

Algebra 2
Unit: Geometry
Section: Geometry of Circles

Example: Inscribed Angles

Problem:

Shown below is circle C, with inscribed angles ADB and AEB drawn. Given that major arc ADB measures 280 degrees, angle ADB measures four x plus two y degrees and angle AEB measures twelve x minus 2 y degrees. Find the values of x and y.

Solution:

To begin this problem, we must remember the property that an inscribed angle has a measure equal to half its intercepted arc. In this case, angle ADB and angle AEB BOTH will have half the measure as minor arc AB.

Since we are not given the measure of minor arc AB, we must first find that. That measure will be 360 minus the measure of major arc ADB.

The measure of minor arc AB equals 360 minus 280. This equals 80.

Now we can set up two different equations. One using inscribed angle ADB and one using inscribed angle AEB.

The measure of angle ADB is equal to half of the measure of arc AB, half of 80. The measure of angle AEB is also equal to half of the measure of arc AB, half of 80.

Using the information given in the problem, we can write the following two equations. Four x plus two y equals 40. Twelve x minus two y equals 40. This is a system of two equations with two variables. These can be solved either by the substitution method or the elimination method.

Notice that if we add these two equations together, the y terms will eliminate. This leaves us with sixteen x equals 80. X equals 5.

Substitute that x-value into either of the original equations to find the value of y. 4 times 5 plus 2 y equals 40.

2 y equals 20, which means y equals 10.

If you want to check your work, substitute the x and y values into the original expressions to see if the angles are equal.