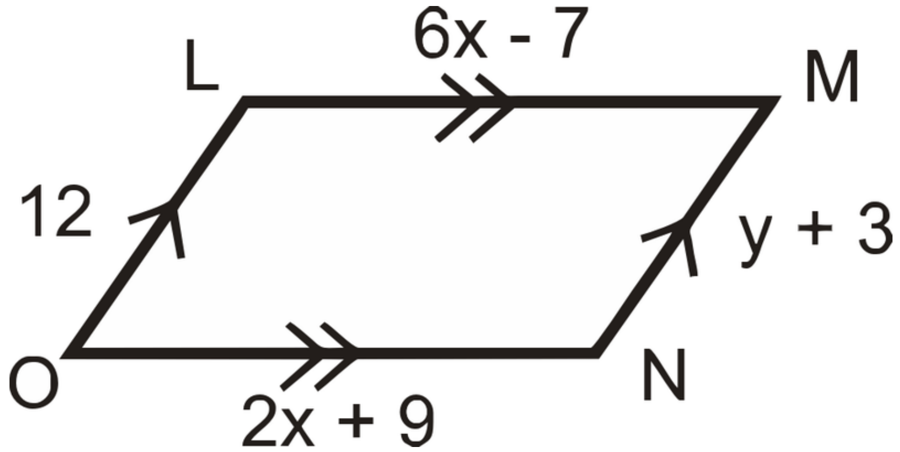
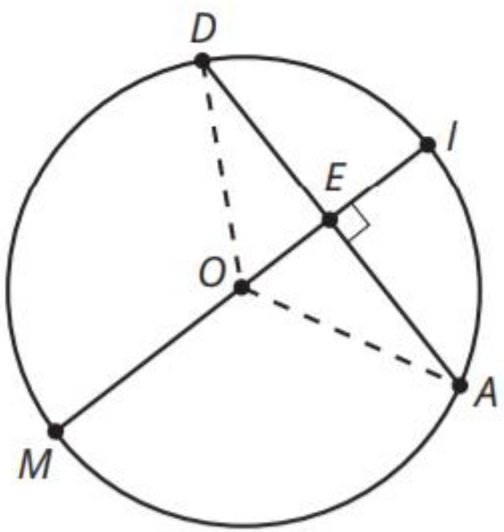
Warm-up

What does *x* and *y* have to be?





2. Prove this relationship between a diameter and a chord.

Given: $\overline{MI}$ **is a diameter of circle** O**.**

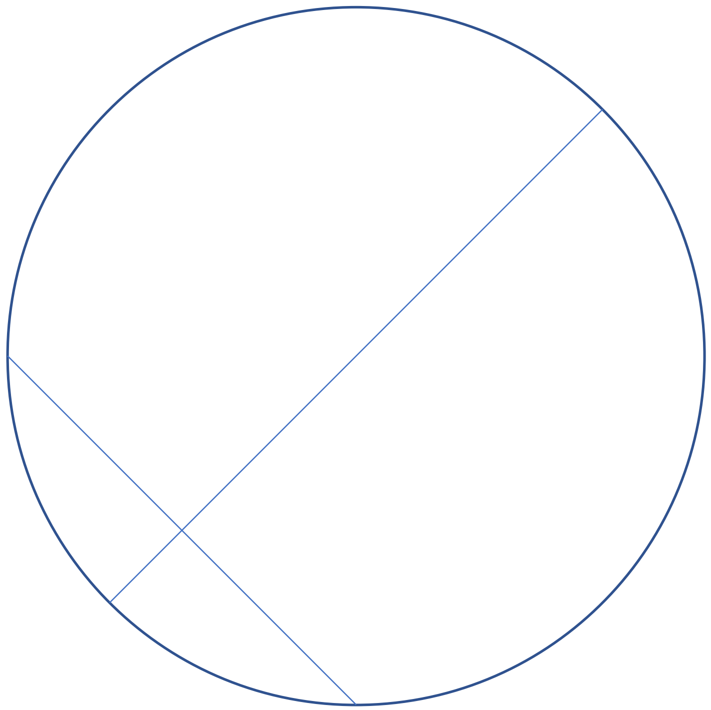
$\overline{MI} \perp \overline{DA}$

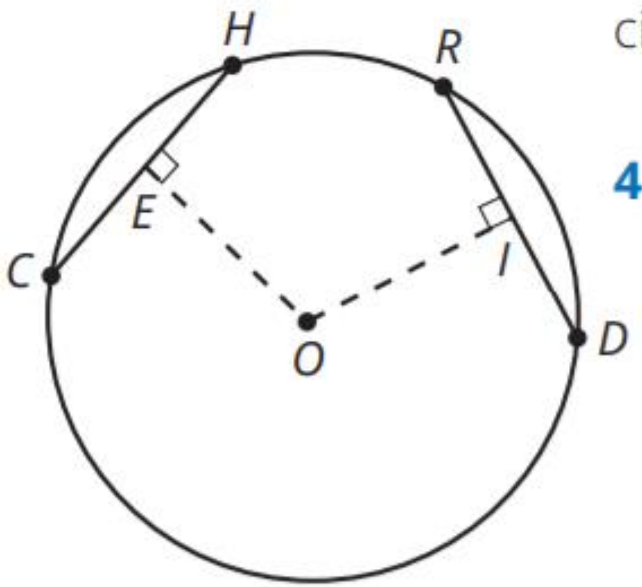
Prove: $\overline{MI}$ **bisects** $\overline{DA}$**.**

$\overline{MI}$ **bisects** $\overset{\frown}{DA}$**.**

Statements	Reasons
1. $\overline{MI}$ is a diameter of circle O. $\overline{MI} \perp \overline{DA}$	1. Given
2. Connect points O and D to form radius $\overline{OD}$. Connect points O and A to form radius $\overline{OA}$.	2. Construction

The **Diamater-Chord Theorem** states: “If a circle’s diameter is perpendicular to a chord, then the diameter bisects the chord and bisects the arc determined by the chord.”





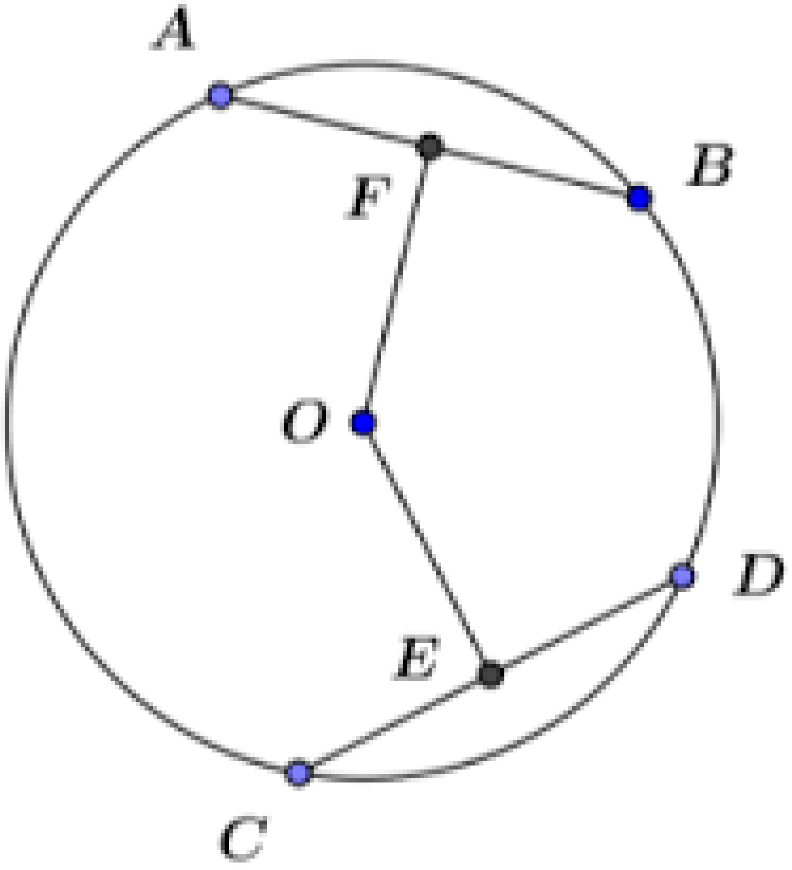
Congruent chords appear to be equidistant from the center point of the circle. This observation can be proved and stated as a theorem.

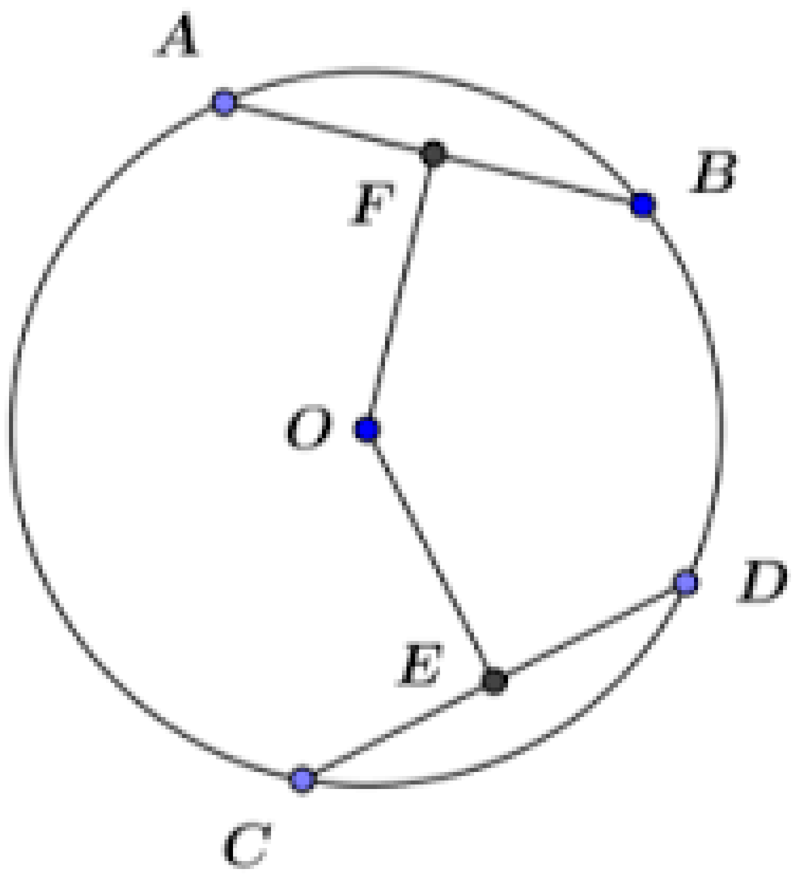
4. Prove this relationship regarding chords.

Given: $\overline{CH} \cong \overline{DR}$
$\overline{OE} \perp \overline{CH}$
$\overline{OI} \perp \overline{DR}$

Prove: $\overline{CH}$ **and** $\overline{DR}$ **are equidistant from center** O**.**

The **Equidistant Chord Theorem** states: "If two chords of the same circle or congruent circles are congruent, then they are equidistant from the center of the circle."



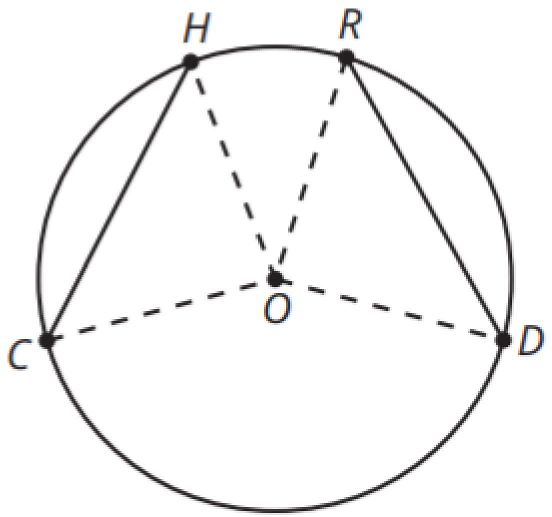


The **Equidistant Chord Converse Theorem** states:
"If two chords of the same circle or congruent circles are equidistant from the center of the circle, then the chords are congruent."

3. Prove this conjecture relating chords and their corresponding arcs.

Given: $\overline{CH} \cong \overline{DR}$

Prove: $\overset{\frown}{CH} \cong \overset{\frown}{DR}$



The **Congruent Chord–Congruent Arc Theorem** states: "If two chords of the same circle or congruent circles are congruent, then their corresponding arcs are congruent."

The **Congruent Chord–Congruent Arc Converse Theorem** states:
"If arcs of the same circle or congruent circles are congruent, then their corresponding chords are congruent."