① FIND THE ROOTS OF THIS QUADRATIC EQUATION

$$9x^2 + 3x = 2$$

② SOLVE FOR x.

$$R = BW(1 + x)$$

③ FIND THE MASS OF POTASSIUM AND OXYGEN IN 1064g OF K_2O?

$$K = 39$$
$$O = 16$$

④ SOLVE BY COMPLETING THE SQUARE.

$$x^2 + \frac{3}{4}x + 8 = 0$$

Ch. 17 – Unit Multipliers & Metric Conversion

ORIGINAL VALUE   x   UNIT   =   ANSWER IN NEW UNITS
                     MULTIPLIER

① HOW MANY INCHES ARE IN 2.5 ft?

② HOW MANY FEET ARE IN 108 inches?

③ HOW MANY OUNCES ARE 3 lb?

④ HOW MANY POUNDS IN 72 oz?

⑤   4 gallons = _____ cups

⑥   19,500 m² = _____ km²

  K   H   DK   UNITS   d   c   m
 ___ ___ ___ _____ ___ ___ ___

⑦   METRIC ⟷ IMPERIAL

     1 L = 1.06 qts

     5 L = _____ qts.   5 qts. = _____ L

⑧   CHANGE   34 in → _____ cm   34 cm → _____ in

Square Unit Multipliers

How many square inches in one square foot? Or how many in^2 in 1 ft^2? 1 square foot = 1 ft x 1 ft = 1 ft^2.

1 square inch = 1 in x 1 in = 1 in^2.

$$\frac{1 \text{ ft}}{1} \times \frac{1 \text{ ft}}{1} \times \frac{?}{?} \times \frac{?}{?} = \frac{? \text{ in}^2}{1}$$

$$\frac{1 \cancel{\text{ ft}}}{1} \times \frac{1 \cancel{\text{ ft}}}{1} \times \frac{12 \text{ in}}{1 \cancel{\text{ ft}}} \times \frac{12 \text{ in}}{1 \cancel{\text{ ft}}} = \frac{144 \text{ in}^2}{1}$$

Change 2 (cubic) ft^3 to in^3

$$\frac{2 \cancel{\text{ ft}}}{1} \times \frac{1 \cancel{\text{ ft}}}{1} \times \frac{1 \cancel{\text{ ft}}}{1} \times \frac{12 \text{ in}}{1 \cancel{\text{ ft}}} \times \frac{12 \text{ in}}{1 \cancel{\text{ ft}}} \times \frac{12 \text{ in}}{1 \cancel{\text{ ft}}} = \frac{3{,}456 \text{ in}^3}{1}$$

Sometimes you need to use more than one unit multiplier in the same problem. In the following examples, watch as 1 mile is changed to inches and 1 gallon is changed to cups.

$$\frac{1 \cancel{\text{ mi}}}{1} \times \frac{5{,}280 \cancel{\text{ ft}}}{1 \cancel{\text{ mi}}} \times \frac{12 \text{ in}}{1 \cancel{\text{ ft}}} = \frac{63{,}360 \text{ in}}{1}$$

$$\frac{1 \cancel{\text{ gal}}}{1} \times \frac{4 \cancel{\text{ quarts}}}{1 \cancel{\text{ gal}}} \times \frac{2 \cancel{\text{ pints}}}{1 \cancel{\text{ quart}}} \times \frac{2 \text{ cups}}{1 \cancel{\text{ pint}}} = \frac{16 \text{ cups}}{1}$$

Practice Problems

1) Change 40 ft^2 into square inches.

2) Change 8 yd^2 into square feet.

3) Change 370 cm^3 into cubic meters.

4) Change 9500 m^2 into km^2.

5) Change 11 ft^3 into cubic inches.

6) Change 16 m^3 into cubic centimeters.

Metric Conversions

There are many metric conversions available for use when converting from metric to English measure and vice versa. I've listed the ones I feel are most important in the following table. The conversions below are approximate and have been rounded for ease in calculations. Because they have been rounded, you may get slightly different answers depending on whether you choose the table on the left or the one on the right for your calculations. The easiest way to do these is to make the denominator in the unit multiplier "1" instead of a decimal. This way you multiply, instead of divide, a decimal. Notice Examples 1 and 2 to see this illustrated.

English to Metric	Metric to English
1 inch = 2.5 centimeters	1 centimeter = .4 inches
1 yard = .9 meters	1 meter = 1.1 yards
1 mile = 1.6 kilometers	1 kilometer = .62 miles
1 ounce = 28 grams	1 gram = .035 ounces
1 pound = .45 kilograms	1 kilogram = 2.2 pounds
1 quart = .95 liters	1 liter = 1.06 quarts

Using what we've learned about unit multipliers, let's work some conversions in the following examples.

Example 1

Change 5 liters to quarts. $\dfrac{5 \text{ liters}}{1} \times \dfrac{1.06 \text{ quart}}{1 \text{ liters}} = \dfrac{5.3 \text{ quarts}}{1}$

Example 2

Change 5 liters to quarts. $\dfrac{5 \text{ liters}}{1} \times \dfrac{1 \text{ quart}}{.95 \text{ liters}} = \dfrac{5.26 \text{ quarts}}{1}$

> It seems easier to multiply by 1.06 than to divide by .95. Notice slightly different answer.

Example 3

Change 34 inches to centimeters. $\dfrac{34 \text{ in.}}{1} \times \dfrac{2.5 \text{ cm}}{1 \text{ in.}} = \dfrac{85 \text{ cm}}{1}$

Practice Problems

1) Change 8 kilometers to miles.

2) Change 27 ounces to grams.

3) Change 8 kilograms to pounds.

4) Change 5 yards to meters.

5) Change 12 quarts to liters.

6) Change 250 grams to ounces.

Alg 1, Week 14, Day 5	Function Notation Practice	

For problems 1-6, use the functions $f(x) = 4x$ and $g(x) = -10x$.

1. $f(2) =$	2. $f(0) =$	3. $g(1) =$
4. $g(-3) =$	5. $f(-4) =$	6. $g(0) =$

For problems 7-12, use the functions $f(x) = -2x + 10$ and $g(x) = 5x - 7$.

7. $g(6) =$	8. $f(2) =$	9. $f(1) =$
10. $g(0) =$	11. $g(-3) =$	12. $f(-3) =$

For problems 13-14, use the function $h(x) = -4\sqrt{x} + 1$.

13. $h(9) =$	14. $h(49) =$