Geometry Notes Name Key

10.4 Use Inscribed Angles and Polygons

Refer to your activity paper from yesterday!

Inscribed Angle: an angle whose vertex is on a circle and whose sides contain chords of the circle.

Intercepted Arc: the arc that lies in the interior of an inscribed angle and has endpoints on the angle.

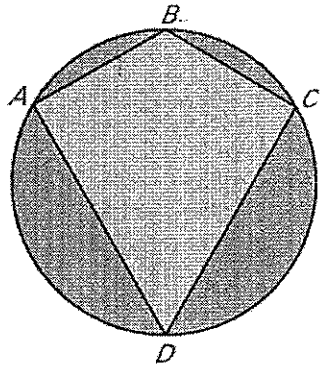
1. $\angle BAD$ is an inscribed angle.

Which arc does it intercept?

BCD

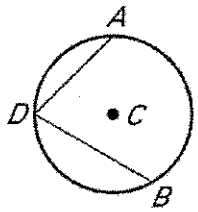
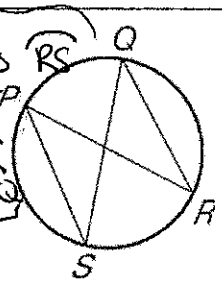
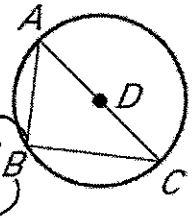
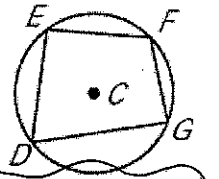
2. Name another inscribed angle and the arc it intercepts.

$\angle ADC$ intercepts $\overset{\frown}{AC}$



Inscribed Polygon: a polygon is an inscribed polygon if all of its vertices lie on a circle. Quad ABCD

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

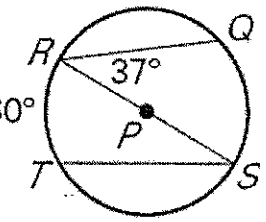
Theorems	Picture/ Description
Measure of an Inscribed Angle Theorem: an inscribed angle $\frac{1}{2}$ the measure of its intercepted arc.	 $m\angle ADB = \frac{1}{2}\overset{\frown}{AB}$
If two inscribed angles of a circle intercept the **same arc**, then the angles are $\cong$	$\angle P \cong \angle Q$ intercepts $\overset{\frown}{RS}$; $\angle S \cong \angle R$ intercepts $\overset{\frown}{PQ}$ 
If a **right triangle** is inscribed in a circle, then the hypotenuse is a diameter of the circle. Explain why: $\triangle ABC$ is inscribed & intercepts $\overset{\frown}{AC}$ which is 180° ∴ $\frac{1}{2}$ is 90°	 $m\angle ABC = 90$ if and only if AC is a diameter
A **quadrilateral** can be **inscribed** in a circle if and only if its opposite angles are Supplementary.	How does $\angle D$ relate to arc EFG? $\frac{1}{2}$ EFG What do you know about $\angle F$? $\frac{1}{2}$ EDG What is arc EFG + arc GDE? 360°  $m\angle D + m\angle F = 180°$

Find the indicated measures.

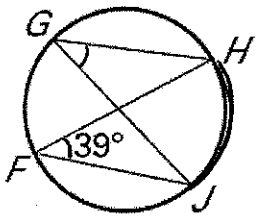
1. a) $\angle S$ intercepts arc $\overset{\frown}{RT}$ $m\angle S = 30^\circ$

   b) $\angle R$ intercepts arc $\overset{\frown}{QS}$ $m\overset{\frown}{QS} = 74^\circ$

   c) $m\overset{\frown}{RQ} = 180 - 74^\circ = 106^\circ$

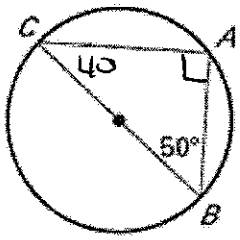


2.

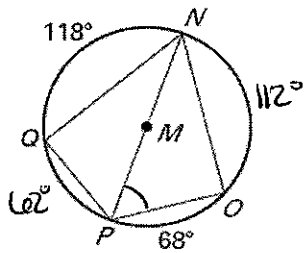


a) $m\overset{\frown}{HJ} = 78^\circ$ b) $m\angle HGJ = 39^\circ$

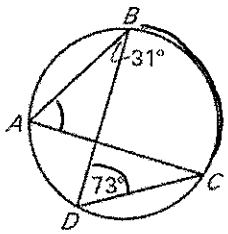
3. $m\overset{\frown}{AB} = 80^\circ$



4. $\angle NPO = 56^\circ$



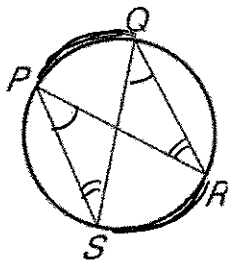
5. $m\angle A = 73^\circ$



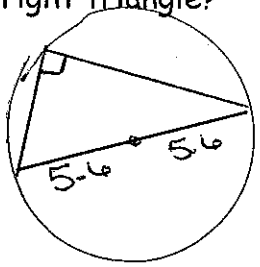
6. Name two pairs of congruent angles that are not vertical angles.

$\angle P \cong \angle Q$

$\angle S \cong \angle R$



7. A right triangle is inscribed in a circle. The radius of the circle is 5.6 cm. What is the length of the hypotenuse of the right triangle?



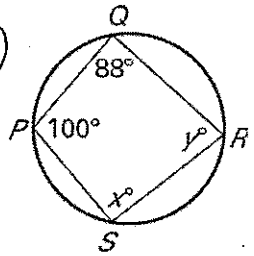
diameter = hypotenuse

$= 11.2$ cm

8. Find the value of each variable.

$x + 88 = 180$ $y + 100 = 180$

$x = 92$ $y = 80$



9. Find the value of each variable.

$\angle Q = \frac{1}{2}\overset{\frown}{FEH}$

$x = \frac{1}{2}(75 + 108)$

$x = 91.5$

$\angle F = \frac{1}{2}\overset{\frown}{EHG}$

$y = \frac{1}{2}(108 + 104)$

$y = 106^\circ$