

Circle Slice Lab

Use central angles to measure arcs and sectors.

HIGH SCHOOL • HSG-C.B

CCSS.Math.Content.HSG-C.B "Find arc lengths and areas of sectors of circles"

NAME _____

DATE _____

PART OF A CIRCLE

A central angle tells what fraction of a full 360-degree circle you are using. For radius r and central angle θ , arc length $= (\theta/360) \times 2\pi r$, and sector area $= (\theta/360) \times \pi r^2$.

WORKED EXAMPLE

A circle has radius 11 cm and a central angle of 60 degrees. Find the arc length and the sector area.

1. The angle is $60/360 = 1/6$ of a full circle.
2. The full circumference is $2\pi(11) = 22\pi$ cm.
3. Arc length $= (1/6) \times 22\pi = 11\pi/3$ cm.
4. Sector area $= (1/6) \times \pi(11^2) = 121\pi/6$ cm².

Answer: Arc length = $11\pi/3$ cm; sector area = $121\pi/6$ cm².

PRACTICE 6 problems

- 1** A circle has radius 7 cm and a central angle of 120 degrees. Find the arc length.

ANSWER _____

- 2** A sector has radius 5 m and a central angle of 72 degrees. Find its area.

ANSWER _____

- 3** A circle has radius 12 inches and a central angle of 150 degrees. Find the arc length.

ANSWER _____

- 4** A sector has radius 8 cm and a central angle of 135 degrees. Find its area.

ANSWER _____

- 5** An arc has length 7π cm in a circle with radius 14 cm. Find the central angle.

ANSWER _____

- 6** A sector has area 16π square units and a central angle of 45 degrees. Find the radius.

ANSWER _____

APPLY IT Show your work

- 1** A student club marks off a curved entrance path around a circular outdoor concert area. The path follows a 144-degree central angle of a circle with radius 15 m. What is the length of the path?

WORK SPACE

ANSWER _____

- 2** You are designing a circular sticker for a laptop. A colored wedge has radius 10 cm and a central angle of 108 degrees. What is the area of the colored wedge?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A sector has a central angle of 40 degrees and an arc length of 8π cm. Find the radius of the circle and the area of the sector.

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A circle has radius 7 cm and a central angle of 120 degrees. Find the arc length.	$14\pi/3$ cm
2	A sector has radius 5 m and a central angle of 72 degrees. Find its area.	5π m²
3	A circle has radius 12 inches and a central angle of 150 degrees. Find the arc length.	10π inches
4	A sector has radius 8 cm and a central angle of 135 degrees. Find its area.	24π cm²
5	An arc has length 7π cm in a circle with radius 14 cm. Find the central angle.	90 degrees
6	A sector has area 16π square units and a central angle of 45 degrees. Find the radius.	$8\sqrt{2}$ units

PART 2 · APPLY IT

- 12π m** The path is $144/360 = 2/5$ of the circle's circumference. Compute $(2/5) \times 2\pi(15) = 12\pi$ m.
- 30π cm²** The wedge is $108/360 = 3/10$ of the full circle. Compute $(3/10) \times \pi(10^2) = 30\pi$ cm².

CHALLENGE

Radius = 36 cm; sector area = 144π cm²

Accept equivalent exact forms, including unsimplified fraction forms that are equal. Require π in exact arc lengths and areas, and accept only a positive value for radius.