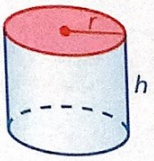
8.6 Lesson

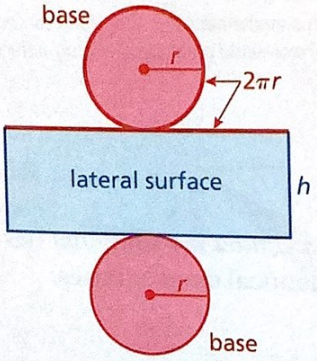
$SA = 2\pi r^2 + 2\pi rh$ (2 circles + side of cylinder)

Key Idea

Surface Area of a Cylinder

Words The surface area S of a cylinder is the sum of the areas of the bases and the lateral surface.





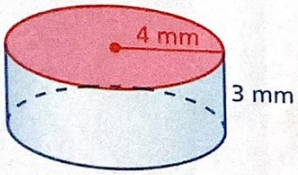
net flattened out of 3D figure

Algebra $S = 2\pi r^2 + 2\pi rh$

Areas of bases

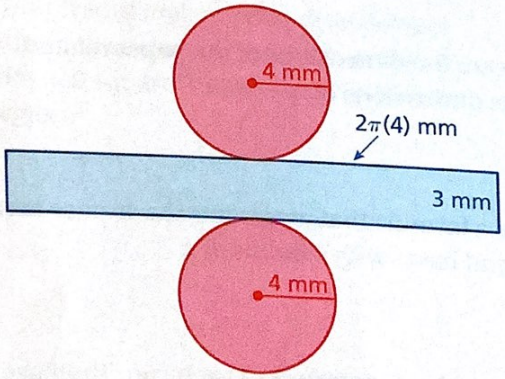
Area of lateral surface

Example 1 Finding the Surface Area of a Cylinder



Find the surface area of the cylinder.

Draw a net. Find the sum of the areas of the bases and the lateral surface.



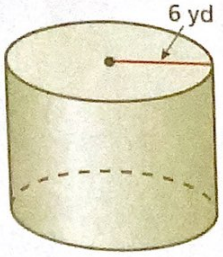
$$S = 2\pi r^2 + 2\pi rh$$
$$= 2\pi(4)^2 + 2\pi(4)(3)$$
$$= 32\pi + 24\pi$$
$$= 56\pi$$
$$\approx 176$$

▶ The surface area is $56\pi \approx 176$ square millimeters.

Try It

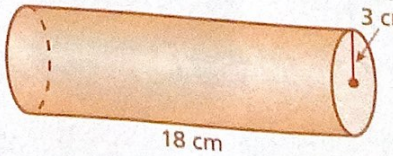
Find the surface area of the cylinder.

1.



$2\pi(6)^2 + 2\pi(6)(9)$
$2\pi 36 + 2\pi 54$
$226.08 + 339.12$
$SA = 565.2 \text{ yd}^2$

2.



$2\pi(3)^2 + 2\pi(3)(18)$
$56.52 + 339.12$
395.64cm^2

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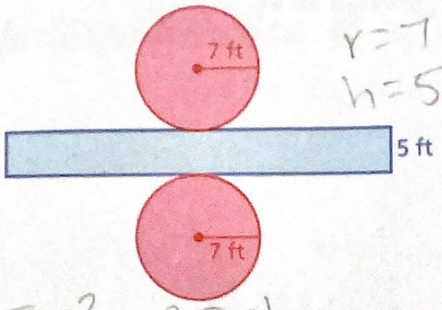
FINDING SURFACE AREA Use the net to find the surface area of the cylinder.

7.



r = 7
h = 5

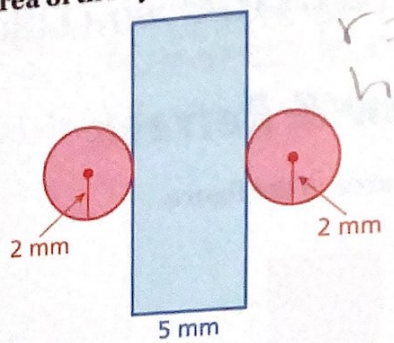
$2\pi r^2 + 2\pi rh$

$2\pi 7^2 + 2\pi(7)(5)$

$307.72 + 219.8$

$527.52 ft^2$

8.



r = 2
h = 5

$2 \cdot \pi \cdot 4 + 2 \cdot \pi \cdot 2 \cdot 5$

$25.12 + 62.8$

$87.92 mm^2$

FINDING SURFACE AREA Find the surface area of the cylinder. (See Example 1.)

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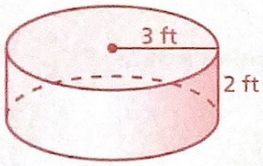
9.



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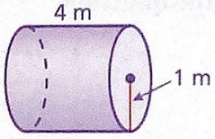

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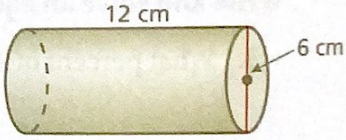
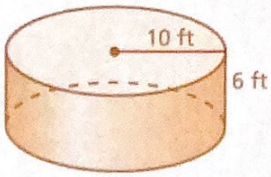


FINDING LATERAL SURFACE AREA Find the lateral surface area of the cylinder. (See Example 2.)

12.



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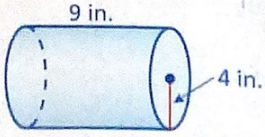
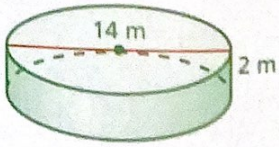
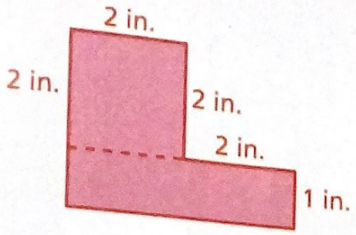


14.

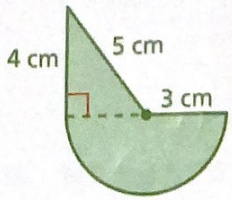


Find the area of the figure.

1.



2.



Write and solve an equation to answer the question.

3. What percent of 92 is 23?

4. 0.75% of what number is 18?

Concepts, Skills, & Problem Solving

FINDING SURFACE AREA Find the surface area of the cylinder. (See Exploration 1.)

5. a can with a radius of 60 millimeters and a height of 160 millimeters

$2 \cdot \pi \cdot 60^2$

22608

6. a hay bale with a diameter of 30 inches and a height of 72 inches

$r = 15$

$2 \cdot \pi \cdot 15^2 + 2 \cdot \pi \cdot 15 \cdot 72$

1413 + 6782.4

8195.4 in^2

60 to 659

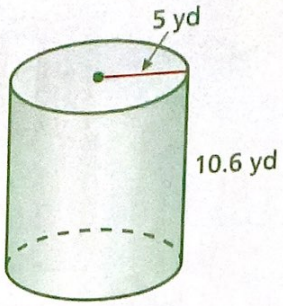
15. B.E.S.T. Test Prep What is the surface area of the cylinder?

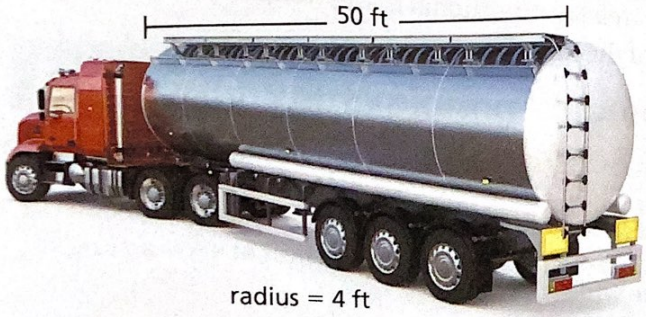
Ⓐ $60\pi \text{ yd}^2$

Ⓑ $78\pi \text{ yd}^2$

Ⓒ $116\pi \text{ yd}^2$

Ⓓ $156\pi \text{ yd}^2$



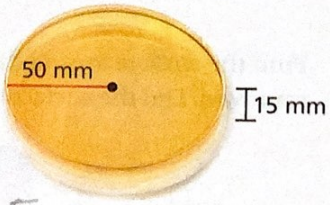


7 MTR

16. MODELING REAL LIFE The tank of a tanker truck is a stainless steel cylinder. Find the surface area of the tank. (See Example 3.)

7 MTR

17. MODELING REAL LIFE The petri dish shown has no lid. What is the surface area of the outside of the petri dish?



no 2 bc no lid → $\pi r^2 + 2\pi rh$

$2500 \cdot \pi + 2\pi \cdot 50 \cdot 15$

$7850 + 4710$

12560 mm^2

18. REASONING You have two 8.5-by-11-inch pieces of paper. You form the lateral surfaces of two different cylinders by taping together a pair of opposite sides on each piece of paper so that one cylinder has a height of 8.5 inches and the other has a height of 11 inches. Without calculating, compare the surface areas of the cylinders (including the bases). Explain.