

Geometry 12.2

Find lateral area and surface area of prisms*

* 6th grade standard

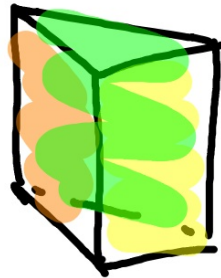
Find lateral area and surface area of cylinders**

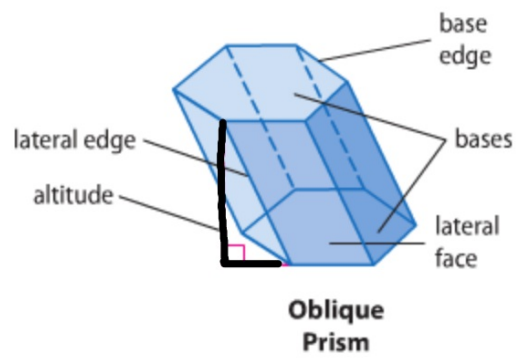
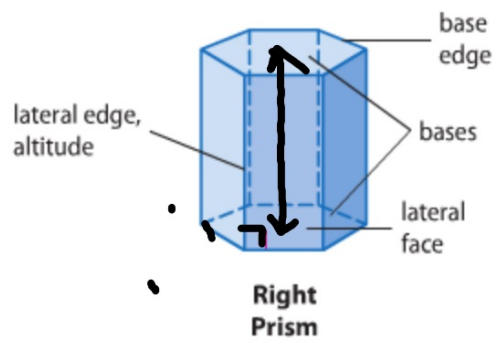
** 8th grade standard

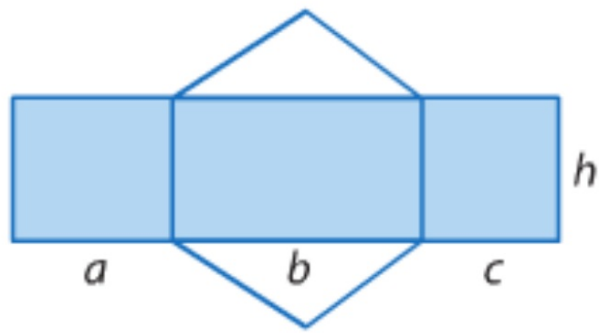
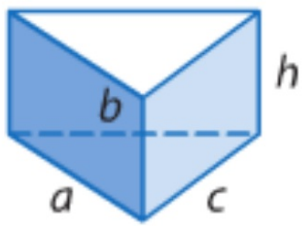
Also Ch. 1

- lateral face
- lateral edge
- base edge
- altitude (height)
- lateral area
- axis
- composite solid
- Total SA**

sides



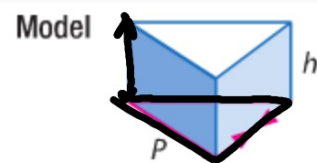




KeyConcept Lateral Area of a Prism

Words The lateral area L of a right prism is $L = Ph$, where h is the height of the prism and P is the perimeter of a base.

Symbols $L = Ph$

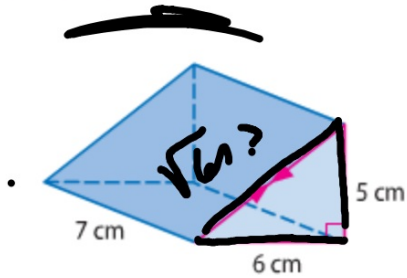


From this point on, you can assume that solids in the text are right solids. If a solid is oblique, it will be clearly stated.

Where are the bases?

Example 1 Lateral Area of a Prism

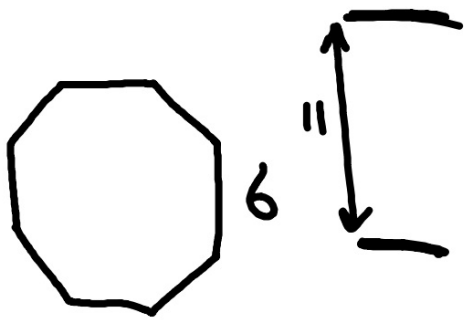
Find the lateral area of the prism. Round to the nearest tenth.



$$\begin{aligned}L &= P \cdot h \\ &= (5 + 6 + 7.81) \cdot 7 \\ &= 131.67 \\ &131.7 \text{ cm}^2\end{aligned}$$

Guided Practice

1. The length of each side of the base of a regular octagonal prism is 6 inches, and the height is 11 inches. Find the lateral area.



$$\begin{aligned} LA &= p \cdot h \\ &= 48 \cdot 11 \\ &= 528 \text{ in}^2 \end{aligned}$$

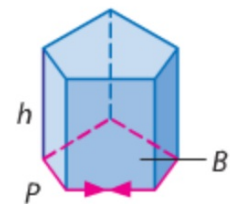
KeyConcept Surface Area of a Prism

Words The surface area S of a right prism is $S = L + 2B$, where L is its lateral area and B is the area of a base.

Symbols $S = L + 2B$ or $S = Ph + 2B$

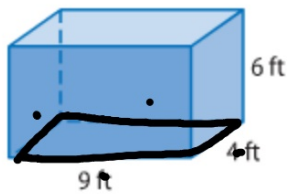


Model



Example 2 Surface Area of a Prism

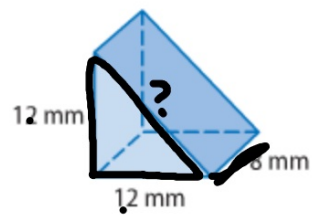
Find the surface area of the rectangular prism.



$$\begin{aligned} &LA + 2B \\ &26(6) + 2 \cdot 36 \\ &156 + 72 \\ &228 \text{ ft}^2 \end{aligned}$$

Guided Practice

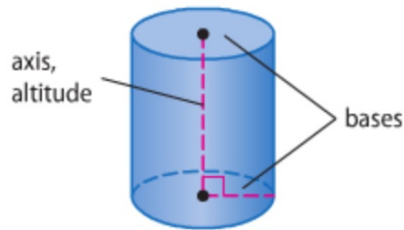
2. Find the surface area of the triangular prism.
Round to the nearest tenth.



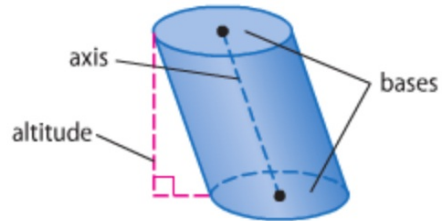
$$\begin{aligned} S &= 2B + \text{perim} \cdot h \\ &= 2\left(\frac{1}{2} \cdot 12 \cdot 12\right) + (12 + 12 + 16) \cdot 8 \\ &= 144 + 327.76 \\ &= 471.8 \text{ mm}^2 \end{aligned}$$

$$LA = p \cdot h \qquad SA = ph + 2B$$

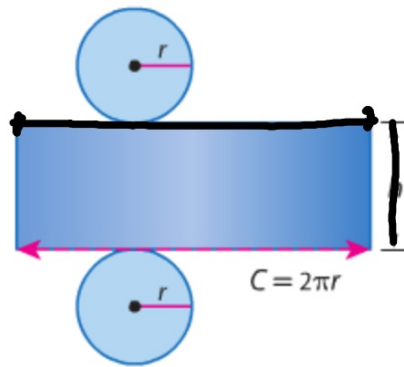
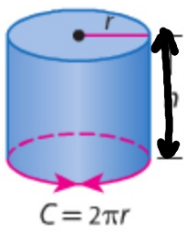
2 Lateral Areas and Surface Areas of Cylinders The **axis** of a cylinder is the segment with endpoints that are centers of the circular bases. If the axis is also an altitude, then the cylinder is a right cylinder. If the axis is not an altitude, then the cylinder is an oblique cylinder.



**Right
Cylinder**



**Oblique
Cylinder**



 **KeyConcept** Surface Area of a Cylinder

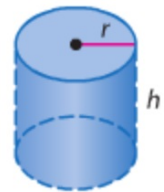


Words

The lateral area L of a right cylinder is $L = 2\pi rh$, where r is the radius of a base and h is the height.

The surface area S of a right cylinder is ~~$S = 2\pi rh + 2\pi r^2$~~ , where r is the radius of a base and h is the height.

Model

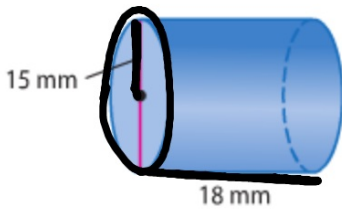


Symbols

$S = L + 2B$ or

Example 3 Lateral Area and Surface Area of a Cylinder

Find the lateral area and the surface area of the cylinder. Round to the nearest tenth.



$$L = p h$$
$$\rightarrow = (15 \pi) 18$$

$$\rightarrow = 848.2 \text{ mm}^2$$

$$SA = L + 2B$$

$$1201.6 \text{ mm}^2$$

$$848.2 + 2 \pi 7.5^2$$
$$353.4$$

Where are the bases?

GuidedPractice

3A. $r = 5$ in., $h = 9$ in.



3B. $d = 6$ cm, $h = 4.8$ cm

12.2
9-27.0
51, 53, 55

