

Circle Slice Skills

Find arc lengths and sector areas exactly.

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 _____

PART OF A CIRCLE

A central angle takes a fraction of a full circle, so use $\theta/360$ as the fraction. Arc length is $L = (\theta/360)(2\pi r)$, and sector area is $A = (\theta/360)(\pi r^2)$.

WORKED EXAMPLE

A sector has radius 9 cm and central angle 80 degrees. Find its arc length and area.

1. Arc fraction = $80/360 = 2/9$.
2. Arc length = $(2/9)(2\pi)(9) = 4\pi$ cm.
3. Sector area = $(2/9)(\pi)(9^2) = 18\pi$ cm².

Answer: Arc length = 4π cm; sector area = 18π cm².

PRACTICE 6 problems

- 1** Find the arc length of a 120-degree arc in a circle with radius 6 cm.

ANSWER _____

- 2** Find the area of a sector with radius 10 cm and central angle 72 degrees.

ANSWER _____

- 3** A sector has radius 8 cm and central angle 135 degrees. Find its arc length and area.

ANSWER _____

- 4** A sector has radius 12 cm and area 48π cm². Find its central angle.

ANSWER _____

- 5** Find the area of a sector with radius 5 cm and central angle 216 degrees.

ANSWER _____

- 6** An arc has length 10π cm in a circle with radius 15 cm. Find the central angle of the arc.

ANSWER _____

APPLY IT Show your work

- 1** For a theater production, a spotlight covers a sector of a circular stage. The stage has a radius of 20 ft, and the spotlight sweeps through 126 degrees. What area of the stage is lit?

WORK SPACE

ANSWER _____

- 2** A runner follows a curved path around a circular plaza. The path has radius 21 m and covers a central angle of 240 degrees. How far does the runner travel along the curved path?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A sector has arc length 14π cm and area 126π cm². Find the radius and the central angle.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the arc length of a 120-degree arc in a circle with radius 6 cm.	4π cm
2	Find the area of a sector with radius 10 cm and central angle 72 degrees.	20π cm²
3	A sector has radius 8 cm and central angle 135 degrees. Find its arc length and area.	Arc length = 6π cm; sector area = 24π cm²
4	A sector has radius 12 cm and area 48π cm ² . Find its central angle.	120 degrees
5	Find the area of a sector with radius 5 cm and central angle 216 degrees.	15π cm²
6	An arc has length 10π cm in a circle with radius 15 cm. Find the central angle of the arc.	120 degrees

PART 2 • APPLY IT

- 140π ft²** Use $A = (126/360)(\pi)(20^2)$. Simplify $126/360$ to $7/20$, so the area is 140π ft².
- 28π m** Use $L = (240/360)(2\pi)(21)$. Since $240/360 = 2/3$, the arc length is 28π m.

CHALLENGE

Radius = 18 cm; central angle = 140 degrees

Accept equivalent exact forms that use π and simplify to the listed answers. Require units for arc length and area, and accept degree notation for central angles.