LESSON MAKER PRO

Circle Angle Quest

Connect arcs, central angles, and related angles.

HIGH SCHOOL · MA.912.GR.6.2

MA.912.GR.6.2 "Solve mathematical and real-world problems involving the measures of arcs and related angles."

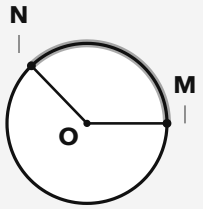
NAME _____ DATE _____

ARC AND ANGLE RULES

A central angle has the same measure as its intercepted minor arc. An inscribed angle measures half its intercepted arc, an angle formed by intersecting chords inside a circle measures half the sum of its intercepted arcs, and an exterior secant angle measures half the difference of its intercepted arcs.

WORKED EXAMPLE

Use the labeled circle. O is the center and m∠MON = 134°. Find the measure of minor arc MN.

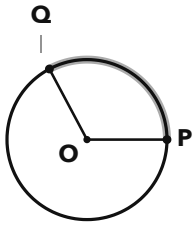


1. m angle MON is a central angle.
2. A central angle and its intercepted minor arc have equal measures.
3. m arc MN = 134°.

Answer: 134°

PRACTICE 6 problems

1 O is the center and m∠POQ = 118°. Use the labeled circle to find the measure of minor arc PQ.



ANSWER _____

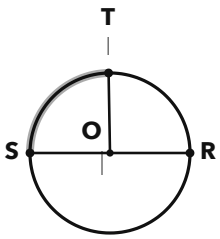
2 An inscribed angle intercepts arc JK and measures 37°. Find m arc JK.

ANSWER _____

3 Minor arc CD measures 156°. Find the measure of an inscribed angle that intercepts arc CD.

ANSWER _____

4 O is the center, RS is a diameter, and T lies on semicircle RS. Given m∠ROT = 91°, find the measure of minor arc TS.



ANSWER _____

5 Chords AB and CD intersect at E inside a circle. m arc AC = 86° and m arc BD = 122°. Find m angle AEC.

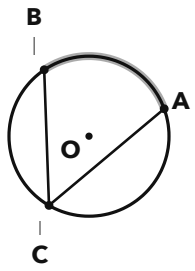
ANSWER _____

6 Two secants from exterior point P meet a circle in the order P-A-B and P-C-D. The far arc BD measures 162°, and the near arc AC measures 46°. Find m angle P.

ANSWER _____

APPLY IT Show your work

1 A drone-racing course has a circular boundary. Camera C is on the boundary and points toward markers A and B. Given inscribed m∠ACB = 52°, use the labeled course diagram to find the measure of minor arc AB that does not contain C.



ANSWER _____

2 At a circular outdoor concert venue, Maya stands at point P outside the boundary. Two sight lines from P meet the boundary in the order P-A-B and P-C-D. The far arc BD measures 170°, and the near arc AC measures 38°. What is the angle between Maya's sight lines?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Chords AB and CD intersect at E inside a circle. m arc AC = 3x + 12, m arc BD = 5x - 8, and m angle AEC = 86°. Find x, m arc AC, and m arc BD. Explain why your equation uses the sum of the two arc measures.

WORK SPACE AND ANSWER

ANSWER KEY # Circle Angle Quest

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	O is the center and m∠POQ = 118°. Use the labeled circle to find the measure of minor arc PQ.	**118°**
2	An inscribed angle intercepts arc JK and measures 37°. Find m arc JK.	**74°**
3	Minor arc CD measures 156°. Find the measure of an inscribed angle that intercepts arc CD.	**78°**
4	O is the center, RS is a diameter, and T lies on semicircle RS. Given m∠ROT = 91°, find the measure of minor arc TS.	**89°**
5	Chords AB and CD intersect at E inside a circle. m arc AC = 86° and m arc BD = 122°. Find m angle AEC.	**104°**
6	Two secants from exterior point P meet a circle in the order P-A-B and P-C-D. The far arc BD measures 162°, and the near arc AC measures 46°. Find m angle P.	**58°**

PART 2 · APPLY IT

1. **104°** Angle ACB is an inscribed angle. Its intercepted arc is twice the angle measure, so m arc AB = 2(52°) = 104°.
2. **66°** An exterior secant angle is half the difference of the far and near arcs. Compute 1/2(170° - 38°) = 66°.

CHALLENGE

x = 21; m arc AC = 75°; m arc BD = 97°. Since angle AEC is formed by intersecting chords inside the circle, its measure is half the sum of its intercepted arcs: 86 = 1/2[(3x + 12) + (5x - 8)].

Accept degree measures with or without the degree symbol. For the challenge, require a correct interior-chord equation or a clear statement that the angle equals half the sum of its intercepted arcs.