LESSON MAKER PRO

Circle Angle Connections

Use arcs, central angles, and inscribed angles to find missing measures.

HIGH SCHOOL · HSG-C.A

CCSS.Math.Content.HSG-C.A "Understand and apply theorems about circles"

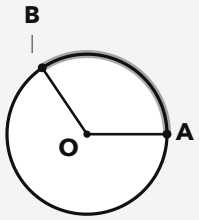
NAME _____ DATE _____

ANGLE AND ARC RULES

A central angle has its vertex at the center of a circle, and its measure equals the measure of its intercepted arc. An inscribed angle has its vertex on the circle, and its measure is half the measure of its intercepted arc. Inscribed angles that intercept the same arc have equal measures.

WORKED EXAMPLE

Circle O has central angle AOB=124°. Find the measure of minor arc AB, highlighted in the diagram.

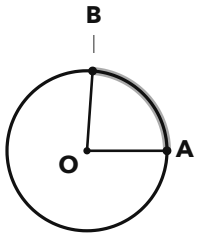


1. The central angle AOB measures 124°.
2. A central angle and its intercepted arc have equal measures.
3. So m arc AB = 124°.

Answer: 124°

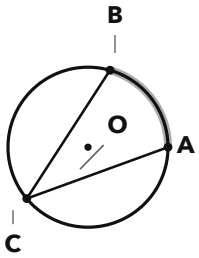
PRACTICE 6 problems

1 Circle O has central angle AOB=86°. Find the measure of the highlighted minor arc AB.



ANSWER _____

2 Inscribed angle ACB=37° intercepts the highlighted minor arc AB. A, B and C are on the circle. Find the measure of minor arc AB.



ANSWER _____

3 An inscribed angle RQS intercepts minor arc RS. If m arc RS = 142°, find m angle RQS.

ANSWER _____

4 A central angle intercepts an arc measuring 156°. An inscribed angle intercepts that same arc. Find the measure of the inscribed angle.

ANSWER _____

5 Angle JKM and angle JLM are inscribed angles that both intercept arc JM. If m angle JKM = 48°, find m angle JLM.

ANSWER _____

6 Quadrilateral ABCD is inscribed in a circle. If m angle A = 109°, find m angle C.

ANSWER _____

APPLY IT Show your work

1 A video club designs a circular esports screen. Points P and Q mark the ends of a highlighted arc, and camera R is on the edge of the screen. The central angle POQ measures 146°. Camera R makes inscribed angle PRQ, which intercepts the highlighted arc. What is m angle PRQ?

WORK SPACE

ANSWER _____

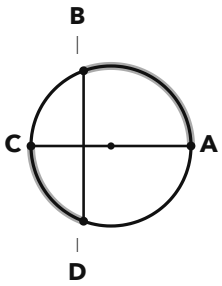
2 At a skate park, points M and N mark the ends of a painted arc on a circular rail. Riders at S and T stand on the rail so that angles MSN and MTN both intercept arc MN. If m angle MSN = 41°, what is m angle MTN?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Points A, B, C, and D lie on a circle in that order. Chords AC and BD intersect at E inside the circle. If m arc AB = 110° and m arc CD = 70°, find m angle AEB. Explain how the two arcs are used. Label the intersection of the drawn chords E.



WORK SPACE AND ANSWER

ANSWER KEY

Circle Angle Connections

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Circle O has central angle AOB=86°. Find the measure of the highlighted minor arc AB.	**86°**
2	Inscribed angle ACB=37° intercepts the highlighted minor arc AB. A, B and C are on the circle. Find the measure of minor arc AB.	**74°**
3	An inscribed angle RQS intercepts minor arc RS. If m arc RS = 142°, find m angle RQS.	**71°**
4	A central angle intercepts an arc measuring 156°. An inscribed angle intercepts that same arc. Find the measure of the inscribed angle.	**78°**
5	Angle JKM and angle JLM are inscribed angles that both intercept arc JM. If m angle JKM = 48°, find m angle JLM.	**48°**
6	Quadrilateral ABCD is inscribed in a circle. If m angle A = 109°, find m angle C.	**71°**

PART 2 · APPLY IT

1. **73°** The central angle shows that m arc PQ = 146°. An inscribed angle intercepting arc PQ measures half of 146°, so it is 73°.
2. **41°** Both angles are inscribed angles that intercept the same arc MN. Inscribed angles intercepting the same arc are congruent.

CHALLENGE

90°. For two chords that intersect inside a circle, m angle AEB is half the sum of its intercepted arcs AB and CD: (110° + 70°) / 2 = 90°.

Accept equivalent notation such as 86 degrees in place of 86°. For the challenge, students should identify that an angle formed by intersecting chords equals half the sum of the two intercepted arcs.