

# MEASUREMENT

## PRAXIS FLASHCARD #131

### UNIT ANALYSIS

**Unit Analysis** is the process of multiplying by successive conversion units (written in fraction form).

unit analysis video: [JoleneMorris.com, Math 115, Wk 2](http://JoleneMorris.com, Math 115, Wk 2)

[Video explaining unit analysis for English units](#)

[Video explaining unit analysis for Metric units](#)

(both videos are at JoleneMorris.com, Math 115, Week 6)

## PRAXIS FLASHCARD #124 & #125

### ENGLISH SYSTEM OF MEASUREMENT

The **English System of Measurement** is also called the Customary System of Measurement (or the Common System of Measurement). This is the primary measurement system used in the United States.

**Length** = inch, foot, yard, rod, mile, etc.

**Weight** = ounce, pound, Ton, etc.

**Volume** = liquid ounces, cup, pint, quart, gallon, etc.

## PRAXIS FLASHCARD #134

### METRIC SYSTEM OF MEASUREMENT

The Metric System is an international system of measurement based on the decimal system. The prefixes of the Metric System are shown in the table to the right:

length → meter

capacity (volume) → liter

mass (weight) → gram

| Text   | Symbol | Factor            |
|--------|--------|-------------------|
| tera   | T      | 1 000 000 000 000 |
| giga   | G      | 1 000 000 000     |
| mega   | M      | 1 000 000         |
| kilo   | k      | 1 000             |
| hecto  | h      | 100               |
| (none) | (none) | 1                 |
| deci   | d      | 0.1               |
| centi  | c      | 0.01              |
| milli  | m      | 0.001             |
| micro  | μ      | 0.000 001         |
| nano   | n      | 0.000 000 001     |

## PRAXIS FLASHCARD #40

### AREA

The two-dimensional measure of how many square units can fit inside the interior of an object

$$1 \text{ acre} = 43,560 \text{ ft}^2 \quad 640 \text{ acres} = 1 \text{ mile}^2$$



## PRAXIS FLASHCARD #101

### PERIMETER

**Perimeter** is the measure of the distance around a polygon (*peri* = around, *meter* = measure)

## PRAXIS FLASHCARD #89

### VOLUME

**Volume** is the measure of the number of cubic units that can fit inside an object. Volume is also known as **capacity**.

## PRAXIS FLASHCARD #117

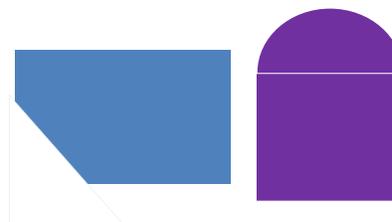
### DENOMINATE NUMBERS

A **denominate number** specifies a quantity in terms of a number and a unit of measurement. For example, 7 feet and 16 acres are denominate numbers.

## PRAXIS FLASHCARD #35

### AREA OF IRREGULAR SHAPES

To find the **area of irregular shapes**, divide the shape into regular two-dimensional shapes or picture a regular shape that has been removed:



**PRAXIS FLASHCARD #111**

**SQUARE UNITS OF MEASUREMENT**

The area of an object is the number of square units that can fit inside the object. For example, if the object is measured in feet, the square unit of measurement for the area of that object is a one-foot by one-foot square. Be careful when finding area of objects when the answer is wanted in a different unit of measure:

$$1 \text{ yd}^2 = 9 \text{ ft}^2 \quad 1 \text{ ft}^2 = 144 \text{ in}^2$$

**PRAXIS FLASHCARD #112**

**UNITS OF CAPACITY**

**Capacity** (also known as **volume**) is the amount of space inside an object. The measurement of capacity/volume in the metric system is the *liter*. In the customary or U. S. English system, refer to the table below:

- 1 *pint (pt)* = 2 *cups (c)*
- 1 *quart (qt)* = 2 *pints (pt)*
- 1 *quart (qt)* = 4 *cups (c)*
- 1 *gallon (gal)* = 4 *quarts (qt)*
- 1 *gallon (gal)* = 8 *pints (pt)*
- 1 *gallon (gal)* = 16 *cups (c)*

**PRAXIS FLASHCARD #113**

**MASS**

**Mass** (also known as **weight** on Earth) is the amount of matter in an object. Technically, weight is a measure of the force of gravity against an object, but on Earth, mass and weight can be thought of as the same thing. The metric measure of mass is the *gram*. In the customary or U. S. English system, refer to the table below:

$$16 \text{ ounces} = 1 \text{ pound} \quad 2,000 \text{ pounds} = 1 \text{ Ton}$$

**PRAXIS FLASHCARD #114**

**LENGTH**

**Length** is a measure of distance. The metric measure of length is the *meter*. In the customary or U.S. English system, refer to the table below:

$$\begin{array}{ll} 12 \text{ inches} = 1 \text{ foot} & 3 \text{ feet} = 1 \text{ yard} \\ 5280 \text{ feet} = 1 \text{ mile} & 1760 \text{ yards} = 1 \text{ mile} \end{array}$$

**PRAXIS FLASHCARD #115**

**ACCELERATION**

**Acceleration** is the measure of how speed (velocity) changes over time. It can be expressed as the change in velocity divided by the change in time:

$$a = \frac{\Delta v}{\Delta t}$$

**PRAXIS FLASHCARD #118**

**CIRCUMFERENCE**

**Circumference** is the distance around a circle. (*circum* = around, *fer* = carry)

**PRAXIS FLASHCARD #121**

**DENSITY**

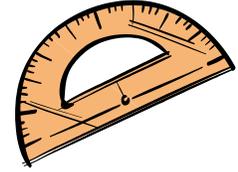
**Density** is the measure of how compact the material is inside an object. Density is measured in terms of the mass per unit volume. We have all heard the story of Archimedes who discovered the concept of density when he saw how his body displaced the water in his bathtub. He cried, "Eureka! Eureka!"



**PRAXIS FLASHCARD #132**

**MEASURING ANGLES**

Angles are measured in degrees using a protractor. Place one ray of the angle along the zero edge of the protractor. The other ray of the angle points to the number of degrees that are in the angle.



**PRAXIS FLASHCARD #133**

**PROTRACTOR**

A **protractor** is a geometry tool used to measure angles. Place one ray of the angle along the zero edge of the protractor. The other ray of the angle points to the number of degrees that are in the angle.

**PRAXIS FLASHCARD #254**

**COMPASS**

A **compass** is a tool used in geometry to draw arcs and circles. These arcs may be used to bisect lines and angles.



**PRAXIS FLASHCARD #264**

**CONVERTING MEASURES OF LENGTH**

To convert measures of length in the Metric System, merely move the decimal point to the “place value” of the new unit of measure: kilo- hecto- deka- m deci- centi- milli-

To convert measures of length in the U. S. Customary System, use Unit Analysis (multiply by the conversion factor in such a way that all units cancel out except the unit you want). For example, to change 16 feet to inches:

$$\frac{16 \cancel{ft}}{1} \times \frac{12 in}{1 \cancel{ft}} = 192 in$$

**PRAXIS FLASHCARD #265**

**CONVERTING MEASURES OF AREA**

To **convert measures of length** in the Metric System, merely move the decimal point to the “place value” of the new unit of measure: kilo- hecto- deka- m deci- centi- milli-

To convert measures of length in the U. S. Customary System, use **Unit Analysis** (multiply by the conversion factor in such a way that all units cancel out except the unit you want). For example, to change 16 feet to inches:

$$\frac{16 \cancel{ft}}{1} \times \frac{12 in}{1 \cancel{ft}} = 192 in$$

**PRAXIS FLASHCARD #266**

**CONVERTING MEASURES OF MASS/WEIGHT**

To **convert measures of mass** in the Metric System, merely move the decimal point to the “place value” of the new unit of measure: kilo- hecto- deka- g deci- centi- milli-

To convert measures of weight in the U. S. Customary System, use **Unit Analysis** (multiply by the conversion factor in such a way that all units cancel out except the unit you want). For example, to change 5 pounds to tons:

$$\frac{5 \cancel{lb}}{1} \times \frac{1 ton}{2000 \cancel{lb}} = 0.0025 ton$$

**PRAXIS FLASHCARD #267**

**CONVERTING MEASURES OF CAPACITY/VOLUME**

To **convert measures of capacity** in the Metric System, merely move the decimal point to the “place value” of the new unit of measure: kilo- hecto- deka- l deci- centi- milli-

To convert measures of length in the U. S. Customary System, use **Unit Analysis** (multiply by the conversion factor in such a way that all units cancel out except the unit you want). For example, to change 5 quarts to ounces:

$$\frac{5 \cancel{qt}}{1} \times \frac{4 \cancel{cup}}{1 \cancel{qt}} \times \frac{8 oz}{1 \cancel{cup}} = 160 oz$$

**PRAXIS FLASHCARD #268**

**CONVERTING MEASURES OF TIME**

To **convert measures of time**, use **Unit Analysis** (multiply by the conversion factor in such a way that all units cancel out except the unit you want). For example, to change 16 hours to seconds:

$$\frac{16 \cancel{\text{hr}}}{1} \times \frac{60 \cancel{\text{min}}}{1 \cancel{\text{hr}}} \times \frac{60 \text{ sec}}{1 \cancel{\text{min}}} = 57,600 \text{ sec}$$

**PRAXIS FLASHCARD #229**

**APPROXIMATE CONVERSIONS**

1 *inch*  $\approx$  2.54 *cm*

1 *yard*  $\approx$  0.91 *m*

1 *mile*  $\approx$  1.61 *km*

1 *ounce*  $\approx$  28 *g*

1 *pound*  $\approx$  2.2 *kg*

1 *quart*  $\approx$  0.94 *l*

A meter is a little more than a yard.

A gram is about the weight of a paper clip.

A liter is a little more than a quart.

**PRAXIS FLASHCARD #230**

**COMMON EQUIVALENTS**

1/2 = 0.5 = 50%

1/3 = 0.33<sup>1</sup>/<sub>3</sub> = 33<sup>1</sup>/<sub>3</sub>%

2/3 = 0.66<sup>2</sup>/<sub>3</sub> = 66<sup>2</sup>/<sub>3</sub>%

1/4 = 0.25 = 25%

3/4 = 0.75 = 75%

1/5 = 0.2 = 20%

2/5 = 0.4 = 40%

3/5 = 0.6 = 60%

4/5 = 0.8 = 80%

1/6 = 0.16<sup>2</sup>/<sub>3</sub> = 16<sup>2</sup>/<sub>3</sub>%

5/6 = 0.83<sup>1</sup>/<sub>3</sub> = 83<sup>1</sup>/<sub>3</sub>%

1/8 = 0.125 = 12.5%

3/8 = 0.375 = 37.5%

5/8 = 0.625 = 62.5%

7/8 = 0.875 = 87.5%

1 = 1.0 = 100%

2 = 2.0 = 200%

3 1/2 = 3.5 = 350%

**PRAXIS FLASHCARD #345**

**SPEED**

Speed is a measurement that tells how fast an object is **moving**. The rate of speed is usually expressed as a ratio of distance over time. Distance = rate of speed  $\times$  time ( $D = rt$ )

$$r = \frac{D}{t} \quad t = \frac{D}{r}$$

**PRAXIS FLASHCARD #350**

**TIME**

**Time** can be formatted in using a 12-hour clock with a.m. and p.m. or using a 24-hour clock (military time). In most places of the world, time is adjusted twice a year by one hour for Daylight Saving Time (note that there is no "S" on Saving -- it is not Daylight Savings Time). The common units of time are:

60 seconds = 1 minute ; 60 minutes = 1 hour ;

24 hours = 1 day ; 7 days = 1 week ;

28-31 days = 1 month ; 12 months = 1 year

365 days = 1 common year (366 days = 1 leap year)

**PRAXIS FLASHCARD #351**

**TEMPERATURE**

There are two scales used to measure **temperature**. The majority of the world uses the Celsius scale (formerly called Centigrade). In the United States, we commonly use the Fahrenheit scale. Water freezes at 0°C and at 32°F. Water boils at 100°C and at 212°F. To convert temperatures between the two scales:

$$[^\circ\text{F}] = \frac{9}{5} [^\circ\text{C}] + 32$$

$$[^\circ\text{C}] = \frac{5}{9} ([^\circ\text{F}] - 32)$$