

Circle Angle Lab

Connect circle diagrams, theorems, and reasoning.

HIGH SCHOOL • MA.912.GR.6

MA.912.GR.6 "Use properties and theorems related to circles."

NAME _____

DATE _____

READ THE GIVEN FIGURE

Central angles equal their intercepted minor arcs; inscribed angles are half their intercepted arcs. For crossing chords, multiply opposite pieces. A radius perpendicular to a chord bisects it. Show the equation or theorem you use. Diagrams are not for measuring.

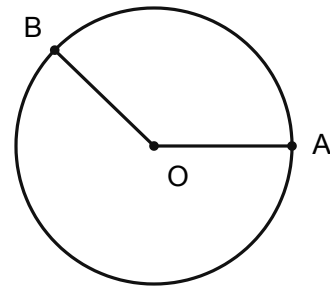
WORKED EXAMPLE

Find minor arc AB and explain why.

1. O is the center, so angle AOB is central.
2. The minor arc equals its central angle: 136° .

Answer: Minor arc AB = 136° .

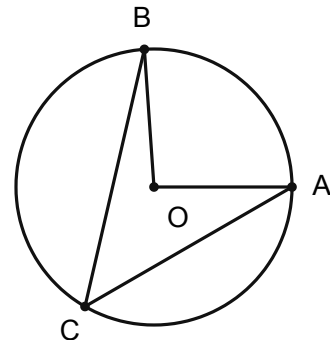
angle AOB = 136°



PRACTICE 4 problems

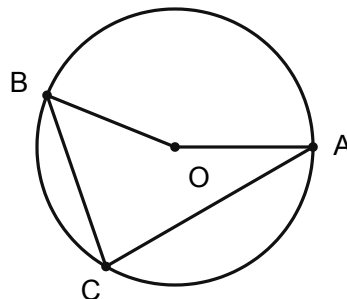
- 1** Find minor arc AB from the inscribed angle. Explain the factor of 2.

angle ACB = 47°



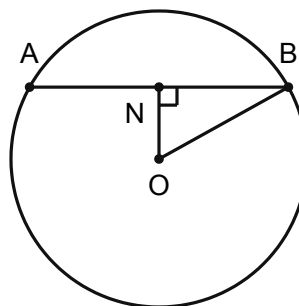
- 2** Find angle ACB. Identify the arc it intercepts.

angle AOB = 158°



- 3** ON is perpendicular to chord AB. AN = 9 and NB = $x + 3$. Find x and justify.

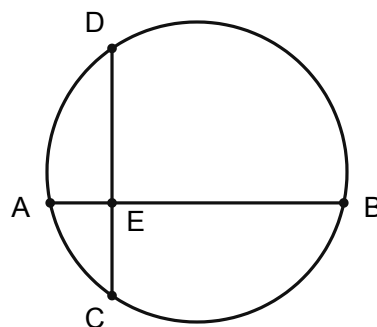
AN = 9; NB = $x + 3$



ON is perpendicular to AB.

- 4** Chords AB and CD cross at E. Find ED = x and show your equation.

AE = 4; EB = 15

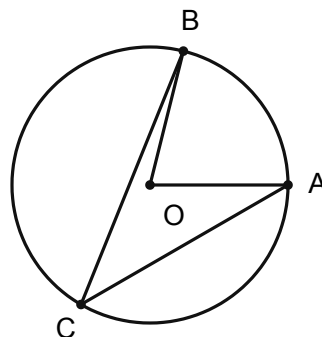


CE = 6; ED = x

APPLY IT Show your work

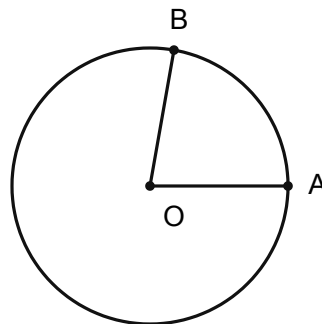
- 1** A circular camera track has center O. The camera at C views A and B. Find the minor arc it sees.

angle ACB = 38°



- 2** A circular garden has radius 9 m. Its minor sector AOB has central angle 80° . Find its arc length and area in terms of pi.

angle AOB = 80°



Radius OA = 9 m

CHALLENGE One step up

Circle O has radius 3 and another circle has radius 8. Explain a translation and dilation that map the first circle onto the second. Why does this prove the circles are similar?

PRACTICE 1

94° ; the arc is twice the 47° inscribed angle.

PRACTICE 2

79° ; angle ACB intercepts minor arc AB = 158° , so $158/2 = 79$.

PRACTICE 3

$x = 6$. A perpendicular radius bisects the chord, so $9 = x + 3$.

PRACTICE 4

$4(15) = 6x$; $x = 10$ units.

APPLY IT 1

76° .

The 38° inscribed angle intercepts minor arc AB, so the arc is $2(38^\circ) = 76^\circ$.

APPLY IT 2

Arc = 4π m; sector area = 18π m².

The sector is $80/360 = 2/9$ of the circle. Arc = $(2/9)(18\pi)$; area = $(2/9)(81\pi)$.

CHALLENGE

Translate O to the other center, then dilate by $8/3$ about that center. Every radius becomes 8; all points land on the second circle. Translation and dilation are similarity transformations.

Lengths and areas need appropriate units; accept equivalent exact expressions using π .