2.1 - Units of Area and Volume

February 14, 2017 10:34 AM

Area
The paintable space
Units: Square Units, $units^2$
Example: m^2, km^2, cm^2, ft^2, ft^2, in^2

Volume
The fillable space
Units: Cubic Units, $units^3$
Example: m^3, km^3, cm^3, ft^3, ft^3, in^3

Area and Volume Formulas

Area of a Rectangle

Area and Volume Formulas

Area of a Rectangle

Area = L x W

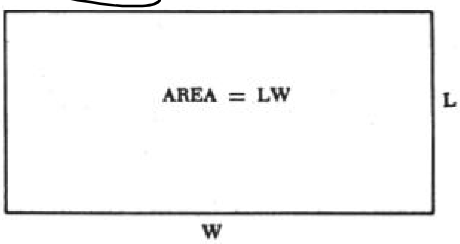
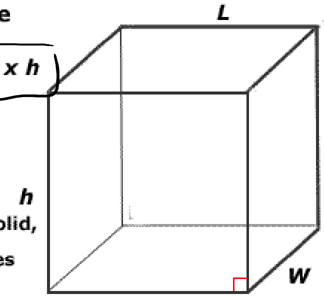


FIGURE 1-5. A rectangle.

Volume of a Cube

Volume = L x W x h



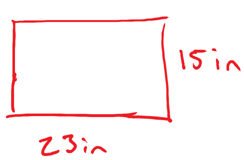
Like a rectangular solid, multiply the length, times the width times the height.

The only difference between these units and those we have been using before is the little ^{2} or ^{3}. These are exponents and signify how many of each unit is present.

m³ : READ "meters cubed" or "Cubic meters"
m³ = (m)(m)(m)

in² : READ "inches squred" or "square inches"
In² = (in)(in)

Let's do some conversions with these units.
Examples:
Calculate the Area in square feet and square yards of a rectangle that is 15in by 23in.



Area = 15in × 23in

$= 345\ in^2$

$= 345 (\cancel{in})(\cancel{in}) \times \frac{1ft}{12\cancel{in}} \times \frac{1ft}{12\cancel{in}}$

$= \frac{345\ ft^2}{(12)(12)}$

$= 2.4\ ft^2$

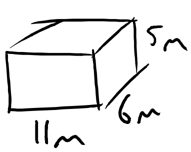
1ft = 12in

$2.4\cancel{ft^2} \times \frac{1yd}{3\cancel{ft}} \times \frac{1yd}{3\cancel{ft}}$

$= 0.266\ yd^2$

☆ when converting Area's do your conversions twice

Calculate the Volume of a rectangular prism that is 5m by 6m by 11m. Find the volume in cubic feet.



$V = L \times W \times h$

$= 11 \times 6 \times 5$

$V = 330\ m^3$

1m = 3.28ft

$= 330 (\cancel{m})(\cancel{m})(\cancel{m}) \times \frac{3.28ft}{1\cancel{m}} \times \frac{3.28ft}{1\cancel{m}} \times \frac{3.28ft}{1\cancel{m}}$

$= 330 \times (3.28)^3\ ft^3$

$= 11645\ ft^3$

$= 11645\,ft^3$

A cube (all side lengths equal) has a volume of 7.628 in^3. Calculate the length of one side in centimetres.

Save for Thursday

A unknown shape has an area of 607 km^2. What is the area in square miles?

$1\,mi = 1.609\,km$

$607\,km^2$

$607\,\cancel{km} \times \cancel{km} \times \frac{1\,mi}{1.609\,\cancel{km}} \times \frac{1\,mi}{1.609\,\cancel{km}} = 234\,mi^2$

Other units for Area and Volume

Acres
1 Acre = 43560ft^2

Litres
1 Litre = 1000cm^3

Example: How many square feet are in 10 acres of land?

$10\,\cancel{acres} \times \frac{43\,560\,ft^2}{1\,\cancel{acres}} = 435\,600\,ft^2$

only used our conversion formula once

Example: How many cubic centimeters is a can of pop (350mL).

remember $m = 0.001$

$1\,L = 1000\,cm^3$

$350\,mL = (350)(0.001)\,L$
$= 0.350\,L$

$0.350\,\cancel{L} \times \frac{1000\,cm^3}{1\,\cancel{L}} = 350\,cm^3$

only use our conversion formula once

$$0.350\cancel{L} \times \frac{1000\,cm^3}{1\cancel{L}} = \underline{\underline{350\,cm^3}}$$

Conv...

Once

Homework
Ch2.1, Page 61, Q:1-11odd, 12

Bathroom / water