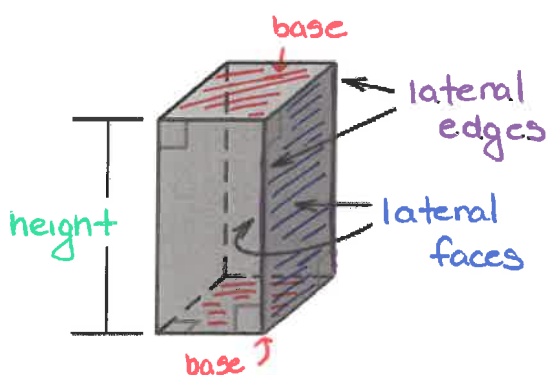


12.2 Surface Area of Prisms and Cylinders  
Geometry CP

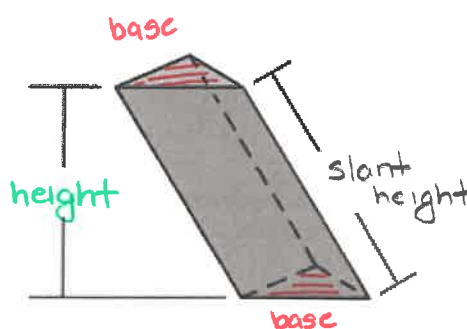
**Prism:** a solid w/ 2 congruent faces that lie in parallel planes  
*bases*

**Lateral Faces:** other faces of the prism that are parallelograms formed by connecting the corresponding vertices of the bases  
segments connecting these vertices: *lateral edges*

**Altitude/Height of a Prism:** perpendicular distance between its bases



Right Rectangular Prism



Oblique triangular prism

**Surface Area:** sum of the areas of its faces

\*classified by shape of its base

**Lateral Area:** sum of the areas of its lateral faces

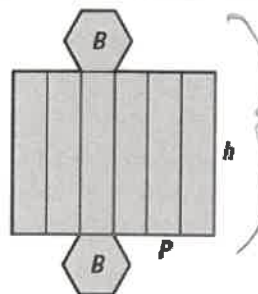
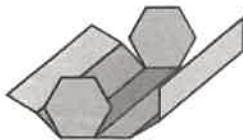
**Cylinder:** a solid w/ congruent circular bases that lie in parallel planes

**Surface Area Formulas:**

**Right Prism:**

$$S = 2B + Ph$$

Where  $B$  is the area of a base,  $P$  is the perimeter of a base, and  $h$  is the height.



Net  
|  
unfolded  
object

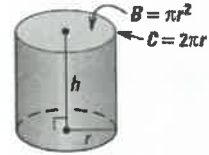
In the net of the prism, notice that the lateral area (the sum of the areas of the lateral faces) is equal to the perimeter of the base multiplied by the height.

12.2 Surface Area of Prisms and Cylinders  
Geometry CP

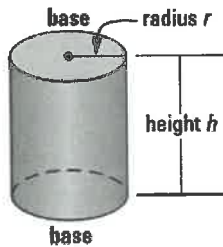
**Right Cylinder:**

$$S = 2B + Ch$$

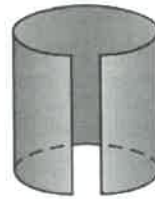
$$= 2\pi r^2 + 2\pi r h$$



Where  $B$  is the area of the base,  $C$  is the circumference of a base,  $r$  is the radius, and  $h$  is the height.



base areas

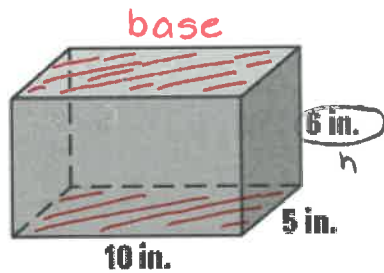


lateral area  $2\pi r h$

1. Find the surface area of:

a.

Right Rectangular  
Prism



$$S = 2B + Ph$$

$$= 2lw + Ph$$

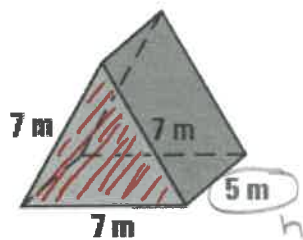
$$= 2(10)(5) + (10 + 10 + 5 + 5)(6)$$

$$= 100 + 180$$

$$= 280 \text{ in}^2$$

b.

Right Equilateral  
Triangular Prism



$$S = 2B + Ph$$

$$= 2\left(\frac{\sqrt{3}}{4}s^2\right) + Ph$$

$$= 2\left(\frac{\sqrt{3}}{4}(7)^2\right) + (7 + 7 + 7)(5)$$

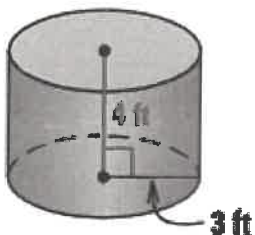
$$= \frac{49\sqrt{3}}{2} + 105$$

$$= 147.4 \text{ m}^2$$

12.2 Surface Area of Prisms and Cylinders  
Geometry CP

c.

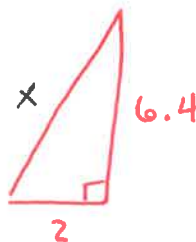
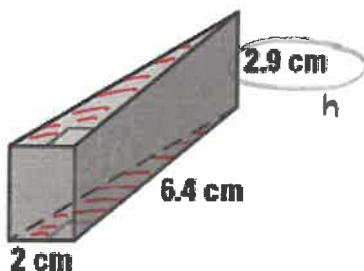
Right  
Cylinder



$$\begin{aligned}
 S &= 2\pi r^2 + 2\pi r h \\
 &= 2\pi(3)^2 + 2\pi(3)(4) \\
 &= 18\pi + 24\pi \\
 &= 42\pi \text{ ft}^2
 \end{aligned}$$

d.

Right Triangular  
Prism

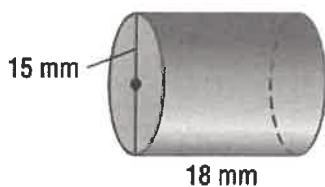


$$\begin{aligned}
 S &= 2B + Ph \\
 &= 2\left(\frac{1}{2}bh\right) + Ph \\
 &= 2\left(\frac{1}{2}(2)(6.4)\right) + (2 + 6.4 + 6.71)(2.9) \\
 &= 12.8 + 43.819 \\
 &= 56.6 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 2^2 + 6.4^2 &= x^2 \\
 44.96 &= x^2 \\
 6.71 &\approx x
 \end{aligned}$$

e.

Right  
Cylinder

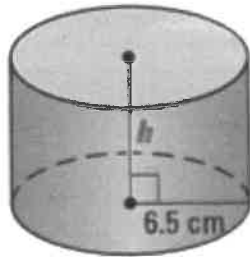


$$\begin{aligned}
 d &= 15 \\
 r &= 7.5
 \end{aligned}$$

$$\begin{aligned}
 S &= 2\pi r^2 + 2\pi r h \\
 &= 2\pi(7.5)^2 + 2\pi(7.5)(18) \\
 &= 112.5\pi + 270\pi \\
 &= 382.5\pi \text{ mm}^2
 \end{aligned}$$

12.2 Surface Area of Prisms and Cylinders  
Geometry CP

2. Find the height of the cylinder which has a radius of 6.5 centimeters and a surface area of 592.19 square centimeters.



$$S = 2\pi r^2 + 2\pi r h$$

$$592.19 = 2\pi (6.5)^2 + 2\pi (6.5) h$$

$$592.19 = 84.5\pi + 13\pi h$$

$$326.7254 = 13\pi h$$

$$7.9999 \approx h$$

$$\boxed{8 \text{ cm} \approx h}$$