Geometry 12.2 2 bases

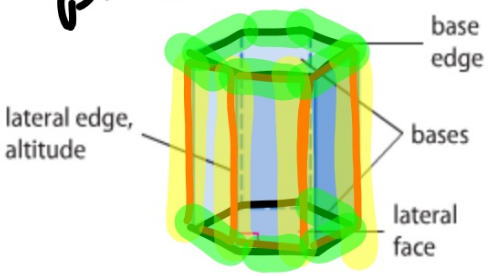
Find lateral area and surface area of prisms* polygon, rect.

Find lateral area and surface area of cylinders** circle, 1 rect.

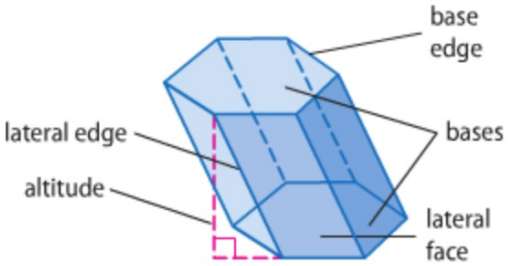
lateral face
lateral edge
base edge
altitude=height (h)
Slant height (l)
lateral area
axis
composite solid

* 6th grade standard
** 8th grade standard
Also Ch. 1.6 & 1.7

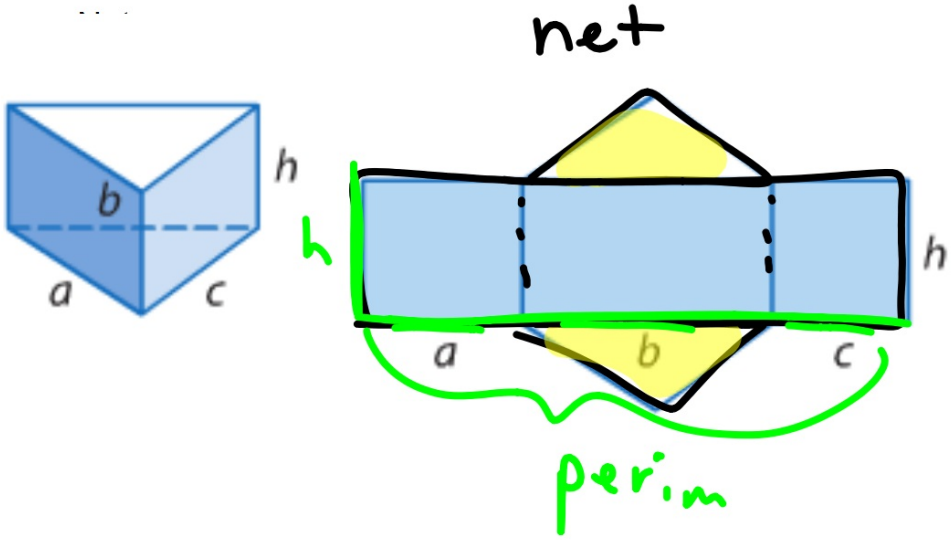
P. 846




**Right Prism**




**Oblique Prism**


net
h
b
a
c
h
h
a
b
c
perim

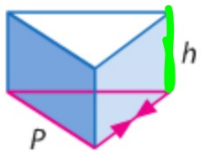
p. 846

## 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** $L = Ph$

**Model**




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.

$LA = P \cdot h = (18.81) \cdot 7$

**Example 1** Lateral Area of a Prism

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

$= 131.7\ cm^2$

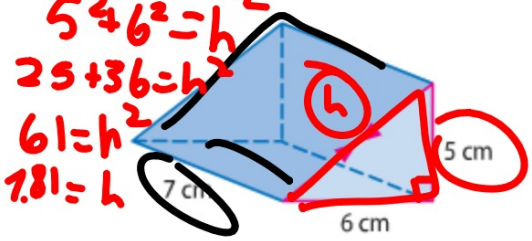
$\cdot 7$

$5^2 + 6^2 = h^2$

$25 + 36 = h^2$

$61 = h^2$

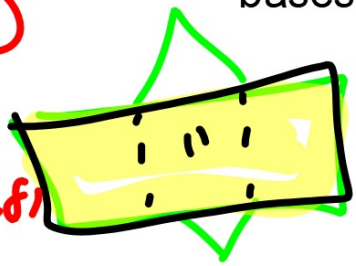
$7.81 = h$




$P = 5 + 6 + 7$

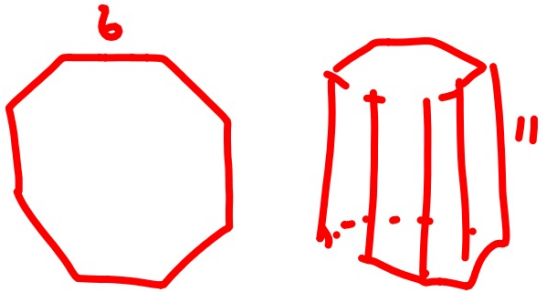
$5 + 6 + 7.81 = 18.81$

Lateral faces MUST be rectangles. So...Where are the bases?



## GuidedPractice

**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.




$LA = Ph$

$= 48 \cdot 11$

$= 528 \text{ in}^2$

$P = 48$

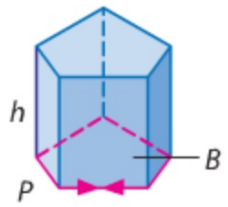
SA = LA + 2B p. 847

## 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.

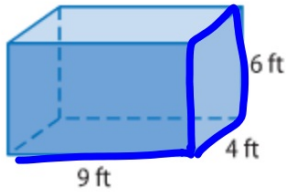
**Symbols** $S = L + 2B$ or $S = Ph + 2B$

**Model**



**Example 2** Surface Area of a Prism

Find the surface area of the rectangular prism.




$SA = LA + 2B$

$= ph + 2l \cdot w$

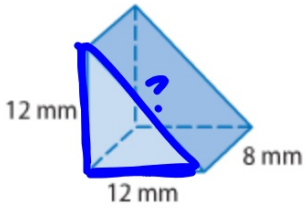
$= 26 \cdot 6 + 2 \cdot 9 \cdot 4$

$= 156 + 72$

$= 228 \text{ ft}^2$

**GuidedPractice**

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




* $SA = LA + 2B$

$= P \cdot h + 2(72)$

$= (40.97)(8) + 144$

$= 327.76 + 144$

$= 399.8 \text{ mm}^2$


$12^2 + 12^2 = h^2$

$16.97 = h$

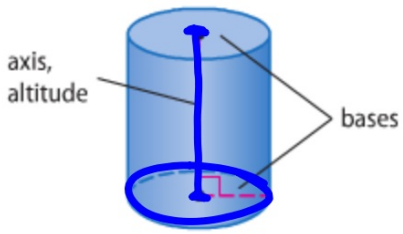
$\frac{1}{2}64$

p. 648

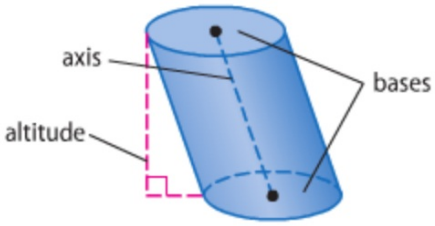
## 2 Lateral Areas and Surface Areas of Cylinders

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.

h



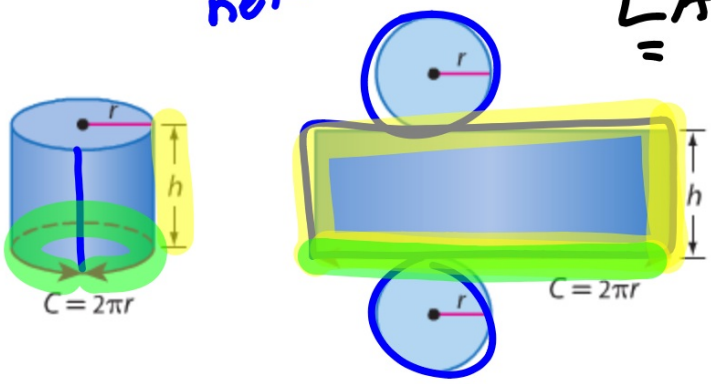

**Right Cylinder**




**Oblique Cylinder**

net

$LA = p \cdot h$



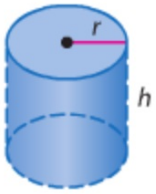
## KeyConcept Surface Area of a Cylinder

**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**



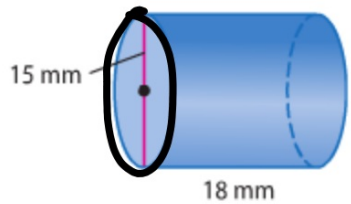

**Symbols**

$S = L + 2B$ or

LA = 47.1 mm²  SA = 400.5 mm²

## 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.**




$LA = P \cdot h$

$= (15 \cdot \pi) \cdot 18$

$= 47.12$


$SA = 47.12 + 2\pi r^2$

35343

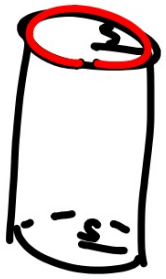
Where are the bases?

Cyl. LA = 282.7 in²
SA = 459.8 in²

**GuidedPractice**

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

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




$LA = p \cdot h$

$= 10\pi \cdot 9 = 282.74$

$SA = LA + 2B$

$= 282.74 + 2(5^2 \cdot \pi)$

$157.08$

12.2 P. 849

1-27 odd