LESSON MAKER PRO

Cylinder Cover-Up

Find the area of every outside surface.

GRADE 8 · PA.GM.2.2

PA.GM.2.2 "Calculate the surface area of a cylinder, in terms of pi (π) and using approximations for pi (π), using decomposition or nets. Use appropriate units (e.g., cm²)."

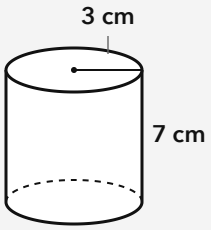
NAME _____ DATE _____

UNWRAP THE CYLINDER

A closed cylinder has two circular ends and one curved side. The ends have a total area of $2\pi r^2$. The side unfolds into a rectangle with area $2\pi rh$, so add these areas to find the total surface area.

WORKED EXAMPLE

Find the total surface area of the closed cylinder shown. Give your answer in terms of π.

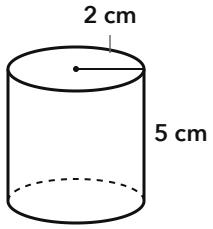


1. Two ends: $2\pi(3^2) = 18\pi$ cm².
2. Curved side: $2\pi(3)(7) = 42\pi$ cm².
3. Total: $18\pi + 42\pi = 60\pi$ cm².

Answer: 60π cm²

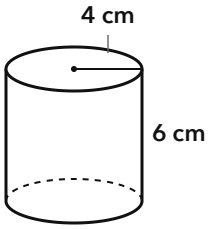
PRACTICE 6 problems

1 Find the total surface area of the closed cylinder shown. Give your answer in terms of π.



ANSWER _____

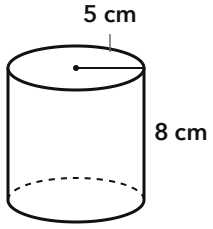
2 For the closed cylinder shown, find the area of the curved side and the total surface area. Give both answers in terms of π.



ANSWER _____

_____

3 Find the total surface area of the closed cylinder shown. Use 3.14 for π.



ANSWER _____

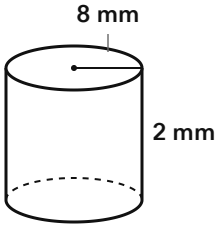
4 A closed cylinder has a diameter of 12 cm and a height of 9 cm. Find its total surface area in terms of π.

ANSWER _____

5 A closed cylinder has a radius of 1 m and a height of 10 m. Find its total surface area using 3.14 for π.

ANSWER _____

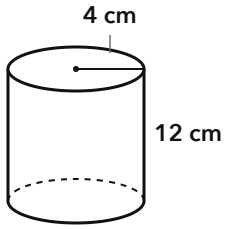
6 Find the total surface area of the closed cylinder shown. Give your answer in terms of π.



ANSWER _____

APPLY IT Show your work

1 A player makes a closed cylindrical case for game tokens. Using the dimensions shown, how much material covers the outside of the case? Give your answer in terms of π.



ANSWER _____

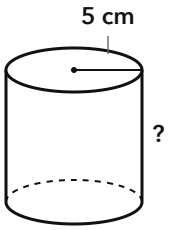
2 A student covers a closed cylindrical gift tin with decorative paper, including both ends. The tin has a radius of 6 cm and a height of 10 cm. How much paper covers the outside? Use 3.14 for π.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The closed cylinder shown has a total surface area of 190π cm². Let x be its height in centimeters. Write an equation and find x.



WORK SPACE AND ANSWER

ANSWER KEY

Cylinder Cover-Up

GRADE 8 · PA.GM.2.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the total surface area of the closed cylinder shown. Give your answer in terms of π.	**28π cm²**
2	For the closed cylinder shown, find the area of the curved side and the total surface area. Give both answers in terms of π.	**Curved side: 48π cm²; total: 80π cm²**
3	Find the total surface area of the closed cylinder shown. Use 3.14 for π.	**408.2 cm²**
4	A closed cylinder has a diameter of 12 cm and a height of 9 cm. Find its total surface area in terms of π.	**180π cm²**
5	A closed cylinder has a radius of 1 m and a height of 10 m. Find its total surface area using 3.14 for π.	**69.08 m²**
6	Find the total surface area of the closed cylinder shown. Give your answer in terms of π.	**160π mm²**

PART 2 · APPLY IT

1. **128π cm²** The two ends have area 32π cm², and the curved side has area 96π cm². Their sum is 128π cm².
2. **602.88 cm²** The total area is $2\pi(6^2) + 2\pi(6)(10) = 192\pi$ cm². Using 3.14 for π gives 602.88 cm².

CHALLENGE

190π = 50π + 10πx, so x = 14 cm.

Accept equivalent exact expressions containing π for questions that request answers in terms of π. Check that students include both circular ends when finding the total surface area.