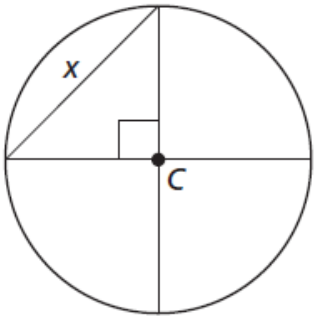
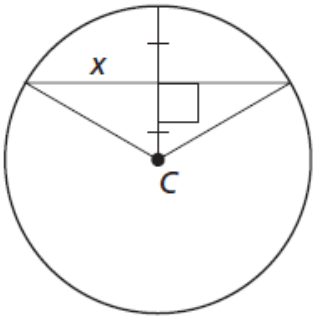
Find the value of *x* given that *C* is the center of the circle and that the circle has a diameter of 12.

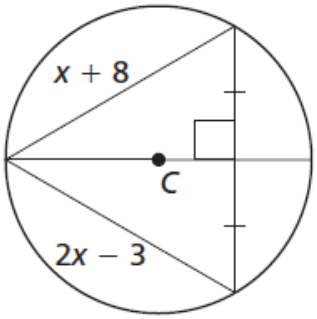
1.



2.



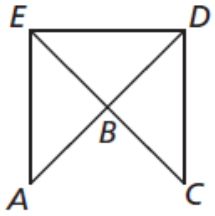
3.



Write a proof.

1. Given: B is the midpoint of $\overline{EC}$ and $\overline{DA}$.

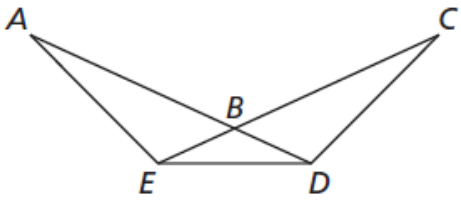
Prove: $\triangle AEB \cong \triangle DCB$



2. Given: $\angle BDE \cong \angle BED$

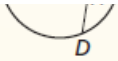
$\angle A \cong \angle C$

Prove: $\triangle AED \cong \triangle CDE$



Essential Question

What are two ways to determine when a chord is a diameter of a circle?

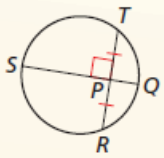


If $\overline{EG}$ is a diameter and $\overline{EG} \perp \overline{DF}$, then $\overline{HD} \cong \overline{HF}$ and $\overset{\frown}{GD} \cong \overset{\frown}{GF}$.

Proof Ex. 22, p. 550

Theorem 10.8 Perpendicular Chord Bisector Converse

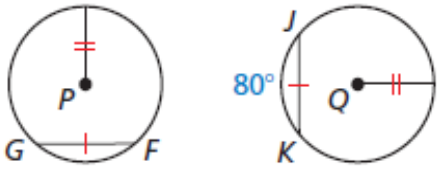
If one chord of a circle is a perpendicular bisector of another chord, then the first chord is a diameter.



If $\overline{QS}$ is a perpendicular bisector of $\overline{TR}$, then $\overline{QS}$ is a diameter of the circle.

Proof Ex. 23, p. 550

In the diagram, $\odot P \cong \odot Q$, $\overline{FG} \cong \overline{JK}$, and $m\overset{\frown}{JK}$ = 80°. Find $m\overset{\frown}{FG}$.



$m\overset{\frown}{FG} = 80°$ (≅ ⊙s, ≅ chords)

a. Find *HK*.

$\overline{HK} = 14$ units

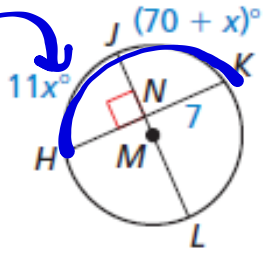
$11x = 70 + x$

$-x \quad -x$

$\frac{10x}{10} = \frac{70}{10}$

$x = 7$

b. Find $m\overset{\frown}{HK}$.



$m\overset{\frown}{HJ} = 77°$

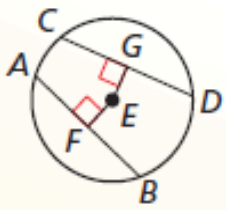
$m\overset{\frown}{JK} = 77°$

$m\overset{\frown}{HK} = 154°$

Theorem

Theorem 10.9 Equidistant Chords Theorem

In the same circle, or in congruent circles, two chords are congruent if and only if they are equidistant from the center.



Proof Ex. 25, p. 550

$\overline{AB} \cong \overline{CD}$ if and only if $EF = EG$.

In the diagram, $QR = ST = 16$, $CU = 2x$, and $CV = 5x - 9$. Find the radius of $\odot C$.

$\overline{UC} \cong \overline{CV}$

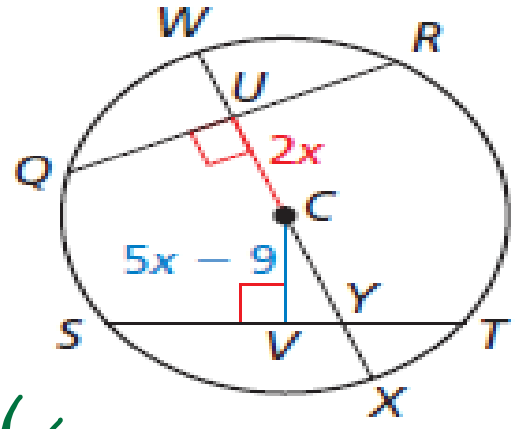
$2x = 5x - 9$

$-2x \quad -2x$

$+9 \quad +9$

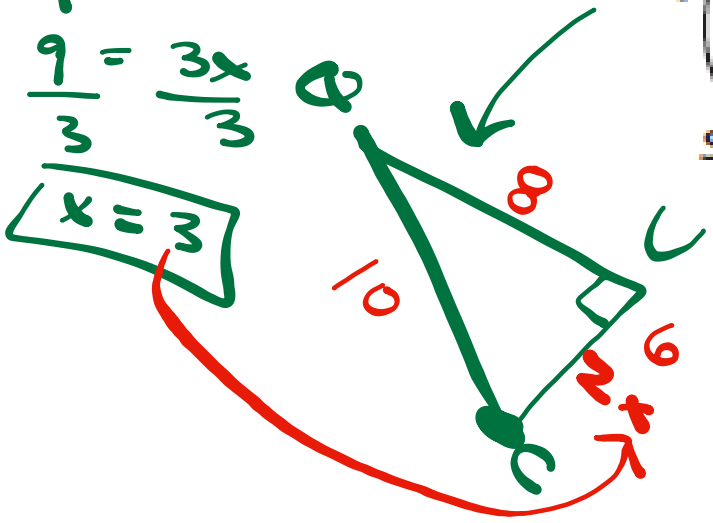
$\frac{9}{3} = \frac{3x}{3}$

$x = 3$



$6^2 + 8^2 = x^2$

$x = 10$



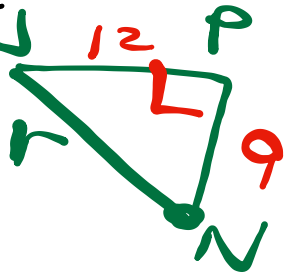
5. In the diagram, $JK = LM = 24$, $NP = 3x$, and $NQ = 7x - 12$. Find the radius of $\odot N$.

$JP = 12$

$3x = 7x - 12$

$-4x = -12$

$x = 3$



$12^2 + 9^2 = r^2$

$144 + 81 = r^2$

$225 = r^2$

$r = 15$