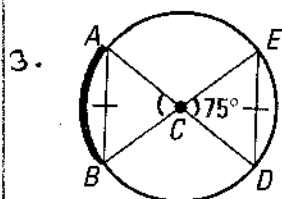
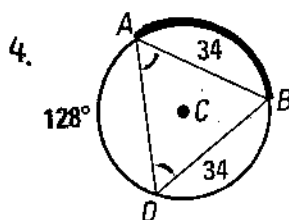


Geometry Ch 10-3 Exer, pg 657 #3-11, 18-19, 23

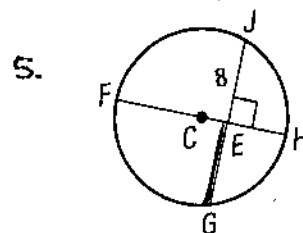
Find the measure of the red arc or chord.



$\angle ACB$ and $\angle ECD$
are congruent
angles [vertical]
and thus intercept
congruent arcs.
 $m\widehat{AB} = 75^\circ$

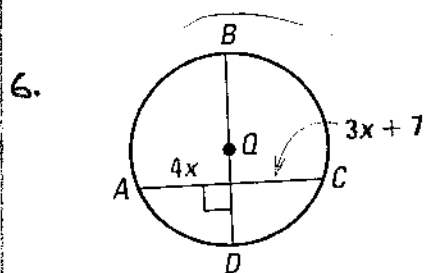


Because $AB \cong DB$,
 $\triangle ABD$ is isosceles.
 $\angle A \cong \angle D$ and thus
 $\widehat{BD} \cong \widehat{BA}$
 $128 + \widehat{BA} + \widehat{BD} = 360$
 $\widehat{BA} + \widehat{BA} = 232$
 $2\widehat{BA} = 232$
 $\widehat{BA} = 116$



Since $JG \perp FH$,
 $JE \cong GE$
 $m\widehat{GE} = 8$

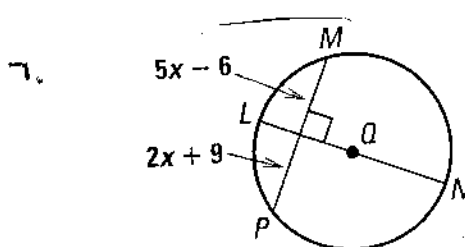
Find the value of x in circle Q.



Since $AC \perp BD$, the
chord is bisected.

$$4x = 3x + 7$$

$$x = 7$$



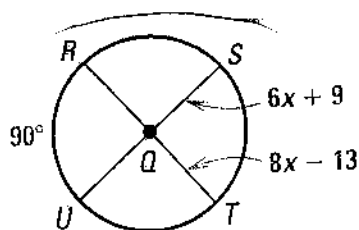
Since $MP \perp LN$, the
chord is bisected

$$5x - 6 = 2x + 9$$

$$3x = 15$$

$$x = 5$$

8.



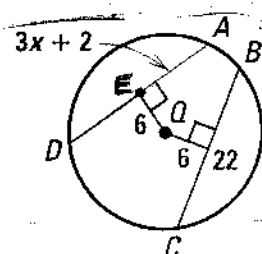
[The 90° arc measure is not relevant] SQ and TQ are both radii of the same circle.

$$6x + 9 = 8x - 13$$

$$22 = 2x$$

$$11 = x$$

10.



Chords DA and CB are each equidistant from the center. As this chord is perpendicular to the center, $\triangle DQ \cong \triangle BQ$

Thus, $DA = 2(3x + 2)$

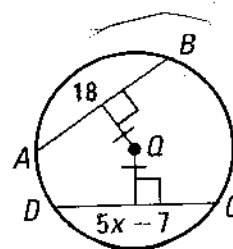
$$2(3x + 2) = 22$$

$$6x + 4 = 22$$

$$6x = 18$$

$$x = 3$$

9.



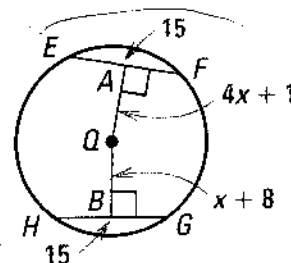
Chords AB and DC are each equidistant from the center.

$$18 = 5x - 7$$

$$25 = 5x$$

$$5 = x$$

11.



Chords EF and HG are congruent. Therefore they are equidistant to the center.

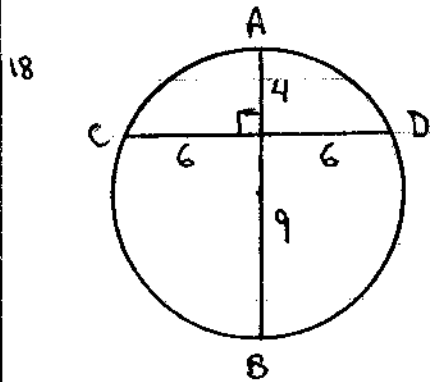
$$AQ = BQ$$

$$4x + 1 = x + 8$$

$$3x = 7$$

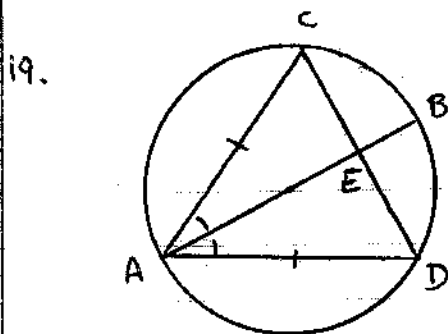
$$x = \frac{7}{3}$$

Determine whether $\overline{AB}$ is a diameter of the circle. Explain.



$\overline{AB}$ is a perpendicular bisector of chord $\overline{CD}$. Therefore $\overline{AB}$ is a diameter.

Note: $\overline{CD}$ is not a diameter. While it is perpendicular to chord $\overline{AB}$, it does not bisect it.

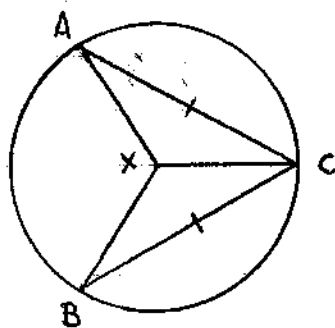


$\overline{AC} \cong \overline{AD}$, Given
 $\angle CAB \cong \angle DAB$, Given
 $\overline{AE} \cong \overline{AE}$, Reflexive
 $\triangle ACE \cong \triangle ADE$, S-A-S
 $\overline{CE} \cong \overline{DE}$, C.P.C.T.C

The two angles at E [$\angle CEA$ and $\angle DEA$] must be right because they are congruent and form a Linear Pair.

Since $\overline{AB}$ is a perpendicular bisector of $\overline{CD}$, $\overline{AB}$ must be a diameter.

23. ALGEBRA: In circle P, $\overline{AC}$, $\overline{BC}$, and all arcs have integer measures. Show that x must be even.



The arcs of a circle must sum to 360° :

$$\widehat{AB} + \widehat{BC} + \widehat{CA} = 360$$

Since the chords $\overline{BC}$ and $\overline{CA}$ are congruent, their intercepted arcs must also be congruent.

$$\begin{aligned}\widehat{AB} + \widehat{BC} + \widehat{BC} &= 360 \\ \widehat{AB} &= 360 - 2\widehat{BC}\end{aligned}$$

Whatever integer measure of $\widehat{BC}$, twice the measure will be an even number. The difference of two even numbers is an even number.

Thus $\widehat{AB}$ must be even, and the central angle that intercepts it is also even.