

Name:

Date:

Period: 6

Inscribed Angles and Polygons in Circles

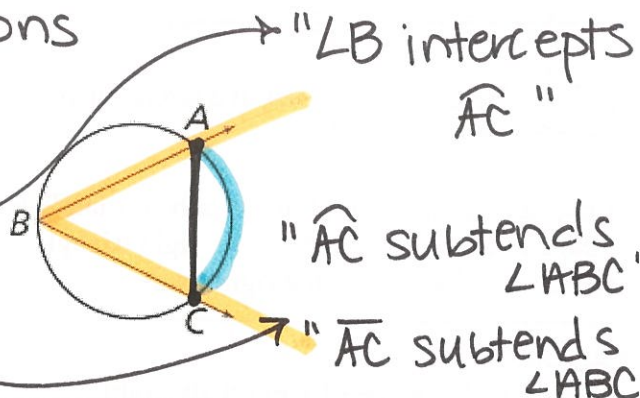
Lesson Objective

WBAT use inscribed $\angle$ s and inscribed polygons

Inscribed Angle: an inscribed angle is an angle whose vertex is on a circle and whose sides are chords of the circle ($\angle ABC$)

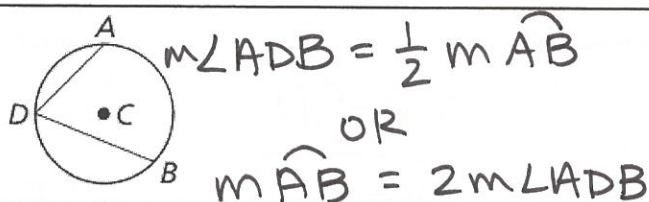
Intercepted arc: An arc on a circle that lies between two lines, rays, or segments ($\widehat{AC}$)

If the endpoints of a chord or arc lie on the sides of the inscribed angle, then the chord or arc is said to "subtend" the angle



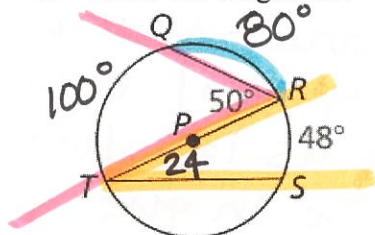
Measure of an Inscribed Angle Theorem

The measure of an inscribed angle is $\frac{1}{2}$ the measure of its intercepted arc



Examples:

1. Given the diagram...

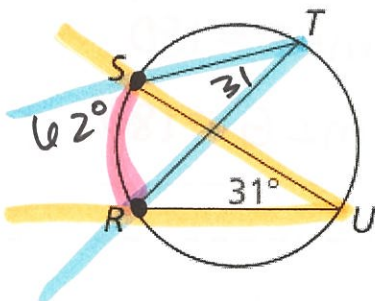


a. Find $m\angle T$ = $\frac{1}{2}(48) = \underline{24^\circ}$

b. Find $m\widehat{QR}$

$$m\widehat{QT} = 2(50) = 100^\circ ; 180 - 100 = \underline{80^\circ}$$

$\widehat{QTR}$ is a semi D!

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

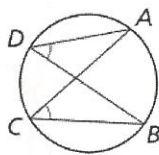
$$m\widehat{RS} = 2(31) = 62$$

$$m\angle STR = \frac{1}{2}(62) = 31$$

$\cong$! and share same intercepted arc, RS

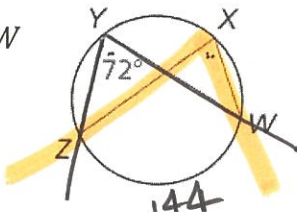
Inscribed Angles of a Circle Theorem

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



$\angle D \cong \angle C$ because they intercept the same arc, $\widehat{AB}$

Example:

3. Find $m\angle ZXW$ 

$$m\angle ZXW = 72^\circ$$

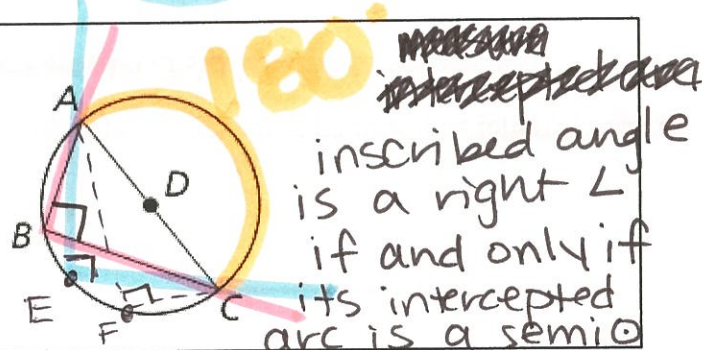
Inscribed Polygons: A polygon is an inscribed polygon when all of its vertices lie on a circle.

Circumscribed Circle: The circle that contains the vertices of an inscribed polygon is called the circumscribed circle.

Inscribed Right Triangle Theorem

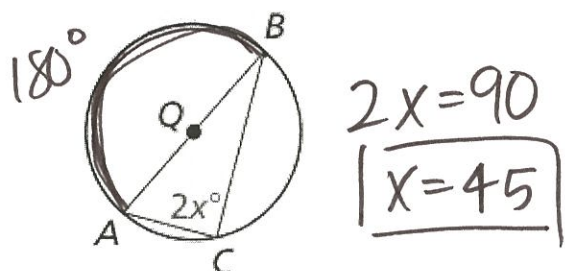
If a right triangle is inscribed in a circle, then the hypotenuse is a diameter of the circle.

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.

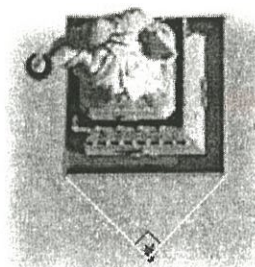


Examples:

4. Find the value of x in the diagram.



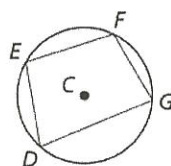
5. Your camera has a 90° field of vision, and you want to photograph the front of a statue. You stand at a location in the front of the statue is all that appears in your camera's field of vision, as shown. You want to change your location. Where else could you stand so that the front of the statue is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



because of the 90° field of vision, as long as you are on the semicircle of circle base of statue as its diameter, the statue will be in the camera's field of vision.

Inscribed Quadrilateral Theorem

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

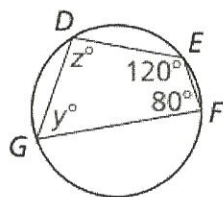


$$m\angle D + m\angle F = 180$$

$$m\angle E + m\angle G = 180$$

Example:

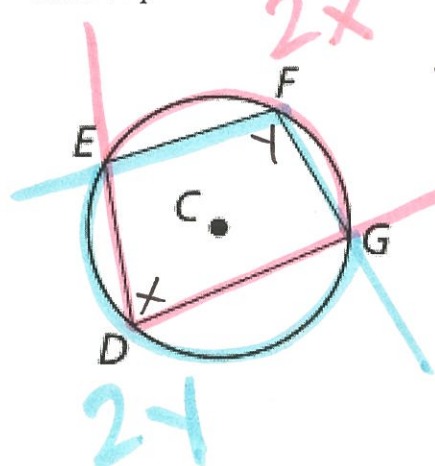
5. Find the values of y and z in the diagram.



$$y = 60$$

$$z = 100$$

"Kind of proof..."



$$\frac{2x + 2y}{2} = \frac{360}{2}$$

$$x + y = 180$$

↓
SUPP!