LESSON MAKER PRO

# Circle Angle Secrets

*Use arcs to connect angles at the center and on the rim.*

**HIGH SCHOOL · MT.CORE.GEOM.ARG.1.d**

**MT.CORE.GEOM.ARG.1.d** "Investigate, conjecture, prove theorems, and communicate the proofs in a variety of ways by: Proving theorems about circles. Theorems include: the relationship between central, inscribed, and circumscribed angles..."

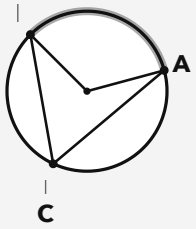
NAME _____ DATE _____

## THE ANGLE CONNECTION

A central angle has the same measure as its intercepted arc. An inscribed angle intercepting that arc has half the measure of the central angle.

**WORKED EXAMPLE**

In the figure, m∠AOB = 120°. Find m∠ACB.




1. Both angles intercept arc AB.
2. m∠ACB = 120° / 2
3. m∠ACB = 60°

**Answer: 60°**

## PRACTICE 4 problems

**1** For the same arc, a central angle is 86°. Find the inscribed angle.

**ANSWER** _____

**2** For the same arc, an inscribed angle is 37°. Find the central angle.

**ANSWER** _____

**3** An arc measures 104°. Find an inscribed angle that intercepts it.

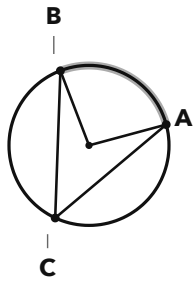
**ANSWER** _____

**4** For the same arc, the central angle is 3x + 18° and an inscribed angle is x + 30°. Find x.

**ANSWER** _____

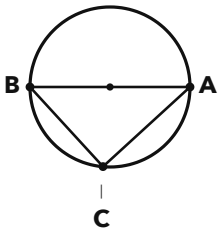
## APPLY IT Show your work

**1** At a round skate park, cameras at O and C view ramps A and B. If m∠AOB = 96°, what is m∠ACB?




**ANSWER** _____

**2** At a round concert stage, exits A and B are opposite ends of a diameter. A camera at C views both exits. Find m∠ACB.




**ANSWER** _____

## CHALLENGE One step up

A central angle is 4x + 36°, and an inscribed angle intercepting the same arc is 3x + 2°. Find x and both angles. Explain your equation.

WORK SPACE AND ANSWER

**ANSWER KEY**

# Circle Angle Secrets

**HIGH SCHOOL · MT.CORE.GEOM.ARG.1.d**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | For the same arc, a central angle is 86°. Find the inscribed angle. | **43°** |
| 2 | For the same arc, an inscribed angle is 37°. Find the central angle. | **74°** |
| 3 | An arc measures 104°. Find an inscribed angle that intercepts it. | **52°** |
| 4 | For the same arc, the central angle is 3x + 18° and an inscribed angle is x + 30°. Find x. | **42** |

## PART 2 · APPLY IT

1. **48°** The angles intercept the same arc, so m∠ACB = 96° / 2 = 48°.
2. **90°** The diameter makes the intercepted arc a semicircle of 180°. Thus m∠ACB = 180° / 2 = 90°.

## CHALLENGE

**x = 16; central angle = 100°; inscribed angle = 50°. Set 4x + 36 = 2(3x + 2) because the central angle is twice the inscribed angle.**

Accept equivalent equations showing that the central angle is twice the inscribed angle. In the diameter problem, students may use either a 180° arc or a 180° central angle.