

Circle Angle Quest

Use arcs, angles, and circle theorems to find missing measures.

HIGH SCHOOL • MA.912.GR.6

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

NAME _____

DATE _____

ARC AND ANGLE RULES

A central angle has the same measure as its intercepted arc. An inscribed angle measures half of its intercepted arc. For an inscribed angle, use the arc that does not contain the angle's vertex.

WORKED EXAMPLE

Point T lies on the major arc RS. The minor arc RS measures 104 degrees. Find $m\angle RTS$.

1. $\angle RTS$ intercepts the minor arc RS.
2. An inscribed angle is half its intercepted arc.
3. $104 / 2 = 52$.

Answer: $m\angle RTS = 52$ degrees

PRACTICE 6 problems

- 1 A central angle measures 86 degrees. What is the measure of its intercepted minor arc?

ANSWER _____

- 2 P lies on the major arc AB. The minor arc AB measures 118 degrees. Find $m\angle APB$.

ANSWER _____

- 3 Q lies on the major arc CD. If $m\angle CQD = 37$ degrees, find the measure of the minor arc CD.

ANSWER _____

- 4 AB is a diameter of a circle, and C is another point on the circle. Find $m\angle ACB$.

ANSWER _____

- 5 R and S both lie on the major arc AB. If $m\angle ARB = 41$ degrees, find $m\angle ASB$.

ANSWER _____

- 6 A tangent touches a circle at T, and TU is a chord. The minor arc TU measures 132 degrees. Find the smaller angle formed by the tangent and chord TU.

ANSWER _____

APPLY IT Show your work

- 1** At a school music festival, a circular LED screen has points A, B, and P marked on its rim. Point P lies on the major arc AB. The minor arc AB measures 132 degrees. What is the measure of the viewing angle $\angle APB$?

WORK SPACE

ANSWER _____

- 2** A student designs a circular skateboard sticker with points M, N, and P on its edge. Point P lies on the major arc MN. If $m\angle MPN = 38$ degrees, what is the measure of the minor arc MN?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Chords AB and CD intersect at E inside a circle. For $\angle AEC$, the intercepted arcs are arc AC and arc BD. If $m \text{ arc AC} = 3x + 10$, $m \text{ arc BD} = x + 30$, and $m\angle AEC = 70$ degrees, find x. Explain your reasoning.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A central angle measures 86 degrees. What is the measure of its intercepted minor arc?	86 degrees
2	P lies on the major arc AB. The minor arc AB measures 118 degrees. Find $m\angle APB$.	59 degrees
3	Q lies on the major arc CD. If $m\angle CQD = 37$ degrees, find the measure of the minor arc CD.	74 degrees
4	AB is a diameter of a circle, and C is another point on the circle. Find $m\angle ACB$.	90 degrees
5	R and S both lie on the major arc AB. If $m\angle ARB = 41$ degrees, find $m\angle ASB$.	41 degrees
6	A tangent touches a circle at T, and TU is a chord. The minor arc TU measures 132 degrees. Find the smaller angle formed by the tangent and chord TU.	66 degrees

PART 2 • APPLY IT

- 66 degrees** Because P lies on the major arc AB, $\angle APB$ intercepts the minor arc AB. An inscribed angle is half its intercepted arc, so $132 / 2 = 66$.
- 76 degrees** Because P lies on the major arc MN, $\angle MPN$ intercepts the minor arc MN. The arc measure is twice the inscribed angle, so $2(38) = 76$.

CHALLENGE

$x = 25$. Use the intersecting-chords angle rule: $70 = 1/2[(3x + 10) + (x + 30)]$, so $70 = 2x + 20$ and $x = 25$.

Accept equivalent angle and arc notation, including degree symbols. For the challenge, accept $x = 25$ with a correct equation using half the sum of the two intercepted arcs.