<u>**VOLUME AND TOTAL SURFACE AREA OF PRISMS, CYLINDERS, PYRAMIDS, AND CONES**</u>

Use the 4 steps for "area sub-problems": 1. Picture Equation 2. Formulas 3. Simplify 4. Answer (exact and approximate)

<u>**PRISMS**</u>:

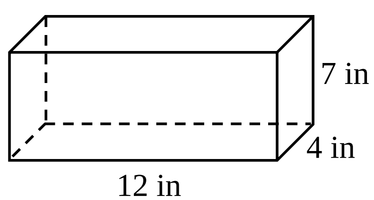
Volume = (*Area of Base*) ● *Height*

Total surface area is the sum of the areas of all faces (or sides)

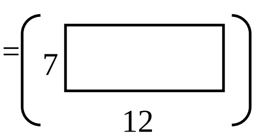
NOTE: The base is NOT always located on the "bottom" of prisms!!!

The <u>bases</u> of a prism are the <u>two congruent faces</u> that are on <u>opposite sides</u> of the prism, and these two faces are <u>connected by parallelograms, rectangles, or rhombi</u>.

Volume & TSA of a Rectangular Prism

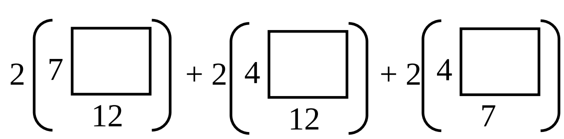


V = (*Area of Base*) ● *Height*

V =  ● 4

V = (12 ● 7) ● 4

V = 336 in^3

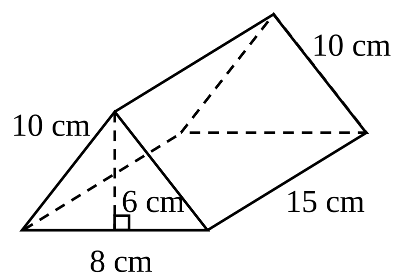
TSA = 

TSA = 2(12 ● 7) + 2(12 ● 4) + 2(7 ● 4)

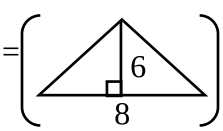
TSA = 168 + 96 + 56

TSA = 320 in^2

Volume & TSA of a Triangular Prism



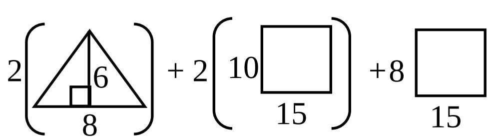
V = (*Area of Base*) ● *Height*

V =  ● 15

V = $\left(\frac{1}{2}\right.$ ● 8● 6$\left.\right)$ ● 15

V = (24) ● 15

V = 360 cm^3

TSA = 

TSA = 2($\frac{1}{2}$ ● 8 ● 6) + 2(15 ● 10) + 2(15 ● 8)

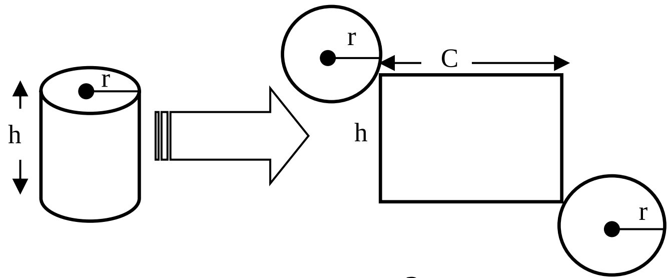
TSA = 48 + 300 + 240

TSA = 588 cm^2

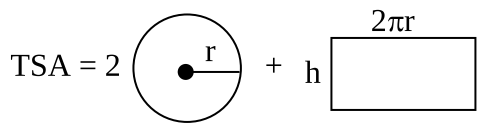
CYLINDERS:

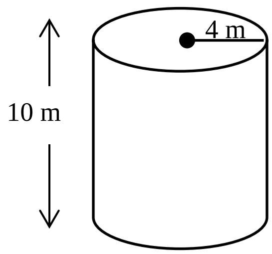
V = (*Area of Circular Base*) ● *Height*

The surface area of a cylinder is the sum of the areas of the top and the bottom base (two circles) and the curved side (a rectangle).

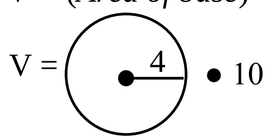


- The bases of a cylinder are equal in area.
- The height of the cylinder is the height of the rectangle.
- The circumference of the cylinder is the length of the rectangle.





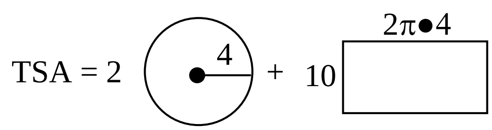
V = (*Area of base*) ● *Height*



V = (π ● 4^2) ● 10

V = 160π m^3

V ≈ 502.65 m^3



TSA = 2(π ● 4^2) + 10(2π●4)

TSA = 32π + 80π

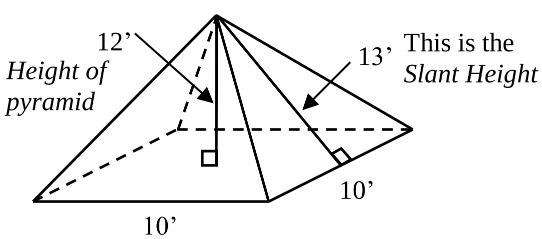
TSA = 112π m^2

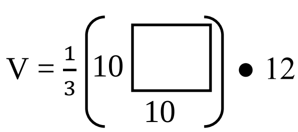
TSA ≈ 351.86 m^2

PYRAMIDS:

V = $\frac{1}{3}$ (*Area of Base*) ● *Height*

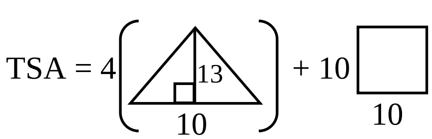
TSA = sum of the areas of all faces





V = $\frac{1}{3}$ (10 ● 10) ● 12

V = 400 ft^3



TSA = 4 ($\frac{1}{2}$ ● 10 ● 13) + (10 ● 10)

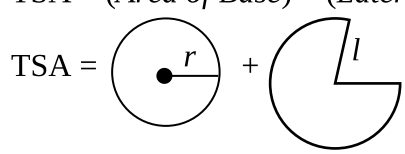
TSA = 260 + 100

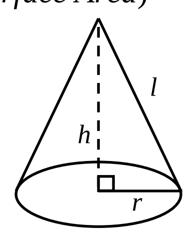
TSA = 360 ft^2

CONES:

V = $\frac{1}{3}$ (*Area of Circular Base*) ● *Height*

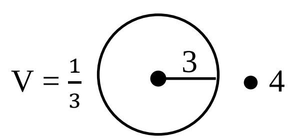
TSA = (*Area of Base*) + (*Lateral Surface Area*)

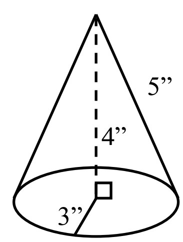




TSA = $\pi r^2 + \pi r l$

$h^2 + r^2 = l^2$

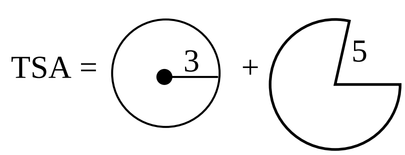




V = $\frac{1}{3}$ (π ● 3^2) ● 4

V = 12π in^3

V ≈ 37.70 in^3



TSA = (π ● 3^2) + (π ● 3 ● 5)

TSA = 9π + 15π

TSA = 24π in^2

TSA ≈ 75.40 in^2