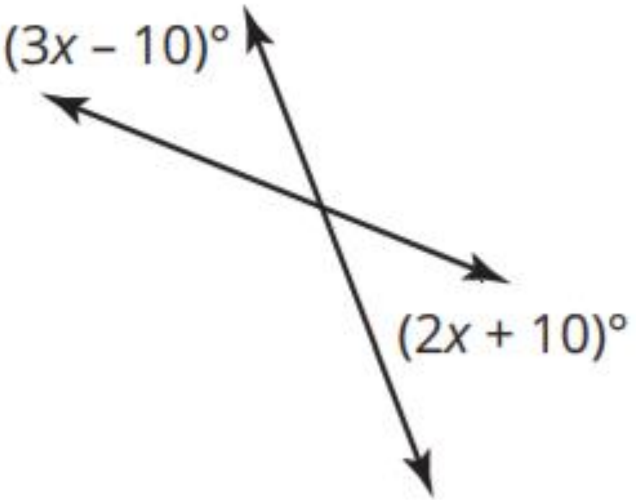
# Warm Up

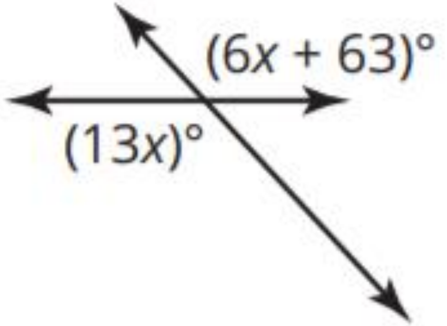
You will need textbook page M1-166

Determine the value of $x$.

1.




2.

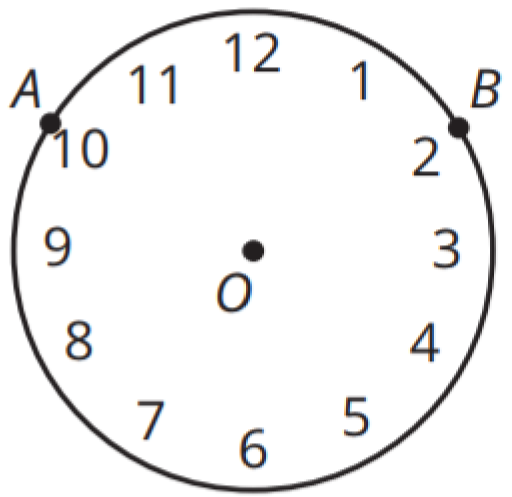


# Look at the Time



Recall that the degree measure of a circle is 360°.

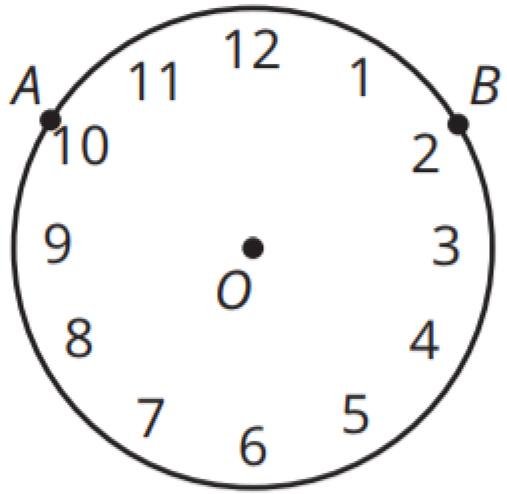
Each minor arc of a circle is associated with and determined by a specific central angle. The **degree measure of an arc** is the same as the degree measure of its central angle. For example, if $\angle PRQ$ is a central angle and $m\angle PRQ = 30°$, then $m\widehat{PQ} = 30°$.



1. Imagine the face of a clock. Consider that it is a circle with center *O*. Point *A* on the circle corresponds with the number 10 on the clock and point *B* corresponds with the number 2.

   a. Draw a central angle using the given points. Identify the central angle you drew and its corresponding minor arc.

   b. Without using a protractor, determine the central angle measure and the measure of the minor arc. Explain your reasoning.



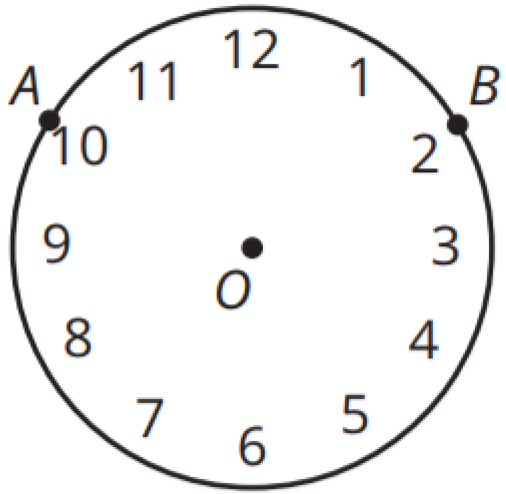

   c. Plot and label point *C* such that $m\widehat{BC} = m\widehat{AB}$. Explain your reasoning.

**Remember:**

**Adjacent arcs** are two arcs of the same circle sharing a common endpoint.

The **Arc Addition Postulate** states: "The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs."

2. **Consider circle *O* in Question 1.**

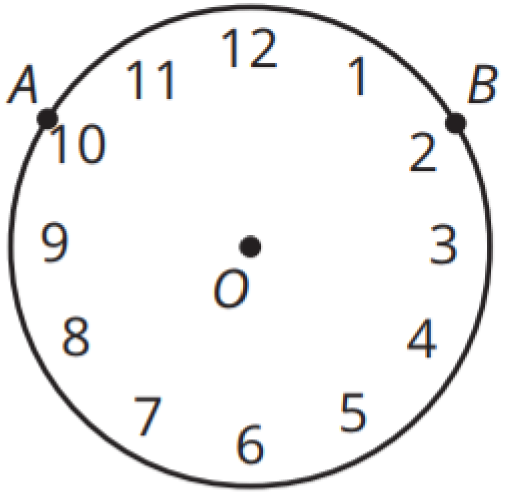



a. **Plot and label point *D* on the circle such that it corresponds to the number 7 on the clock. Use the Arc Addition Postulate to determine the measure of $\overset{\frown}{BD}$.**

b. **At which numbers on the clock could you plot point *E* such that $\overset{\frown}{BD} \cong \overset{\frown}{AE}$? Explain your reasoning.**

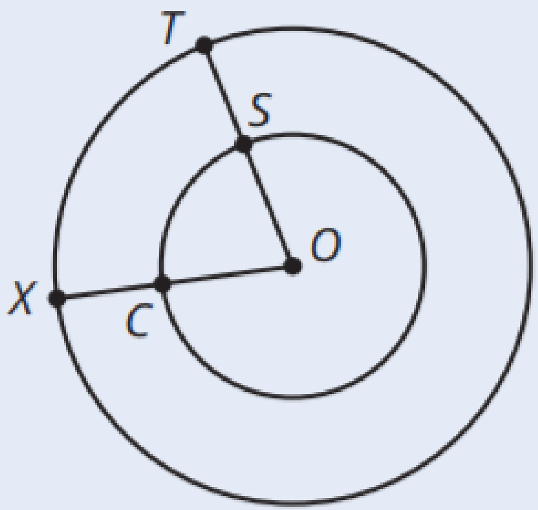
**3. If the measures of two central angles of the same circle (or congruent circles) are equal, are their corresponding minor arcs congruent? Explain your reasoning.**

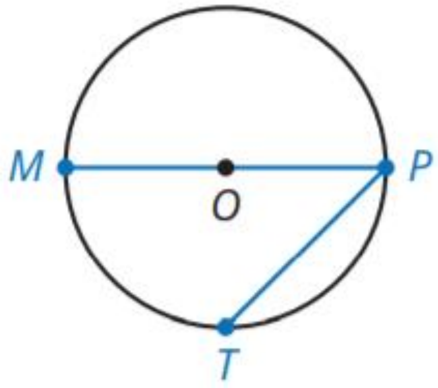
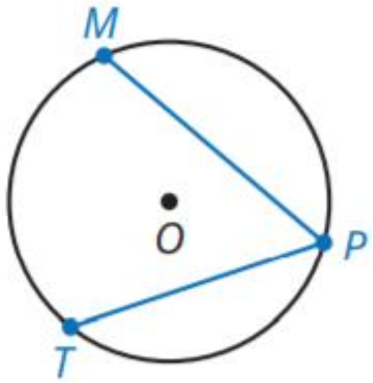
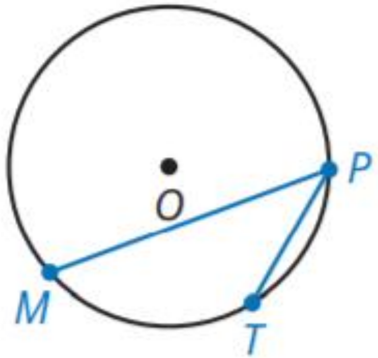
M1-167




**4. If the measures of two minor arcs of the same circle (or congruent circles) are equal, are their corresponding central angles congruent? Explain your reasoning.**

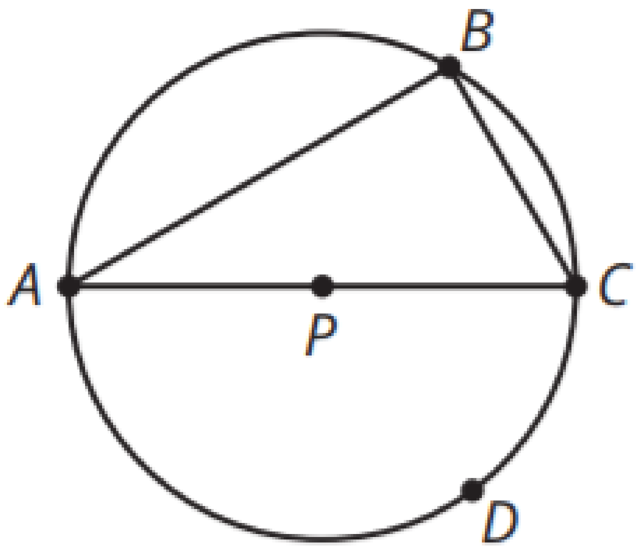
5. **Alicia explains to her classmate that $\overset{\frown}{SC}$ is congruent to $\overset{\frown}{TX}$. How did Alicia arrive at this conclusion? Is Alicia correct? Explain your reasoning.**



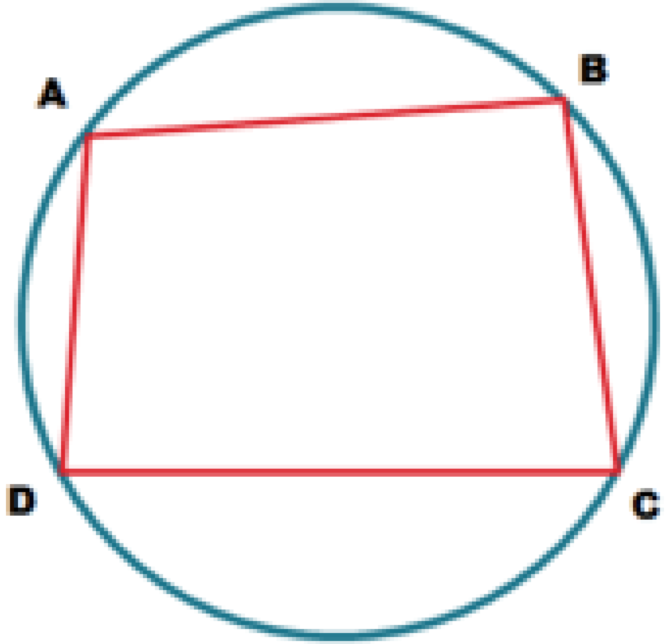
| Case 1 | Case 2 | Case 3 |
|---|---|---|
| ∠$MPT$ is inscribed in such a way that the center point lies on one side of the inscribed angle. | ∠$MPT$ is inscribed in such a way that the center point lies on the interior of the inscribed angle. | ∠$MPT$ is inscribed in such a way that the center point lies on the exterior of the inscribed angle. |
|  |  |  |

Because you have proved your conjecture is true, you can now refer to it as a theorem. The **Inscribed Angle Theorem** states: “The measure of an inscribed angle is half the measure of its intercepted arc.”

Consider $\triangle ABC$ that is inscribed in circle $P$.



Because you have proved that the relationship is true, you can now refer to it as a theorem. The **Inscribed Right Triangle–Diameter Theorem** states: “If a triangle is inscribed in a circle such that one side of the triangle is a diameter of the circle, then the triangle is a right triangle.”






Because you have proved that this conjecture is true, you can now refer to it as a theorem. The **Inscribed Quadrilateral–Opposite Angles Theorem** states: “If a quadrilateral is inscribed in a circle, then the opposite angles are supplementary.”