Math Conversions

Many people are familiar with the U.S. Customary units of measure that are used, either because they are using them currently or have used them in the past. However, the metric system, while commonly used in many parts of the world, is not always as familiar to people in the United States.

The metric system began as a result of the French National Assembly asking the French Academy of Sciences to try to standardize the system of weights and measures that had become so confused in France. In 1791, work on the new system was begun, and by 1795, all metric units had been set and identified. By 1799, the new units were declared the legal standards for every measurement used in France. It wasn't until 1875 that an international conference met in Paris to set up an International Bureau of Weights and Measures. Meetings are held to reconsider the way the units have been determined, and the system has been refined over the years. However, the metric system, based on units of 10, has been officially adopted by most of the countries in the world.

There are a few things to keep in mind. When working with the weight equivalencies, one important thing to remember is that the U.S. Customary measurements measure weight, which depends upon the pull of gravity. The metric system measures mass, which is the same regardless of what the pull of gravity is. In other words, the mass would be the same on Earth and on the moon, but the weight would be different. For our purposes, we are using the gravity of Earth to do our conversions.

Temperature conversion can become confusing because of the negative numbers. Another way of converting temperatures is:

(Fahrenheit temperature – 32) X 5/9 = Celsius temperature

(Celsius temperature X 9/5) + 32 = Fahrenheit temperature

(Fahrenheit temperature + 459.67) X 5/9 = Kelvin temperature

(Kelvin temperature X 9/5) - 459.67 = Fahrenheit temperature

Celsius temperature + 273.15 = Kelvin temperature

Kelvin temperature - 273.15 = Celsius temperature

On the following pages, you will see tables for length, weight, volume (liquid), volume (dry), area, temperature, and speed that compare metric measurements to common U.S. Customary measurements. For ease in use, we have rounded the measurements to two decimal places where possible. When working the problems, the rounding of these measures will cause answers to vary.

Length Charts

	Millimeter	Centimeter	Meter	Kilometer
1 Inch	25.40	2.54	0.03	0.00003
1 Foot	304.80	30.48	0.30	0.0003
1 Yard	914.40	91.44	0.91	0.0009
1 Mile	1,609,344	160,934.40	1,609.34	1.61

	Inch	Foot	Yard	Mile
1 Millimeter	0.04	0.003	0.001	- - -
1 Centimeter	0.39	0.03	0.01	0.000006
1 Meter	39.37	3.28	1.09	0.0006
1 Kilometer	39,370.08	3,280.84	1,093.61	0.62

Weight Charts

	Milligrams	Grams	Kilograms	Metric Ton
1 Ounce	28,349.52	28.35	0.03	0.00003
1 Pound	453,592.37	453.59	0.45	0.0005
1 Short Ton (2000 lbs.—US)	907,184,740	907,184.74	907.18	.91
1 Long Ton (2240 lbs.—UK)	1,016,046,908.8	1,016,046.91	1,016.05	1.02

	Ounce	Pound	Short Ton	Long Ton
1 Milligram	0.00004	0.000002	- - -	- - -
1 Gram	0.04	0.002	0.000001	- - -
1 Kilogram	35.27	2.20	0.001	0.001
1 Metric Ton	35,273.96	2,204.62	1.10	0.98

Activity One (Length):

Find the answers to the following problems if 1 inch (in) = 25.4 millimeters (mm) or 2.54 centimeters (cm). There are 10 millimeters in a centimeter. To convert from millimeters to centimeters, divide the number of millimeters by 10. To convert from centimeters to millimeters, multiply the number of centimeters by 10.

Inches to Millimeters and Centimeters	Inches to Centimeters and Millimeters
3 in. = _____ mm or _____ cm	5 in. = _____ cm or _____ mm
9 in. = _____ mm or _____cm	7 in. = _____ cm or _____mm
18 in. = _____ mm or _____cm	20 in. = _____ cm or _____mm
25 in. = _____ mm or _____cm	23 in. = _____ cm or _____mm
34 in. = _____ mm or _____cm	36 in. = _____ cm or _____mm

Activity Two (Length):

Use the equivalencies at the top of each column to complete the problems.

Centimeters to Inches	Meters to Feet	Kilometers to Miles
1 cm = .39 in.	1 m = 3.28 ft.	1 km = .62 mi.
16 cm = _____ in.	16 m = _____ ft.	73 km = _____ mi.
249 cm = _____ in.	23 m = _____ ft.	19 km = _____ mi.
67 cm = _____ in.	35 m = _____ ft.	28 km = _____ mi.
83 cm = _____ in.	52 m = _____ ft.	97 km = _____ mi.
71 cm = _____ in.	30 m = _____ ft.	59 km = _____ mi.

Let's Review

Use the charts in the front of the book to answer the questions.

1. If you are building a room onto your house that is 18 feet by 16 feet, what would those measurements be in meters?

2. For the race, you are making lines on the ground that are 15 feet apart to make it easier to see who is in the lead at different points. How many meters apart are the lines?

3. You are looking for a box to send a gift to a friend. The box must measure at least 8 inches, by 6 inches, by 4 inches. What would these measurements be in centimeters?

4. When figuring the distance to travel on your vacation, you find you will have to travel 175 miles. How many kilometers do you have to travel?

5. You have to total the distance traveled for your job for reimbursement. You traveled 30 miles on Monday, 21 miles on Tuesday, 16 miles on Wednesday, and 9 miles on Thursday. How many total kilometers did you travel?