

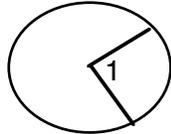
Geometry, You Can Do It !

Circle Theorems, angles

by Bill Hanlon

Last time we looked at circle theorems dealing with lines and segments, today we'll look at angles associated with circles.

A **central angle** of a circle is an angle whose vertex is the center of the circle.



Angle 1 is a central angle of $\odot P$.

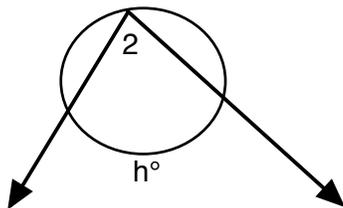
A **minor arc** of a circle is the union of two points on the circle and all the points of the circle that lie in the interior of the central angle whose sides contain the two points.

The measure of a minor arc is defined to be the measure of its central angle.

What that means is that if the measure of the minor arc is 50° , then the measure of $\angle 1$ is 50° .

A **semicircle** is the union of the endpoints of a diameter and all the points of the circle lying on one side of the diameter.

An **inscribed angle** is an angle whose vertex lies on the circle and whose sides contain chords of a circle.



Angle 2 is an inscribed angle.

Theorem

The measure of an inscribed angle is equal to half the measure of the intercepted arc.

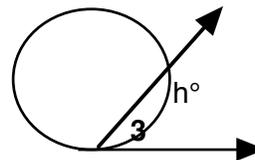
$$\angle 2 = \frac{1}{2} h$$

Corollary

An angle inscribed in a semicircle is a right angle.

Theorem

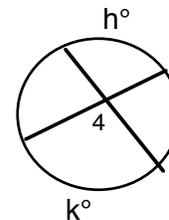
When a secant ray and a tangent ray are drawn from a point on a circle, the measure of the angle formed is equal to half the measure of the intercepted arc.



$$\angle 3 = \frac{1}{2} h$$

Theorem

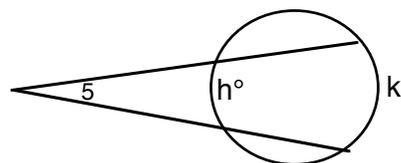
When two secants intersect in the interior of a circle, the measure of the angle is equal to half the sum of the measures of the arcs intercepted by that angle and its vertical angle.



$$\angle 4 = \frac{1}{2}(h + k)$$

Theorem

When two secant rays, a secant ray and a tangent ray, or two tangent rays are drawn to a circle from an exterior point, the measure of the angle formed is equal to half the difference of the measures of the intercepted arcs.



$$\angle 5 = \frac{1}{2}(k - h)$$

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