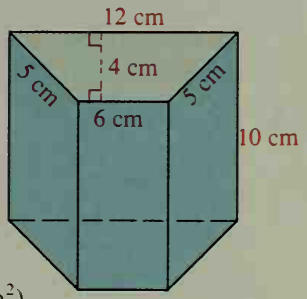
Example 1 A right trapezoidal prism is shown. Find the **(a)** lateral area, **(b)** total area, and **(c)** volume.



Solution

a. First find the perimeter of a base.
$p = 5 + 6 + 5 + 12 = 28$ (cm)

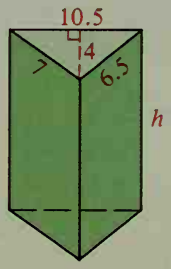
Now use the formula for lateral area.
L.A. $= ph = 28 \cdot 10 = 280$ (cm^2)

b. First find the area of a base.
$B = \frac{1}{2} \cdot 4 \cdot (12 + 6) = 36$ (cm^2)

Now use the formula for total area.
T.A. $=$ L.A. $+ 2B = 280 + 2 \cdot 36 = 352$ (cm^2)

c. $V = Bh = 36 \cdot 10 = 360$ (cm^3)

Example 2 A right triangular prism is shown. The volume is 315. Find the total area.



Solution First find the height of the prism.

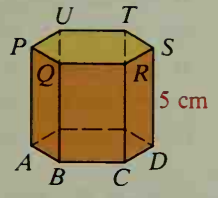
$$\begin{aligned} V &= Bh \\ 315 &= (\tfrac{1}{2} \cdot 10.5 \cdot 4)h \\ 315 &= 21h \\ 15 &= h \end{aligned}$$

Next find the lateral area.
L.A. $= ph = (10.5 + 6.5 + 7) \cdot 15 = 24 \cdot 15 = 360$

Now use the formula for total area.
T.A. $=$ L.A. $+ 2B = 360 + 2 \cdot 21 = 402$

Classroom Exercises

Exercises 1–6 refer to the right prism shown.



1. The prism is called a right ___?___ prism.
2. How many lateral faces are there?
3. What kind of figure is each lateral face?
4. Name two lateral edges and an altitude.
5. The length of an altitude is called the ___?___ of the prism.
6. Suppose the bases are regular hexagons with 4 cm edges.
   a. Find the lateral area. **b.** Find the base area.
   c. Find the total area. **d.** Find the volume.

7. Can a prism have lateral faces that are triangles?
8. What is the minimum number of faces a prism can have?
9. If two prisms have equal volumes, must they also have equal total areas?
10. **a.** Since 1 yd $= 3$ ft, 1 yd^2 $=$ ___?___ ft^2 and 1 yd^3 $=$ ___?___ ft^3.
    b. Since 1 ft $=$ ___?___ in., 1 ft^2 $=$ ___?___ in.^{2} and 1 ft^3 $=$ ___?___ in.^{3}
    c. Since 1 m $=$ ___?___ cm, 1 m^2 $=$ ___?___ cm^2 and 1 m^3 $=$ ___?___ cm^3.