LESSON MAKER PRO

Sector Sense

Find arc length and sector area with exact values.

HIGH SCHOOL · MA.912.GR.6.4

MA.912.GR.6.4 "Solve mathematical and real-world problems involving the arc length and area of a sector in a given circle."

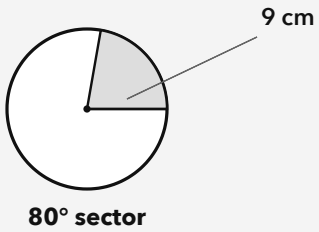
NAME _____ DATE _____

PARTS OF A CIRCLE

For a sector with central angle x°, arc length is $(x/360)(2\pi r)$, and sector area is $(x/360)(\pi r^2)$. First find what fraction of the full 360° circle the sector represents, then multiply that fraction by the full circumference or full area.

WORKED EXAMPLE

The shaded sector has radius 9 cm and central angle 80°. Find its arc length and area.

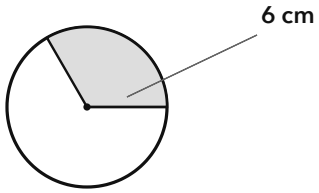


1. The sector is 80/360 = 2/9 of the circle.
2. Arc length = $(2/9)(2\pi)(9) = 4\pi$ cm.
3. Sector area = $(2/9)(\pi)(9^2) = 18\pi$ cm^2.

Answer: Arc length: 4π cm; area: 18π cm^2.

PRACTICE 6 problems

1 The shaded sector has radius 6 cm and central angle 120°. Find its arc length and area.



120° sector

ANSWER _____

_____

2 A sector has radius 10 cm and central angle 72°. Find its arc length and area.

ANSWER _____

_____

3 A circle has radius 7 cm. Find the arc length of a 180° sector.

ANSWER _____

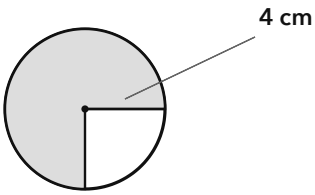
4 Find the area of a sector with radius 8 cm and central angle 45°.

ANSWER _____

5 A sector of a circle with radius 15 cm has arc length 5π cm. Find its central angle.

ANSWER _____

6 The shaded sector has radius 4 cm and central angle 270°. Find its arc length and area.



270° sector

ANSWER _____

_____

APPLY IT Show your work

1 The fan zone at a music festival is a sector of a circular field with radius 12 m and central angle 150°. Organizers place a rope along the curved edge of the zone. Find the rope length and the area of the fan zone.

WORK SPACE

ANSWER _____

2 For a game-streaming logo, Maya designs a 90° sector with radius 14 cm. Find the length of its curved edge and the area she will color.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A sector has radius 12 cm and area 48π cm^2. Find its central angle and its arc length.

WORK SPACE AND ANSWER

Sector Sense

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The shaded sector has radius 6 cm and central angle 120°. Find its arc length and area.	**Arc length: 4π cm; area: 12π cm^2.**
2	A sector has radius 10 cm and central angle 72°. Find its arc length and area.	**Arc length: 4π cm; area: 20π cm^2.**
3	A circle has radius 7 cm. Find the arc length of a 180° sector.	**7π cm**
4	Find the area of a sector with radius 8 cm and central angle 45°.	**8π cm^2**
5	A sector of a circle with radius 15 cm has arc length 5π cm. Find its central angle.	**60°**
6	The shaded sector has radius 4 cm and central angle 270°. Find its arc length and area.	**Arc length: 6π cm; area: 12π cm^2.**

PART 2 · APPLY IT

1. **Rope length: 10π m; area: 60π m^2.** The sector is 150/360 = 5/12 of the full circle. Multiply 5/12 by the circumference 24π and by the area 144π.
2. **Curved edge: 7π cm; area: 49π cm^2.** A 90° sector is 1/4 of a circle. Multiply 1/4 by the circumference 28π and by the area 196π.

CHALLENGE

Central angle: 120°; arc length: 8π cm.

Accept equivalent exact forms involving π. Require length units in cm or m as stated, and area units in cm^2 or m^2 as stated.