

Example: Central Angles**Problem:**

Shown below is circle C, with central angle ACB drawn. Given that major arc ADB measures $40x$ degrees and angle ACB measures $10x$ minus 40 degrees. Find the value of x . Then find the measure of major arc ADB, minor arc AB and the measure of angle ACB.

Solution:

To begin this problem, we must remember the property that a central angle has a measure equal to its intercepted arc. In this case, angle ACB will have the same measure as minor arc AB.

This problem, however, gives us information about the measure of major arc ADB. To find the measure of minor arc AB, we must begin by subtracting that value from 360 degrees.

The measure of arc AB equals 360 minus the measure of arc ADB.

Using the information given in the problem, you can write the equation: the measure of arc AB equals 360 minus $40x$.

We know the property of central angles: the measure of the central angle ACB is equal to the measure of the intercepted arc AB.

Using the information given in the problem and what we found for arc AB, we can write the equation $10x$ minus 40 equals 360 minus $40x$.

Add 40 to both sides to get $10x$ equals 400 minus $40x$.

Add $40x$ to both sides to get $50x$ equals 400.

Divided by 50 to get x equals 8.

The problem has asked us to find the measures of both the major arc ADB and the minor arc AB as well as the measure of angle ACB. We do this simply by substituting the x -value that we found. This is a way to check to make sure that the work we have done is correct.

The measure of major arc ADB equals $40x$. Substituting the value of x equals 8, we get 320 degrees.

Minor arc AB is equal to 360 minus the measure of arc ADB, this is 360 minus 320 which equals 40 degrees.

The measure of central angle ACB equals $10x$ minus 40. Substituting the value x equals 8, we get 10 times 8 minus 40. This equals 40 degrees. We can see, since the central angle and the intercepted arcs have the same measure, that our calculations are correct.