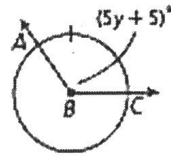
$$5y + 5 = 7y - 43$$
$$-5y \qquad -5y$$
$$5 = 2y - 43$$
$$+43 \qquad +43$$
$$48 = 2y$$
$$y = 24$$
$$7(24) - 43$$
$$\boxed{125°}$$

Example: Use the diagram of ⊙D.

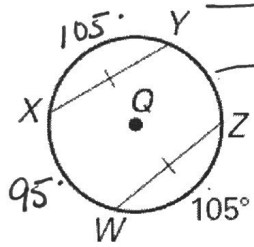1. If $m\widehat{AB} = 110°$, find $m\widehat{BC}$. $= \boxed{110°}$

2. If $m\widehat{AC} = 150°$, find $m\widehat{AB}$.
$$360 - 150 = \frac{210}{2} = \boxed{105°}$$
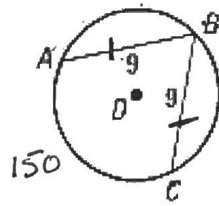
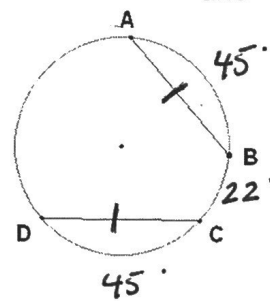**Try:**

1. Find the measure of arc YZ if the measure of arc XW = 95°

$$360 - 210° = 150$$
$$-95$$
$$\boxed{55°}$$
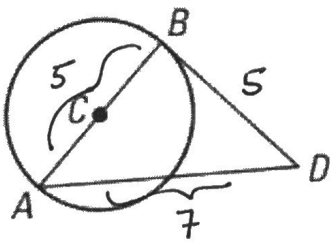
2. Given $m\widehat{AB} = 45°$ and $m\widehat{BC} = 22°$. $m\widehat{AD}$

$$\begin{array}{r} 360 \\ -45 \\ 45 \\ 22 \\ \hline \boxed{288°} \end{array}$$
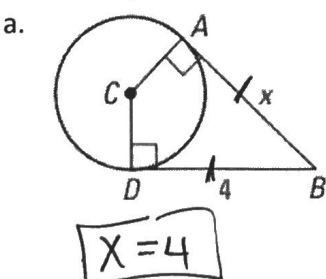

⭐ **Skills Practice**

1. In the diagram below, AB = BD = 5 and AD = 7. Is $\overline{BD}$ tangent to ⊙C ? Explain.
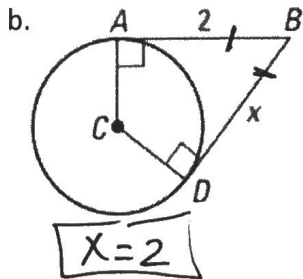

$$5^2 + 5^2 = 7^2$$
$$25 + 25 = 49$$
$$50 \neq 49$$

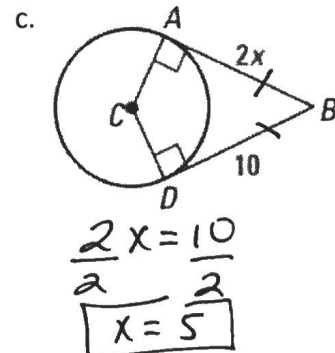No, $\overline{BD}$ is not tangent b/c it is not a 90° angle. Pythagorean Thm does not work.

2. $\overline{AB}$ is tangent to ⊙C at A and $\overline{DB}$ is tangent to ⊙C at D. Find the value of x.

a.

$$\boxed{X = 4}$$

b.

$$\boxed{X = 2}$$

c.

$$\frac{2x}{2} = \frac{10}{2}$$
$$\boxed{X = 5}$$

4

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.		$\overline{FR} \cong \overline{RG}$ $\overarc{FT} \cong \overarc{GT}$
Converse of Diameter-Chord Theorem	If a segment is the perpendicular bisector of a chord, then it is the radius or diameter.		$\overline{KT}$ or $\overline{ST}$ radius / diameter

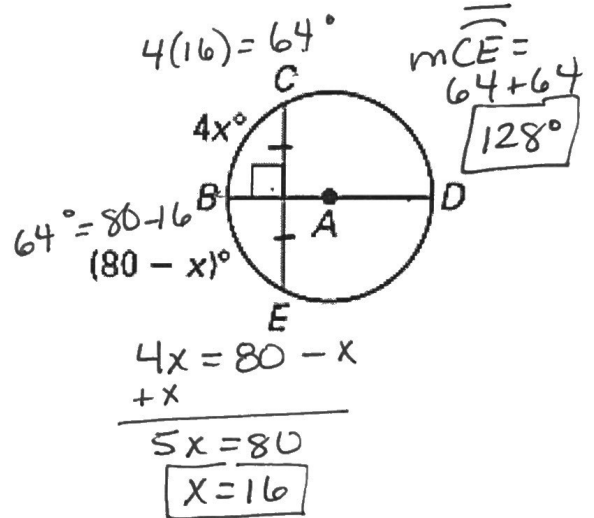**Example:** Find the measure of HT. Then find the measure of WA if you know XZ = 6.
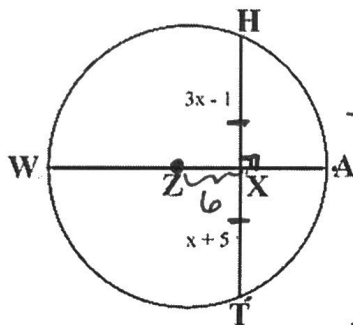
$$3x-1=x+5$$
$$\begin{array}{r} -x \quad\quad +1 \\ \hline \end{array}$$
$$\frac{2x}{2}=\frac{6}{2}$$
$$x=3$$
$$m\,HT = 3(3)-1 + (3)+5$$
$$9-1 + 3 + 5$$
$$\boxed{16}$$

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

$$4(16)=64°$$

$m\overarc{CE}=$
$64+64$
$\boxed{128°}$

$$64° = 80-16$$
$$(80 - x)°$$

$$4x = 80 - x$$
$$\begin{array}{r} +x \\ \hline \end{array}$$
$$5x = 80$$
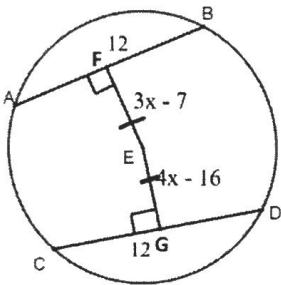$$\boxed{x=16}$$

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

Example: Find EF. $= 3(2) = \boxed{6}$
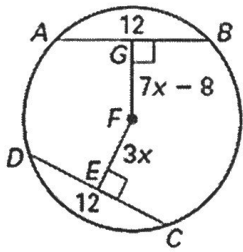
$7x - 8 = 3x$
$-7x$
─────────
$-8 = -4x$
$\dfrac{-8}{-4} = \dfrac{-4x}{-4}$

$\boxed{x = 2}$

1. Find the measure of EG.

$3x - 7 = 4x - 16$
$+16 \quad -3x$
─────────
$9 = \cancel{4}x$

$\boxed{x = 9}$

$4(9) - 16$
$36 - 16 = \boxed{20}$

Example: Are segments TQ and UQ congruent?
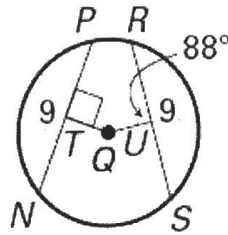
No, they not $\cong$.
$\ne$ distance

2. Is segment QS a diameter? Explain your reasoning.
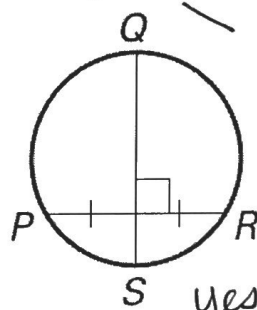
1. $\perp$ lines
   $90°$
2. Bisect

yes, $\overline{QS}$ is a diameter.