

Geometry Unit 0 Review: Lesson 0-1 and 0-2

Dimensional Analysis

Goal: Convert units of measurement in the same system and between metric and customary systems.

OAS: Prerequisite Skill

Vocabulary: None

Changing Units Within the Same System

Measurement U.S. Customary

The United States is the only major country that uses the customary system.

Capacity
Capacity measures the amount of something in a container, such as milk, laundry soap, or gas.

3 teaspoons = 1 tablespoon = $\frac{1}{2}$ fl. oz.
 16 tablespoons = 1 cup = 8 fl. oz.
 2 cups = 1 pint = 16 fl. oz. fl. oz. = fluid ounce
 2 pints = 1 quart = 32 fl. oz.
 4 quarts = 1 gallon = 128 fl. oz.

Length and Distance
Length is the measurement of an object, such as a pencil, a car, or your foot. Distance is the measurement between two places, such as from your house to your school.

12 inches = 1 foot
 3 feet = 1 yard
 5,280 feet = 1 mile

Weight
Weight measures the heaviness of something, such as a bus, a feather, or even a pig!

16 ounces = 1 pound
 2000 pounds = 1 short ton

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Measurement Metric

The metric system is used throughout the entire world.

Capacity
Capacity measures the amount an object can hold.

1,000 milliliters = 1 liter
(about the volume of 2 $\frac{3}{4}$ cans of a soft drink)

1,000 liters = 1 kiloliter
(the volume of water used in about 6 $\frac{1}{2}$ loads of laundry)

Length and Distance
Length is the measurement of an object, and distance is the measurement between two places.

10 millimeters = 1 centimeter
(about the diameter of a AAA battery)

100 centimeters = 1 meter
(about the distance from floor to door knob)

1,000 meters = 1 kilometer
(about the length of seven city blocks)

Weight
Weight measures the heaviness of something.

1,000 milligrams = 1 gram
(about the weight of a paperclip)

1,000 grams = 1 kilogram
(about the weight of a bag of pasta)

1,000 kilograms = 1 metric ton
(about the weight of a sub-compact car)

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Step 1: Write down the measurement you are starting with on one side of your paper and where you want to end on the other side of the paper.

Ex) Convert: 4.2 km = _____ m

4.2 km = _____ m

Step 2: Use the property of cross simplification to eliminate the units except the one you want to end with. This assures that you have the numbers in the correct positions.

Ex) Convert 4.2 km = _____ m

$$\frac{4.2 \text{ km}}{1} \times \frac{m}{\text{km}} = \text{_____} m$$

Step 3: Add in the conversions from the conversion chart.

Ex) Convert 4.2 km = _____ m

$$\frac{4.2 \text{ km}}{1} \times \frac{1000 \text{ m}}{1 \text{ km}} = \text{_____} m$$

Step 4: Multiply across and simplify to a decimal answer. Check to make sure the unit that you want is the only one left.

Ex) Convert 4.2 km = _____ m

$$\frac{4.2 \text{ km}}{1} \times \frac{1000 \text{ m}}{1 \text{ km}} = 4200 \text{ m}$$

*****Error Watch: Fluid ounces (liquids measured in ounces) are NOT the same as the number of ounces in a pound.**

Change units within different systems:

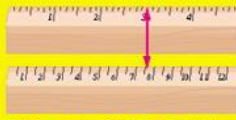
Metric Conversion

Converting Metrics & U.S. Customary Measurements

U.S. Measurement	Metric Conversion	Measurement	Conversion
1 inch	= 2.54 centimeters	1 millimeter	= 0.04 inch
1 foot	= 0.3048 meter	1 centimeter	= 0.39 inch
1 yard	= 0.914 meter	1 meter	= 39.37 inches
1 mile	= 1.609 kilometers	1 kilometer	= 0.62 mile
1 acre	= 0.405 hectare	1 hectare	= 2.47 acres
1 (fluid) ounce	= 29.573 milliliters		
1 (fluid) pint	= 0.473 liter		
1 (fluid) quart	= 0.946 liter	1 liter (fluid)	= 1.057 quarts
1 gallon	= 3.785 liters		
1 (dry) pint	= 0.550 liter		
1 (dry) quart	= 1.101 liters	1 liter (dry)	= 0.908 quart
1 ounce	= 28.349 grams	1 gram	= 0.035 ounce
1 pound	= 0.453 kilogram	1 kilogram	= 2.2046 pounds
1 ton (2,000 lbs.)	= 0.907 metric ton		
1 square inch	= 6.45 sq. cm	1 square cm	= 0.155 sq. inch
1 square foot	= 0.0929 sq. meters	1 square meter	= 1.2 sq. yards
1 square yard	= 0.836 sq. meters	1 square km	= 0.4 sq. mile

Examples of Converting to Metric

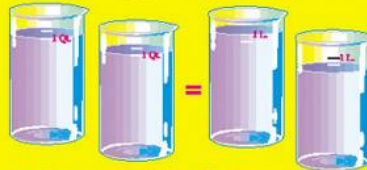
Example 1: Changing 3 inches to centimeters



$$\text{inches} \quad \text{conversion factor} \quad \text{centimeters}$$

$$3 \times 2.54 = 7.62$$

Example 2: Changing 2 (fluid) quarts to liters



$$\text{quarts} \quad \text{conversion factor} \quad \text{liters}$$

$$2 \times 0.946 = 1.892$$

The steps are very similar to above except you may have to use more than one conversion to solve the problem.

Step 1: Write down the measurement you are starting with on one side of your paper and where you want to end on the other side of the paper.

Ex) 10.7 L = _____ pt

10.7 L = _____pt

Step 2: Use the property of cross simplification to eliminate the units except the one you want to end with. This assures that you have the numbers in the correct positions.

Ex) Convert 10.7 L = _____ pt

$$\frac{10.7 \cancel{L}}{1} \times \frac{\cancel{qt}}{L} \times \frac{pt}{\cancel{qt}} = \text{_____} pt$$

Step 3: Add in the conversions from the conversion chart.

Ex) Convert 10.7 L = _____ pt

$$\frac{10.7 \cancel{L}}{1} \times \frac{1.057 \cancel{qt}}{1 \cancel{L}} \times \frac{2 \text{ pt}}{1 \cancel{qt}} = \text{_____} pt$$

Step 4: Multiply across and simplify to a decimal answer. Check to make sure the unit that you want is the only one left.

Ex) Convert 10.7 L = _____ pt

$$\frac{10.7 \cancel{L}}{1} \times \frac{1.057 \cancel{qt}}{1 \cancel{L}} \times \frac{2 \text{ pt}}{1 \cancel{qt}} = 22.6198 \text{ pt}$$