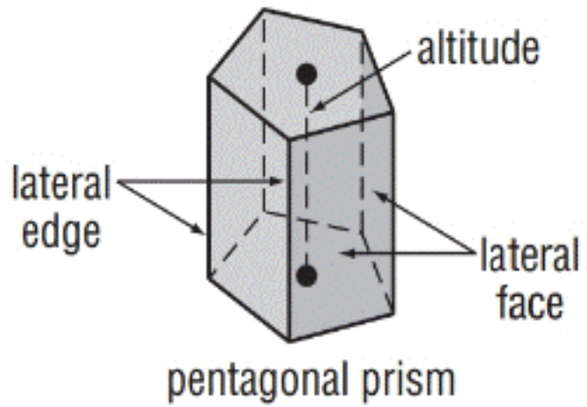
12-2 Surface Area of Prisms

Lateral Areas of Prisms

Here are some characteristics of prisms.

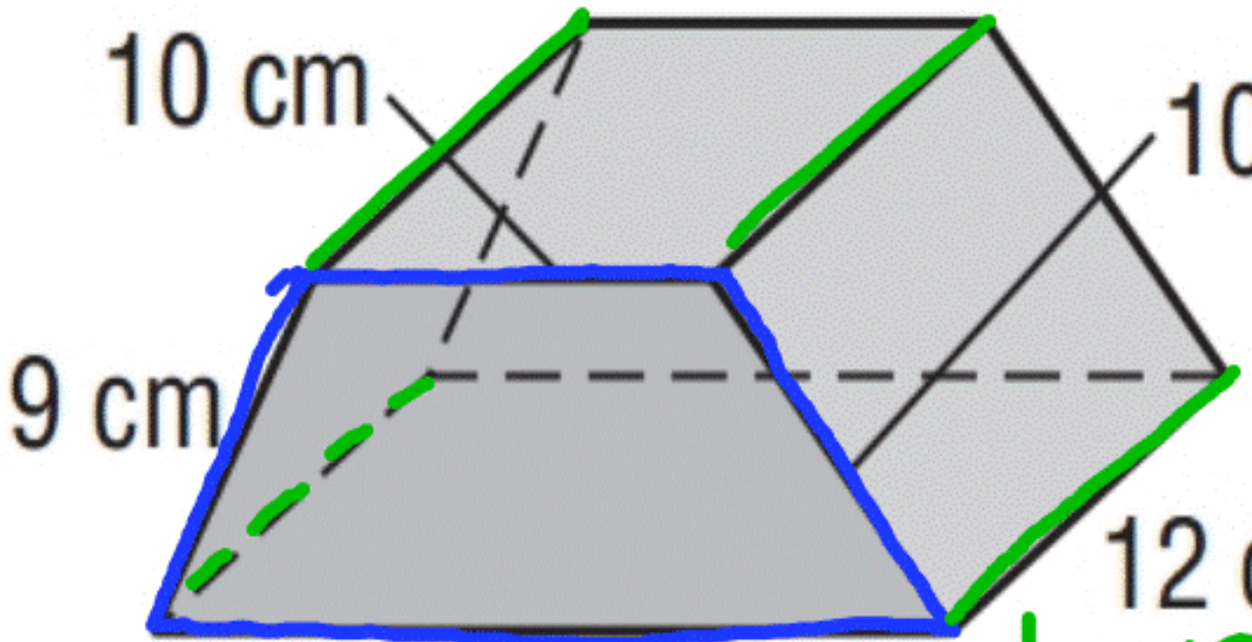
- The bases are parallel and congruent.
- The **lateral faces** are the faces that are not bases.
- The lateral faces intersect at **lateral edges**, which are parallel.
- The **altitude** of a prism is a segment that is perpendicular to the bases with an endpoint in each base.
- For a **right prism**, the lateral edges are perpendicular to the bases. Otherwise, the prism is **oblique**.

Lateral Area of a Prism	If a prism has a lateral area of L square units, a height of h units, and each base has a perimeter of P units, then $L = Ph$.



pentagonal prism

Find the lateral area of each prism.



$L = Ph$ ← height between bases

P ← perimeter of base

$P = 9 + 20 + 10 + 10$

$P = 49\text{ cm}$

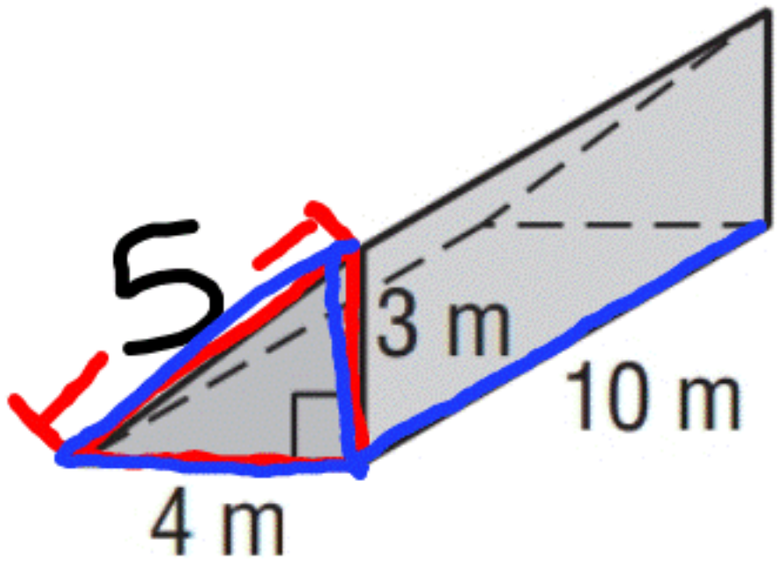
$h = 12\text{cm}$

$L = (49)(12)$

$= 588\text{cm}^2$

Find the lateral area of each prism.

$L = Ph$



$3^2 + 4^2 = x^2$

$9 + 16 = x^2$

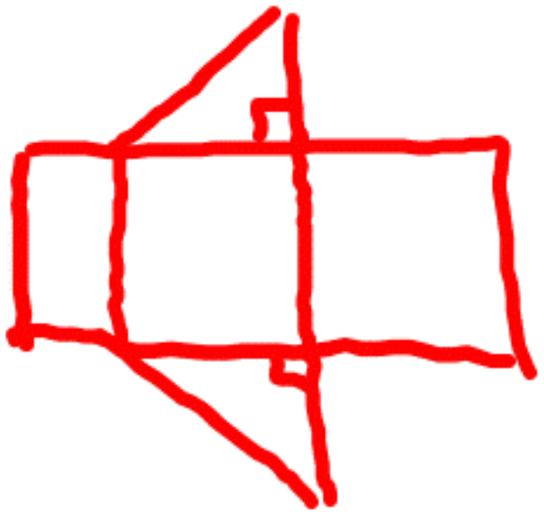
$\sqrt{25} = \sqrt{x^2}$

$x = 5$

$4 + 3 + 5$

$P = 12\text{ m}$

$h = 10\text{ m}$

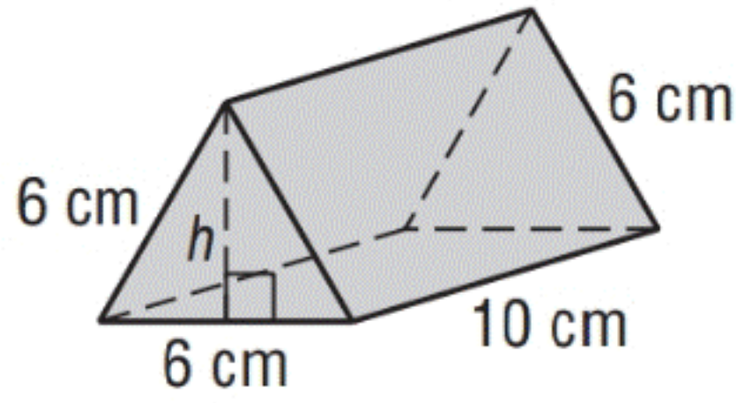


$L = 12(10) = 120\text{ m}^2$

Surface Areas of Prisms

The surface area of a prism is the lateral area of the prism plus the areas of the bases.

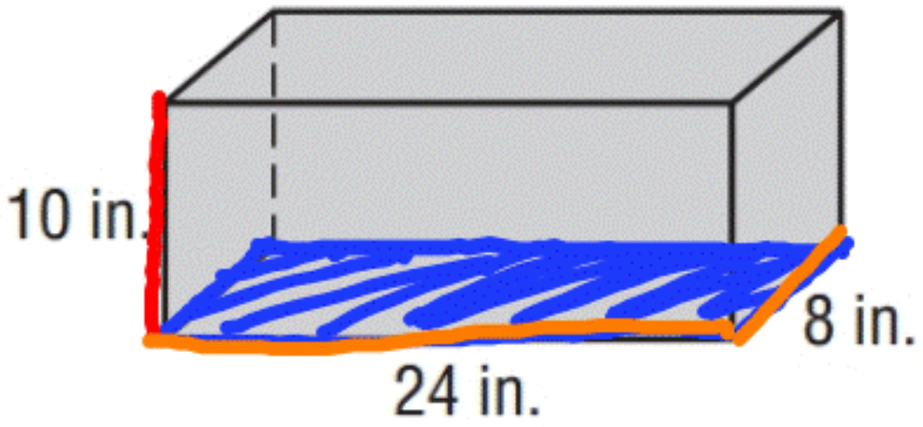
Surface Area of a Prism	If the total surface area of a prism is T square units, its height is h units, and each base has an area of B square units and a perimeter of P units, then $T = L + 2B$.



$SA = Ph + 2B$

area of base

Find the surface area of each prism. Round to the nearest tenth if necessary.



$SA = Ph + 2B$ ← area of base

$P = 64$ in.

$h = 10$ in.

$P = 24 + 8 + 24 + 8$

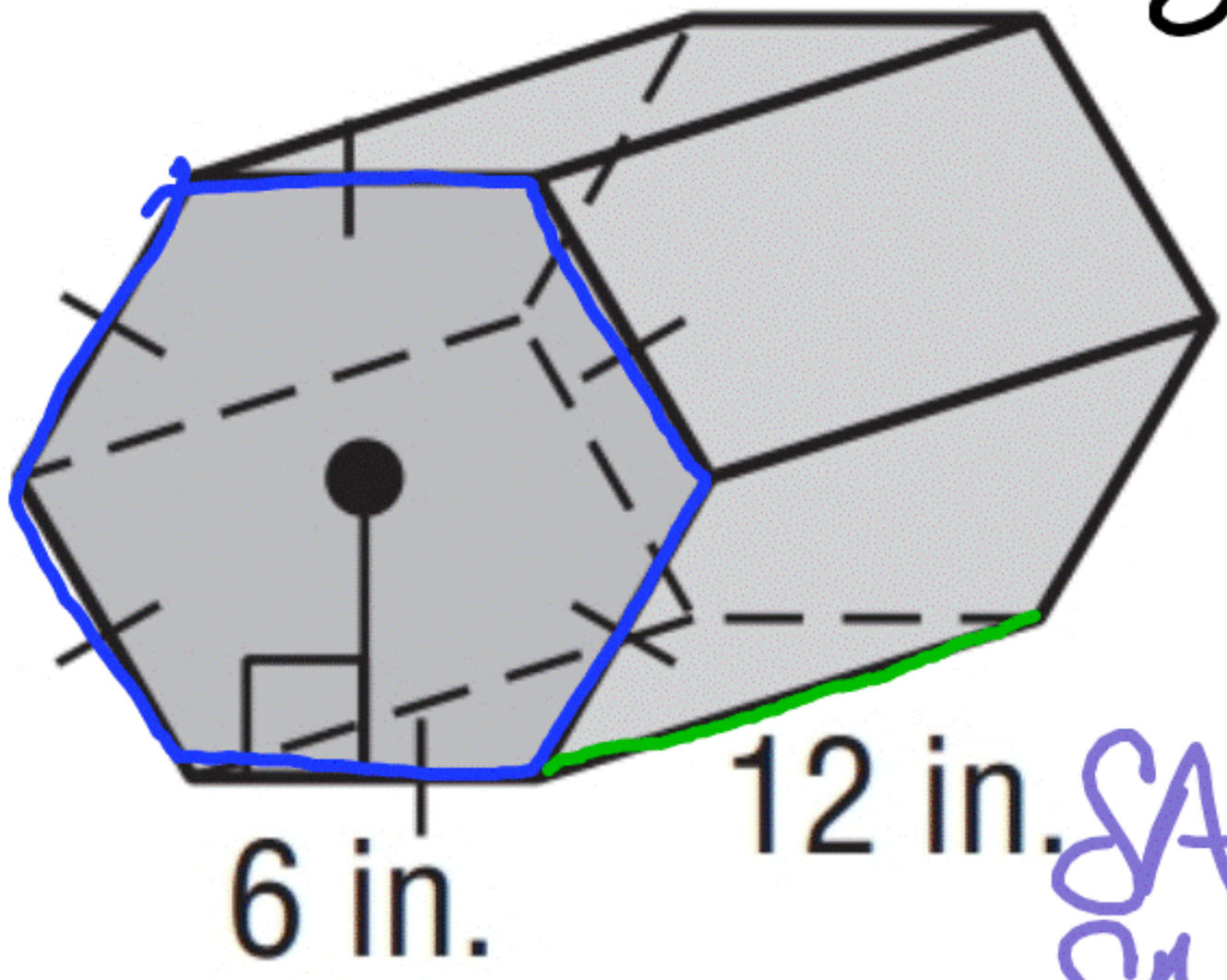
$B = 192$ in^2

$B = 24(8)$

$SA = 64(10) + 2(192)$

$SA = 1024$ in^2

Find the surface area of each prism. Round to the nearest tenth if necessary.



$SA = Ph + 2B$

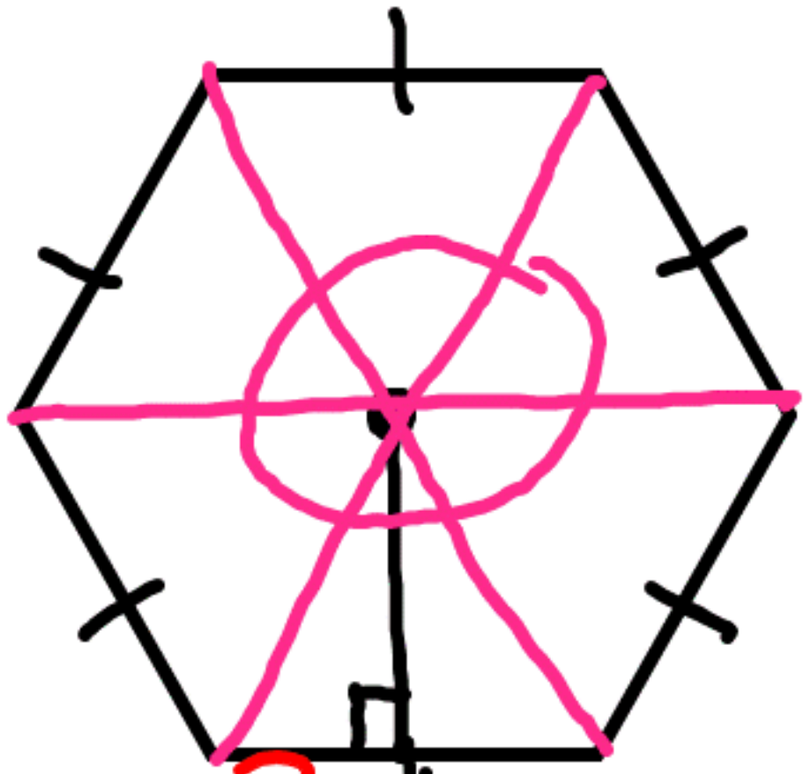
$P = 36$ in.

$h = 12$ in.

$B = 95.5$ in^2

$SA = 36(12) + 2(95.5)$

$SA = 623$ in.^{2}



$$\tan 30 = \frac{3}{x}$$

$$A = \frac{1}{2}Pa$$

$$= \frac{1}{2}(36)(3\sqrt{3})$$

$$= 95.5 \text{ in}^2$$