Geometry 12.2

Find lateral area (LA) and surface area (SA) of prisms*

Find lateral area and surface area of cylinders**

base - might be rectangle

lateral face (not base) rectangle

lateral edge face + face

base edge face + base

Altitude=height (h)

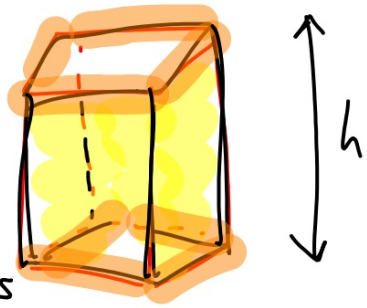
~~Slant height (l)~~

LA lateral area total faces

axis

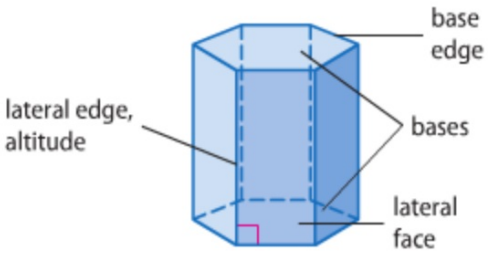
composite solid 2 + solids

SA = lateral + 2 B

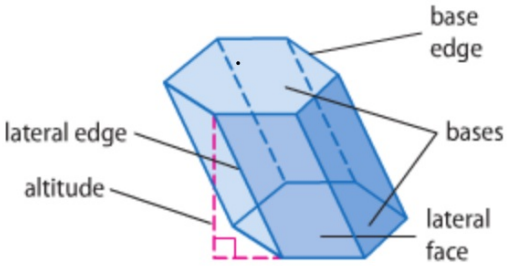


* 6th grade standard

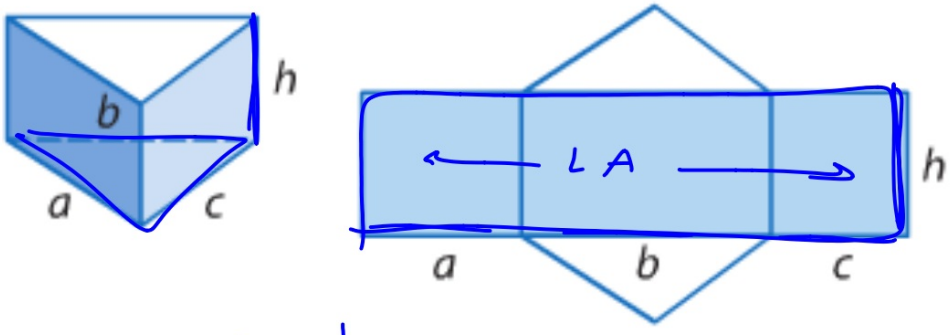
** 8th grade standard
Also Geom. (Ch.1.7)



Right Prism



Oblique Prism



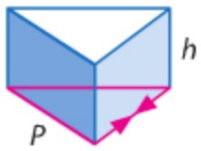
perim. h

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 $L = Ph$

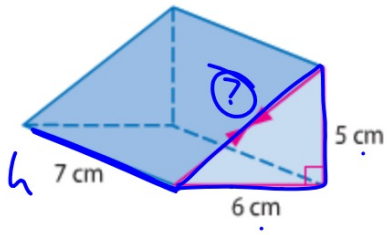
Model



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.

Example 1 Lateral Area of a Prism

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



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

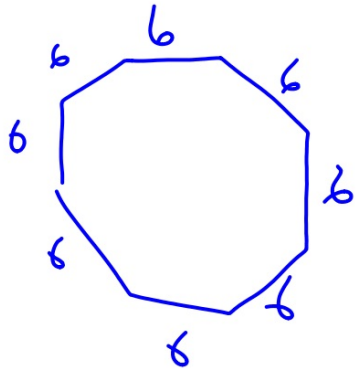
$LA = (5+6+7.8)(7)$

$= (18.8)7$

$= 131.6\ cm^2$

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.



$LA = (48)(11)$

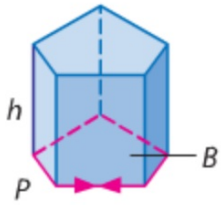
$= 528 \text{ in}^2$

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.

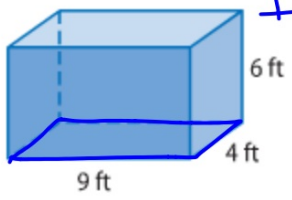
Symbols $S = L + 2B$ or $S = Ph + 2B$

Model



Example 2 Surface Area of a Prism

Find the surface area of the rectangular prism.



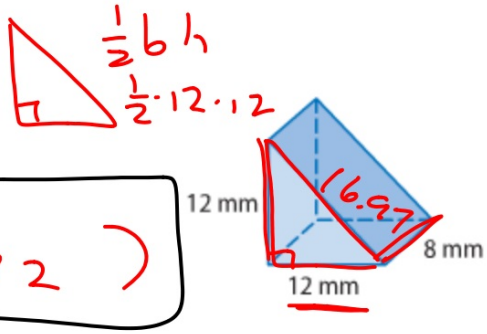
$SA = (2 \cdot 6 \cdot 6) + 2(36)$

$= 156 + 72$

$= 228 \text{ ft}^2$

GuidedPractice

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



$\frac{1}{2}bh$

$\frac{1}{2} \cdot 12 \cdot 12$

$SA = (40.97 \cdot 8) + 2(72)$

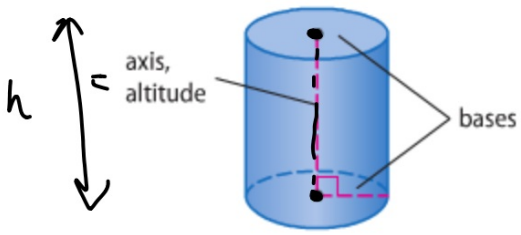
$= 327.76 + 144$

$= 471.8 \text{ mm}^2$

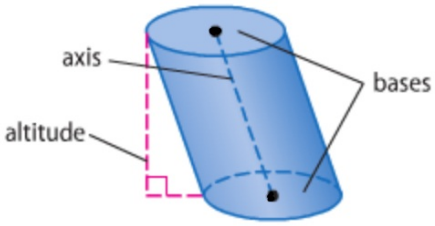
$A = \pi r^2$ $C = \pi d$

2 Lateral Areas and Surface Areas of Cylinders

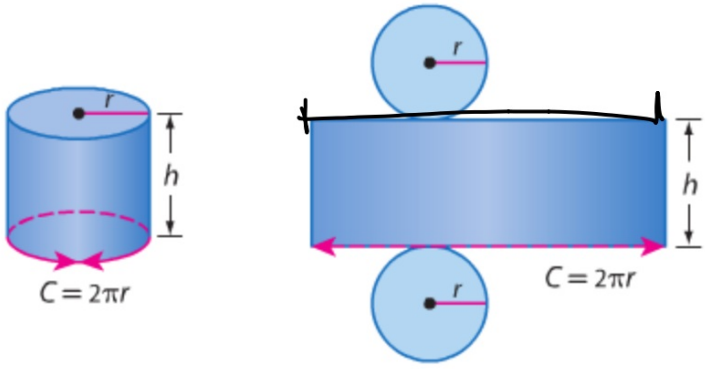
The **axis** of a cylinder is the segment with endpoints that are centers of the circular bases. If the axis is also an altitude, then the cylinder is a right cylinder. If the axis is not an altitude, then the cylinder is an oblique cylinder.



Right Cylinder



Oblique Cylinder


r
h
C = 2πr
r
h
C = 2πr
r

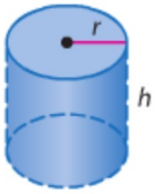
KeyConcept Surface Area of a Cylinder

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

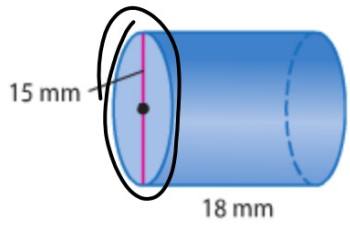


Symbols

$S = L + 2B$ 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.



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

$= 848.16 \rightarrow 848.2 \text{ mm}^2$

$SA = (848.16) + 2(\pi \cdot 7.5^2)$

$= 848.16 + 353.25$

$= 1201.4 \text{ mm}^2$

Where are the bases?

GuidedPractice

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

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

Composite 2+

WB 12.2
prac
8k.