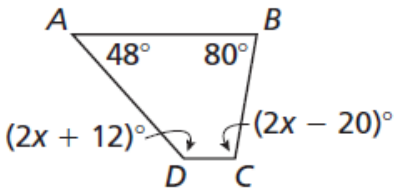
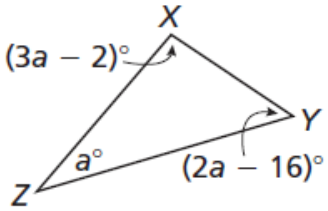
Find the measure of each angle in the polygon.

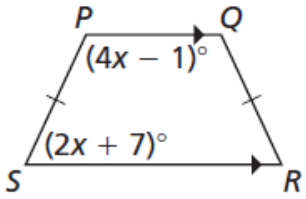
1.



2.

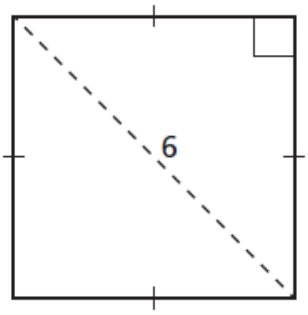


3.

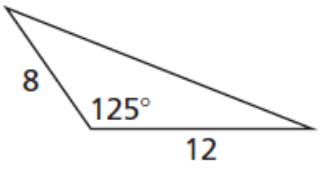


Find the area of the geometric figure. Round your answer to the nearest tenth, when necessary.

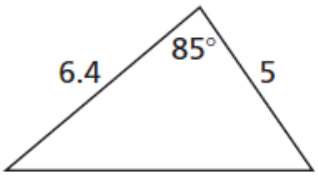
1.



2.



3.



Essential Question

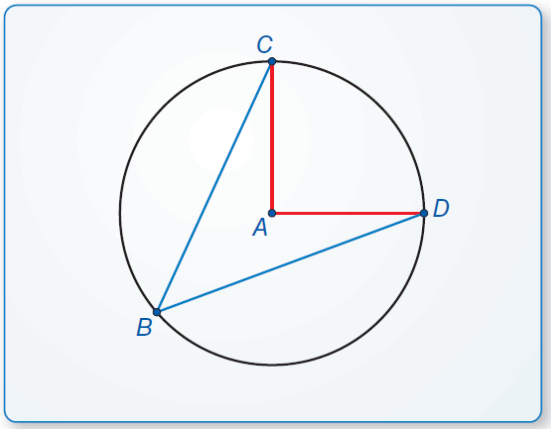
How are inscribed angles related to their intercepted arcs? How are the angles of an inscribed quadrilateral related to each other?

Work with a partner. Use dynamic geometry software.

a. Construct an inscribed angle in a circle. Then construct the corresponding central angle.

b. Measure both angles. How is the inscribed angle related to its intercepted arc?

Sample



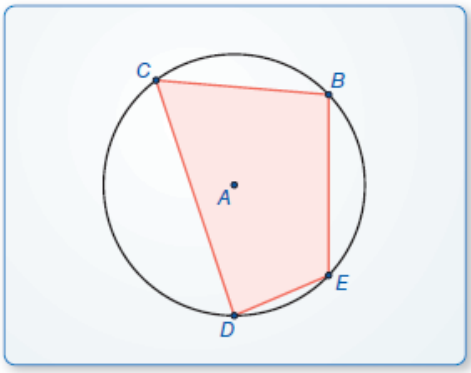
c. Repeat parts (a) and (b) several times. Record your results in a table. Write a conjecture about how an inscribed angle is related to its intercepted arc.

Work with a partner. Use dynamic geometry software.

a. Construct a quadrilateral with each vertex on a circle.

b. Measure all four angles. What relationships do you notice?

Sample

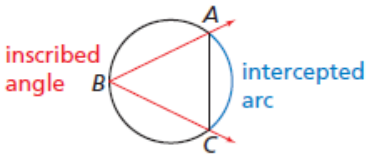


c. Repeat parts (a) and (b) several times. Record your results in a table. Then write a conjecture that summarizes the data.

Core Concept

Inscribed Angle and Intercepted Arc

An **inscribed angle** is an angle whose vertex is on a circle and whose sides contain chords of the circle. An arc that lies between two lines, rays, or segments is called an **intercepted arc**. If the endpoints of a chord or arc lie on the sides of an inscribed angle, then the chord or arc is said to **subtend** the angle.

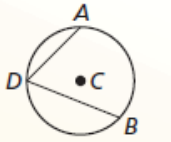


$\angle B$ intercepts $\overset{\frown}{AC}$.
$\overset{\frown}{AC}$ subtends $\angle B$.
$\overline{AC}$ subtends $\angle B$.

Theorem

Theorem 10.10 Measure of an Inscribed Angle Theorem

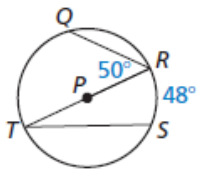
The measure of an inscribed angle is one-half the measure of its intercepted arc.



$m\angle ADB = \frac{1}{2}m\overset{\frown}{AB}$

Proof Ex. 37, p. 560

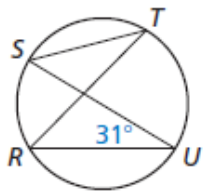
Find the indicated measure.



a. $m\angle T$

b. $m\overset{\frown}{QR}$

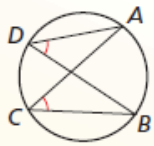
Find $m\overset{\frown}{RS}$ and $m\angle STR$. What do you notice about $\angle STR$ and $\angle RUS$?



Theorem

Theorem 10.11 Inscribed Angles of a Circle Theorem

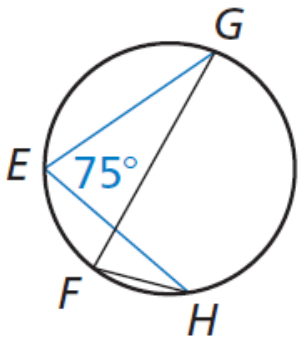
If two inscribed angles of a circle intercept the same arc, then the angles are congruent.



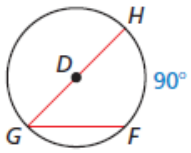
Proof Ex. 38, p. 560

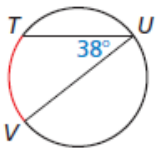
$\angle ADB \cong \angle ACB$

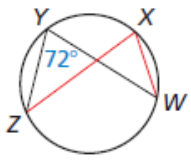
Given $m\angle E = 75°$, find $m\angle F$.



Find the measure of the red arc or angle.

1. 

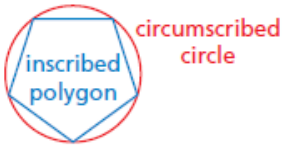
2. 

3. 

Core Concept

Inscribed Polygon

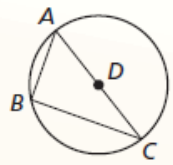
A polygon is an **inscribed polygon** when all its vertices lie on a circle. The circle that contains the vertices is a **circumscribed circle**.



Theorems

Theorem 10.12 Inscribed Right Triangle Theorem

If a right triangle is inscribed in a circle, then the hypotenuse is a diameter of the circle. Conversely, if one side of an inscribed triangle is a diameter of the circle, then the triangle is a right triangle and the angle opposite the diameter is the right angle.

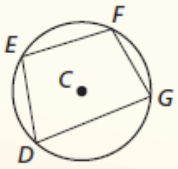


Proof Ex. 39, p. 560

$m\angle ABC = 90°$ if and only if $\overline{AC}$ is a diameter of the circle.

Theorem 10.13 Inscribed Quadrilateral Theorem

A quadrilateral can be inscribed in a circle if and only if its opposite angles are supplementary.

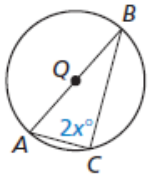


Proof Ex. 40, p. 560

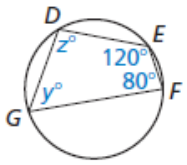
D, E, F, and G lie on $\odot C$ if and only if $m\angle D + m\angle F = m\angle E + m\angle G = 180°$.

Find the value of each variable.

a.



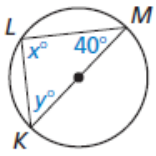
b.



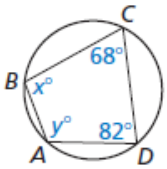
Your camera has a 90° field of vision, and you want to photograph the front of a statue. You stand at a location in which the front of the statue is all that appears in your camera's field of vision, as shown. You want to change your location. Where else can you stand so that the front of the statue is all that appears in your camera's field of vision?

Find the value of each variable.

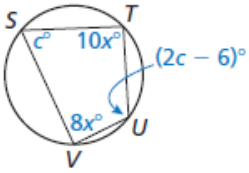
4.



5.



6.



7. In Example 5, explain how to find locations where the front and left side of the statue are all that appears in your camera's field of vision.

• **Exit Ticket:** Quadrilateral *ABCD* is inscribed in a circle. Let $m\angle A = 72°$ and $m\angle B = 113°$. Find $m\angle C$ and $m\angle D$.