

Circle Shape Sleuth

Use circle facts to solve inscribed triangles and quadrilaterals.

HIGH SCHOOL • MA.912.GR.6.3

MA.912.GR.6.3 "Solve mathematical problems involving triangles and quadrilaterals inscribed in a circle."

NAME _____

DATE _____

ANGLES ON A CIRCLE

In a quadrilateral inscribed in a circle, opposite angles are supplementary, so their measures add to 180 degrees. An inscribed angle measures half the measure of its intercepted arc. Use the angle or arc that faces the angle you need.

WORKED EXAMPLE

Quadrilateral ABCD is inscribed in a circle. If $m\angle A = 73$ degrees, find $m\angle C$.

1. Opposite angles in an inscribed quadrilateral add to 180 degrees.
2. $m\angle A + m\angle C = 180$
3. $73 + m\angle C = 180$
4. $m\angle C = 107$ degrees

Answer: 107 degrees

PRACTICE 6 problems

- 1** Quadrilateral PQRS is inscribed in a circle. If $m\angle P = 68$ degrees, find $m\angle R$.

ANSWER _____

- 2** Quadrilateral ABCD is inscribed in a circle. If $m\angle A = 3x + 12$ and $m\angle C = 5x - 8$, find x .

ANSWER _____

- 3** An inscribed angle intercepts an arc measuring 124 degrees. Find the measure of the angle.

ANSWER _____

- 4** An inscribed angle measures 39 degrees. Find the measure of its intercepted arc.

ANSWER _____

- 5** Triangle ABC is inscribed in a circle. The measure of arc BC is 144 degrees. Find $m\angle A$.

ANSWER _____

- 6** Quadrilateral WXYZ is inscribed in a circle. If $m\angle X = 94$ degrees, find $m\angle Z$.

ANSWER _____

APPLY IT Show your work

- 1** At a drone-racing event, four checkpoints lie on a circular course and form an inscribed quadrilateral. The angle at checkpoint A is 71 degrees. What is the measure of the angle at the opposite checkpoint C?

WORK SPACE

ANSWER _____

- 2** A concert stage designer places three lights A, B, and C on the edge of a circular screen. Arc AB measures 110 degrees, arc BC measures 130 degrees, and arc CA measures 120 degrees. Find the measures of $\angle A$, $\angle B$, and $\angle C$ in the inscribed triangle.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Quadrilateral ABCD is inscribed in a circle. $m\angle A = 4x + 6$, $m\angle B = 3x + 6$, and $m\angle C = 2x + 30$. Find x and the measures of all four angles.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Quadrilateral PQRS is inscribed in a circle. If $m\angle P = 68$ degrees, find $m\angle R$.	112 degrees
2	Quadrilateral ABCD is inscribed in a circle. If $m\angle A = 3x + 12$ and $m\angle C = 5x - 8$, find x .	$x = 22$
3	An inscribed angle intercepts an arc measuring 124 degrees. Find the measure of the angle.	62 degrees
4	An inscribed angle measures 39 degrees. Find the measure of its intercepted arc.	78 degrees
5	Triangle ABC is inscribed in a circle. The measure of arc BC is 144 degrees. Find $m\angle A$.	72 degrees
6	Quadrilateral WXYZ is inscribed in a circle. If $m\angle X = 94$ degrees, find $m\angle Z$.	86 degrees

PART 2 • APPLY IT

- 109 degrees** Opposite angles of an inscribed quadrilateral are supplementary. Subtract 71 from 180 to get 109 degrees.
- $m\angle A = 65$ degrees, $m\angle B = 60$ degrees, $m\angle C = 55$ degrees** Each inscribed angle is half its opposite intercepted arc. $\angle A$ intercepts arc BC, $\angle B$ intercepts arc CA, and $\angle C$ intercepts arc AB.

CHALLENGE

$x = 24$; $m\angle A = 102$ degrees, $m\angle B = 78$ degrees, $m\angle C = 78$ degrees, $m\angle D = 102$ degrees

Accept answers written with or without the word degrees. For the challenge, accept correct angle measures if students use either pair of opposite supplementary angles to find the final missing angle.