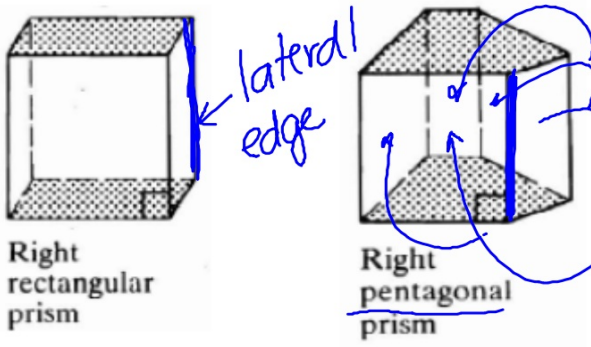
12-1 Prisms

Date March 21

The shaded polygons are called bases. They are congruent and parallel.
A prism is named for its base.

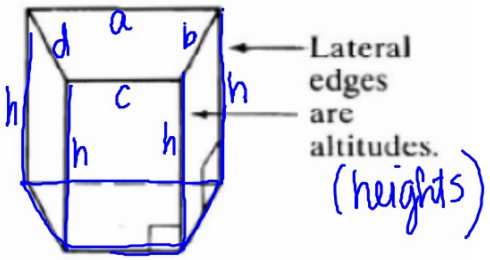


Right rectangular prism

Right pentagonal prism

The parallelograms that are not bases are called lateral faces.

In right prisms, the lateral faces are rectangles. They intersect each other along lateral edges.



Right trapezoidal prism

The **lateral area** (LA) of a prism is the sum of the areas of the lateral faces.

$L.A. = bh + ch + dh + ah$

$= h(b + c + d + a)$

$=$ ht. $\times$ perimeter of the base

Lateral Area of a Right Prism $L.A = ph$

The **total area** (TA) of a prism is the sum of all lateral faces and the two bases (B).

Total Area of a Right Prism $T.A. = LA + 2B$

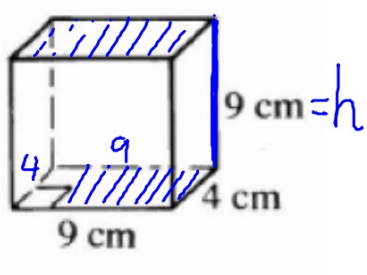
$B =$ base areas

The **volume** (V) of a prism is the "airspace" inside of the prism.

Volume of a Prism $V = Bh$

Examples: find lateral area, total area, and volume.

1.



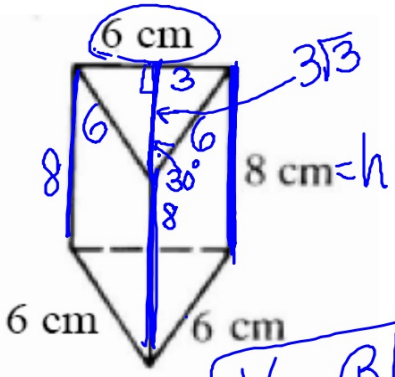
$L.A = ph = 26 \cdot 9 = 234\ cm^2$

$T.A = L.A. + 2B$

$234 + 2(36) = 306\ cm^2$

$V = Bh = 36 \cdot 9 = 324\ cm^3$ (cubic cm)

2.



$L.A. = ph = 18 \cdot 8 = 144\ cm^2$

$T.A. = LA + 2B$

$144 + 2\left(\frac{1}{2} \cdot 6 \cdot 3\sqrt{3}\right)$

$144 + 2(9\sqrt{3}) = 144 + 18\sqrt{3}\ cm^2$ (B)

$V = Bh = (9\sqrt{3})8 = 72\sqrt{3}\ cm^3$