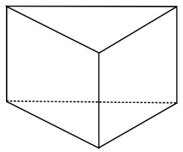
Tuesday, May 19, 2020

Sec 11-2 Surface Areas of Prisms and Cylinders

Prism:

- A polyhedron with exactly two congruent, parallel faces, called BASES.
- Other faces are called LATERAL FACES.

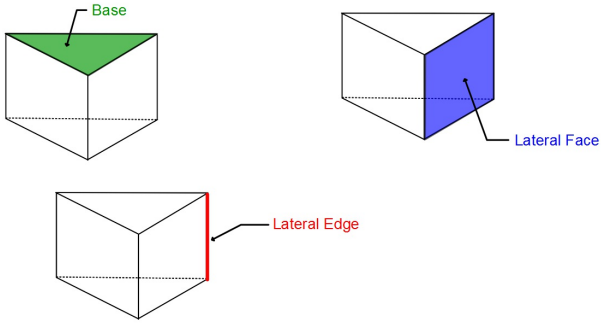


Prism Vocabulary:

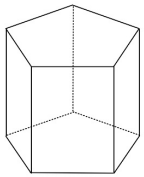
Base

Lateral Face

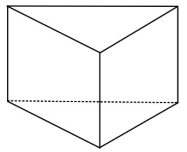
Lateral Edge



The name of a prism is given by the shape of its base.



Pentagonal Prism

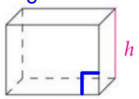


Triangular Prism

The Height of a Prism is
the perpendicular distance between the bases.

A Prism can either be a Right Prism or an Oblique Prism.

Right Prism



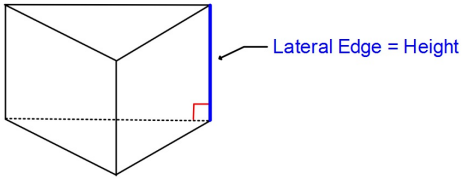
When the lateral edges form a right angle with the bases

Oblique Prism

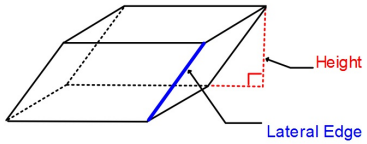
When the lateral edges DON'T form a right angle with the bases.

In a Right Prism:

- Lateral Faces are Rectangles
- Lateral Edge is an altitude (height).

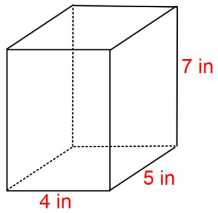


Oblique Prism: Lateral Edge is NOT the height

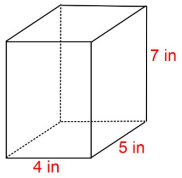


We'll work with Right Prisms only.

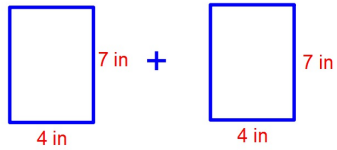
Find the number of square inches of wrapping paper it would take to comver this box (rectangular prism).



One method would be to find the area of all 6 faces and add them together.



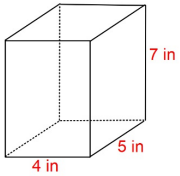
Front and Back:

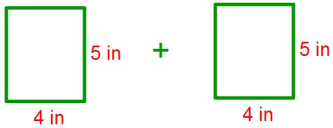


$A = (4)(7) = 28\ in^2$ $A = (4)(7) = 28\ in^2$

Front and Back = $2(28) = 56\ in^2$

Top and Bottom:

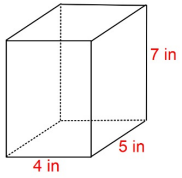


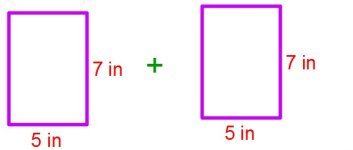


$A = (4)(5) = 20\ in^2$ $A = (4)(5) = 20\ in^2$

Top and Bottom = $2(20) = 40\ in^2$

Left and Right:





$A = (5)(7) = 35\ in^2$ $A = (5)(7) = 35\ in^2$

Left and Right = $2(35) = 70\ in^2$

Total Surface Area =

(Front and Back)+(Top and Bottom)+(Left and Right)=

(56)+(40)+(70) = 166 in^2

Surface Area of a Prism:

SA = LA + 2B

LA: Lateral Area

2B: Area of the Bases

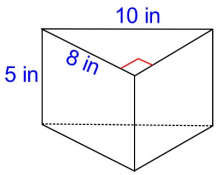
Lateral Area: Sum of areas of lateral faces.

LA = *ph*

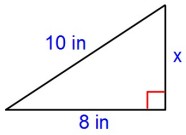
LA = (perimeter of the Base)(height)

Area of the bases: Use the formula that applies to whatever the shape of the base is.

Find the Total Surface Area (SA) of the Right Triangular Prism.



Base:

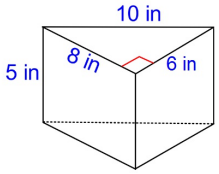


Find the third side: $8^2 + x^2 = 10^2$

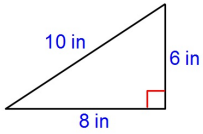
$x^2 = 10^2 - 8^2$

$x = \sqrt{10^2 - 8^2}$ x = 6

Find LA:

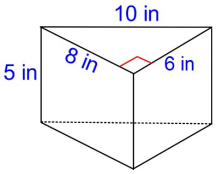


Base:

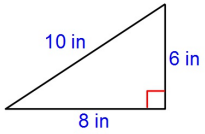


LA = $(p)(h) = (10+8+6)(5) = (24)(5) =$ **$120\ in^2$**

Find 2B:



Base:



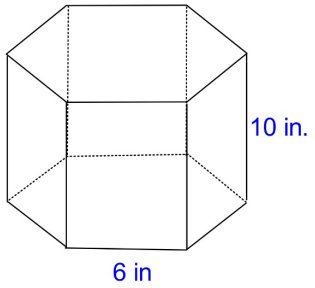
B = area of the base = $\frac{1}{2}(b)(h)$

$= \frac{1}{2}(8)(6) = 24\ in^2$

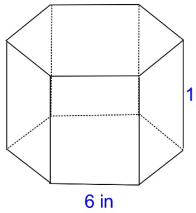
2B = $2(24) =$ **$48\ in^2$**

SA = LA + 2B = $120 + 48 =$ **$168\ in^2$**

Find the SA of this regular hexagonal prism to the nearest tenth.



Find the SA of this regular hexagonal prism to the nearest hundredth.



Find LA:

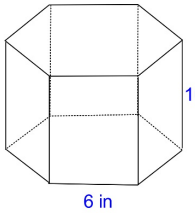
LA = $(p)(h)$

p = 6(length of a side) = 6(6) = 36

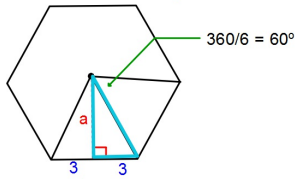
LA = (36)(10) = $360\ in^2$

Find 2B: Base is a Regular Hexagon: B = $\frac{1}{2}(a)(p)$

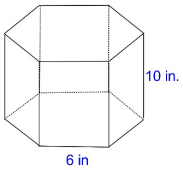
We already have the perimeter: p = 36

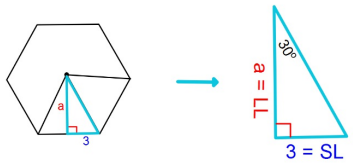


Now we need the apothem:



Find 2B:



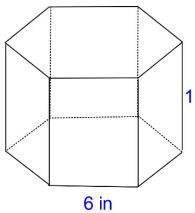


a = LL = $\sqrt{3}$ • SL = $3\sqrt{3}$

B = $\frac{1}{2}(a)(p) = \frac{1}{2}\left(3\sqrt{3}\right)(36) = 54\sqrt{3}$

2B = $108\sqrt{3}$

Find the SA of this regular hexagonal prism to the nearest hundredth.



SA = LA + 2B

= 360 + $108\sqrt{3}$

SA ≈ 547.06 in^2

You can continue working on Practice #25.

We'll continue tomorrow over this material.

Practice #25 will be due on Thursday, May 21
by 10:00 pm