

## Math 310 - Dr. Miller - Summary #4: Personal References - Fall 2024

The phrases “reference unit” or “personal reference” refer to any mental image or concept that an individual uses to represent the size of a standard measuring unit. Here are several of the most useful reference units:

### Linear measure (length, height, width, distance, etc.):

- 1 millimeter is roughly the thickness of a paperclip wire.
- 1 centimeter is about the width of a #2 pencil or an ordinary ballpoint pen.
- 1 inch is about the diameter of a quarter (coin).
- 1 meter is roughly the height of a doorknob from the floor.
- 1 kilometer (about 1/2 mile) is roughly the distance from the Smith Center to McKay.
- 1 kilometer (or 1/2 mile) can also be thought of as how far you can walk in 12 minutes.
- The distance from SRU to Exit 105 on I-79 is about 5 miles or 8 km.

### Weight (or Mass - they're similar attributes, but not exactly the same):

- 1 milligram is roughly the weight of 3 grains of sand: you can't feel it at all.
- 1 gram is roughly the weight of 1 paperclip: you can barely feel it.
- A quarter weighs a little over 5 grams: you can feel it.
- 5 quarters weight 1 ounce. So does an ordinary ballpoint pen.
- A bottle of water from a vending machine weighs about 1 pound.
- Two vending machine bottles of water weigh 1 kilogram.
- A 2-liter bottle of pop weighs about 2 kilograms or 4 pounds.
- 3 gallons of milk weigh about 10 kilograms.

### Volume/Capacity: (how much something holds or can be filled with)

- 1 milliliter is roughly the volume of your pinky fingertip, from the base of your nail on.
- 1 fluid ounce (volume, not weight) is about 6 spoonfuls (like the plastic ones you get with take-out).
- 1 fluid ounce is also about 2 large spoonfuls (like a soup spoon, or tablespoon for baking).
- A bottle of water from a vending machine is 1/2 liter.
- That size bottle is also about 16 fluid ounces, or 1/2 a quart.
- 1 liter is half of a 2-liter bottle.
- About 4 liters fit into one gallon jug.
- A bathtub holds about 80 gallons of water when it's full.
- 1 bathtub also holds about 1/4 of a kiloliter.
- A “cube fridge” for your dorm room is about 2 cubic feet.
- A full-size fridge for a house holds about 25 cubic feet, or close to one cubic yard/cubic meter.
- 1 cubic (*blank*) is a box that is 1 (*blank*) tall by 1 (*blank*) wide and 1 (*blank*) deep.

### Area: (how much flat surface something covers) - almost always measured in SQUARE UNITS

- 1 square (*blank*) is a flat square that is 1 (*blank*) long by 1 (*blank*) wide.
- 1 square foot is a little less than two sheets of copier paper side-by-side.

### Temperature: (degrees Celsius or degrees Fahrenheit)

- Water freezes at 0° C or 32° F.
- Water boils at 100° C or 212° F.
- Body temperature is a little less than 40° C or 100° F.
- Room temperature is a little less than 20° C or 70° F.
- A refrigerator works best at around 4° C or 40° F.

### IMPORTANT comparisons between metric and customary units:

- A yard is a *little less* than a meter.
- A quart is a *little less* than a liter.
- A pound is *about half* of a kilogram.
- A kilometer is *about half* of a mile.
- A centimeter is *about half* of an inch.