Objective: Find surface area of cylinders

Concept

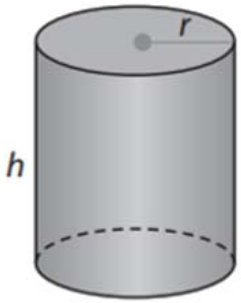
Surface Area, S, is the total area of all surfaces, including sides and bases.

Lateral Area, L, is the area of only the side or sides of a figure.

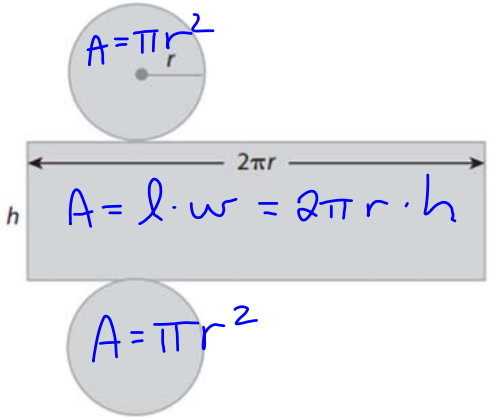
Surface Area of a Cylinder

$$S = L + 2B \text{ or } S = 2\pi rh + 2\pi r^2$$

Cylinder



Net of a Cylinder



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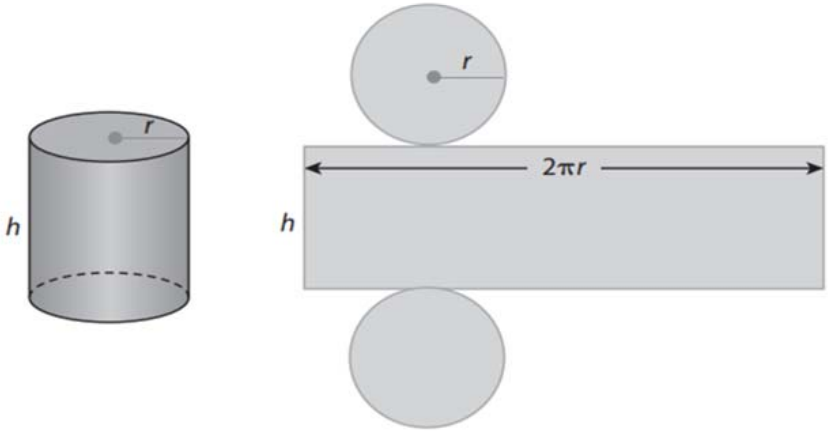
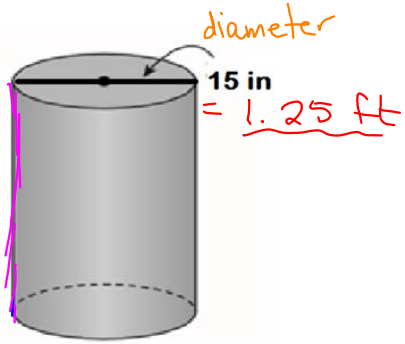
Steps to Find the Surface Area of a Cylinder using $S = 2\pi rh + 2\pi r^2$

1. Find the **radius**, r, of the circular base
2. Find the **height**, h, of the cylinder
3. Find the **lateral area**, $L = 2\pi rh$
4. Find the **area of a base**, $B = \pi r^2$
5. Find the surface area: $S = L + 2B$ *or* $S = 2\pi rh + 2\pi r^2$



Objective: Find surface area of cylinders

Ex) All surfaces of a trash can in the shape of a right cylinder, including the lid, are going to be painted. Find the area that will be painted in square feet. Round to the nearest tenth.



① convert inches to feet

$\frac{15\text{ in}}{1} \cdot \frac{1\text{ ft}}{12\text{ in}} = 1.25\text{ ft}$

② surface area

ⓐ radius $= \frac{\text{diameter}}{2} = \frac{1.25\text{ ft}}{2} = 0.625\text{ ft}$

ⓑ height = 2 ft

ⓒ $S = 2\pi rh + 2\pi r^2$

$S = 2\pi(0.625\text{ ft})(2\text{ ft}) + 2\pi(0.625\text{ ft})^2$

$S \approx 10.3\text{ ft}^2$

$A = \pi r^2 = \pi(.625)^2$

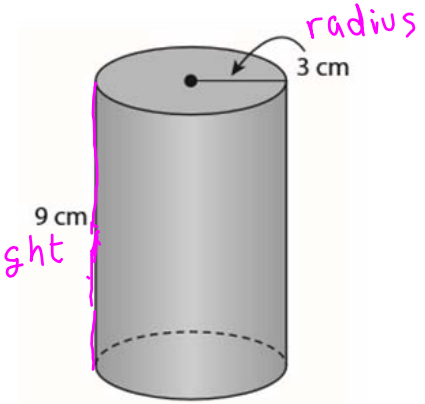
$A = l \cdot w = 2\pi(.625)(2)$

$A = \pi(.625)^2$

ⓓ The area to be painted is about 10.3 square feet.

Objective: Find surface area of cylinders

Ex) An aluminum can is a right cylinder with the given dimensions. A label is going to be wrapped around the entire side of the cylinder. Find the amount of paper needed for the can's label. Round to the nearest tenth.



① side of the can = lateral area

② side of the can $A = l \cdot w = 2\pi rh$ } height = 9cm

circumference of the circle $C = 2\pi r = 2\pi(3\text{cm})$

③ lateral area $= 2\pi rh$

$= 2\pi(3\text{cm})(9\text{cm})$

$\approx 169.6\ \text{cm}^2$

④ The amount of paper needed for the can's label is about $169.6\ \text{cm}^2$.

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Closure

Explain the difference between finding the surface area of a cylinder and only the lateral area of a cylinder.

To find the surface area of a cylinder find the area of both bases and the side using the entire formula $S = 2\pi rh + 2\pi r^2$. To find only the lateral area of a cylinder, find the area of just the side using only the first part of the surface area formula, $L = 2\pi rh$.