

Name: _____

Date: _____

CONVERTING UNITS
N-GEN MATH[®] 6

Video Notes
Link on my weebly

When we measure length or weight or volume or really anything there are various **units** we can measure the quantity with. In this lesson we will work on **converting** a measurement in one type of unit to another.

Exercise #1: For each of the following, list different units you might use to measure each of the following. List as many as you can.

(a) length

(b) weight

(c) volume

Exercise #2: Evie and Elliette are measuring the height of a small apple tree. Evie finds that it is four feet tall. Elliette however finds that it is 48 inches tall. Could they both be correct? Explain.

In the last problem you saw that since the **ratio of inches to feet** is a constant (12 inches per 1 foot), we can use this ratio to convert between the two units.

Exercise #3: At a track and field event, Sean runs a race that is 1,600 yards long.

(a) What is the **ratio of feet to yards** in any length measurement? State as a unit rate and use appropriate “per” units.

(c) If a mile is 5,280 feet long, did Sean run shorter or longer than a mile in his race? Justify.

(b) What is the **ratio of yards to feet**? State as a unit rate and use appropriate “per” units.



We should be able to convert between various units based on our past knowledge.

Exercise #4: Allyson times herself while running a mile and finds that she runs it in 492 seconds. She would like to know how many minutes it took her.

- (a) What is the ratio of minutes to seconds? Express as a unit rate with appropriate “per” units.
- (b) Write a product that converts 492 seconds into an equivalent time in minutes. Use division to find the answer. (It will be a decimal answer.)

We’ve now seen conversions of **length** and conversions of **time**. Now for **volume**.

Exercise #5: Mia has a lot of apples from trees growing in her yard. She makes 3.6 gallons of apple juice from them. She stores the juice in containers that hold one pint. A pint contains one-eighth of a gallon. Answer the following questions.

- (a) What is the ratio of pints to gallons? State as a unit rate using appropriate “per” units.
- (b) How many pint containers will Mia need? Show your work.

The last type of conversion we will look at is that of **weight**. As we saw in *Exercise #1*, weight can be measured in many different units.

Exercise #6: On a digital scale at the grocery store, Antonio weighs some tomatoes that he is going to buy. The scale tells him that he has 48 ounces of tomatoes. Antonio switched the scale so it measures in pounds and tells him that the tomatoes weigh three pounds.

- (a) Based on the information in the problem, what is the ratio of ounces to pounds? Express as a unit rate using appropriate “per” units.
- (b) If Antonio adds an additional $2\frac{1}{4}$ pounds of tomatoes, how many ounces did he add? Justify.



CONVERTING UNITS
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USING YOUR MATH

1. Give each of the following ratios as unit rates with appropriate “per” units. Some of your unit rates will be fractions.

(a) The ratio of inches to feet.

(b) The ratio of feet to inches.

(c) The ratio of centimeters to meters.

(d) The ratio of meters to centimeters.

2. Small quantities of cooking ingredients are measured using **teaspoons** and **tablespoons**. Marcus is making a recipe that calls for four tablespoons of sugar. He doesn’t have a tablespoon but does have a teaspoon. He knows that one tablespoon is larger and holds as much as three full teaspoons.

(a) What is the ratio of teaspoons to tablespoons? Express as a unit rate and use appropriate “per” units.



=

three teaspoons



(b) What is the ratio of tablespoons to teaspoons? Express as a unit rate and use appropriate “per” units.

(c) How many teaspoons will Marcus need to use in his recipe? Show how you arrived at your answer.

(d) Charlotte is making a recipe that calls for five teaspoons of salt. She has only a tablespoon. How many tablespoons of salt should she add? (Beware, your answer will include a fraction).



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3. A common unit to measure lengths in other countries is the **kilometer**. For example, if you drive in Canada, you might see a speed limit sign that says 100 kph (kilometers per hour). Recall that in the metric system **kilo** stands for 1,000.
- (a) What is the ratio of meters to kilometers? State as a unit rate with proper “per” units.
- (b) What is the ratio of kilometers to meters? State as a unit rate with proper “per” units.
- (c) Mason has an app on his phone that records the distance he walks during his day. If he walks 6,390 meters, how many kilometers did he walk? Show how you found your answer.
- (d) In the metric system, there are 1,000 millimeters per meter. Given this and what you found in (a), how many millimeters are in a kilometer? The answer is awesome!
4. Small amounts of weight are often measured in grams or ounces. Recall from *Exercise #6* that there are 16 ounces per pound. Grams are even smaller. Camilla weighs an onion and finds that it is 112 grams. On another scale, she finds that it weighs four ounces.
- (a) Using the information from Camilla’s onion, determine the ratio of grams to ounces. State as a unit rate using proper “per” units.
- (b) If Dylan weighs an apple on a scale and finds that it is 63 grams, determine the weight of the apple in ounces based on (a). Show your work and express your answer as a decimal.

REVIEWING YOUR MATH

5. In a class of students, 11 out of 20 students in the class own phones. If there were 100 students instead and the ratio of students who own phones stayed the same, how many of the 100 would own phones? Use any appropriate method. Show how you found your answer.



Name _____

Customary Length

You can convert one customary unit of length to another customary unit of length by multiplying or dividing.

Multiply to change from larger to smaller units of length.

Divide to change from smaller to larger units of length.

Convert 3 feet to inches.

Step 1

Decide:

Multiply or Divide

feet → inches
larger → smaller

Step 2

Think:

1 ft = 12 in., so
3 ft = (3 × 12) in.

Customary Units of Length

1 foot (ft) = 12 inches (in.)
1 yard (yd) = 3 feet
1 mile (mi) = 5,280 feet
1 mile = 1,760 yards

Step 3

Multiply.

$3 \times 12 = 36$

So, 3 feet = 36 inches.

Convert 363 feet to yards.

Step 1

Decide:

Multiply or Divide

feet → yards
smaller → larger

Step 2

Think:

3 ft = 1 yd,
so 363 ft = (363 ÷ 3) yd.

Step 3

Divide.

$363 \div 3 = \underline{121}$

So, 363 feet = 121 yards.

Convert.

1. 33 yd = _____ ft 2. 300 mi = _____ yd 3. 46 in. = ____ ft ____ in.

4. 96 yd = _____ ft 5. 48 ft = _____ yd 6. 2 mi 20 yd = _____ yd

Compare. Write <, >, or =.

7. 2 yd ○ 7 ft 8. 67 mi ○ 117,920 yd 9. 250 yd ○ 800 ft

10. 14 yd 2 ft ○ 16 ft 11. 34 ft 10 in. ○ 518 in. 12. 5 mi 8 ft ○ 8,800 yd

Customary Capacity

You can convert one unit of customary capacity to another by multiplying or dividing.

Multiply to change from larger to smaller units.

Divide to change from smaller to larger units.

Convert 8 cups to quarts.

Step 1

Decide:

Multiply or Divide

cups \rightarrow quarts
smaller \rightarrow larger

Step 2

Think:

4 c = 1 qt,
so 8 c = (8 \div 4) qt.

Step 3

Divide.

8 \div 4 = 2

So, 8 cups = 2 quarts.

Convert 19 gallons to quarts.

Step 1

Decide:

Multiply or Divide

gallons \rightarrow quarts
larger \rightarrow smaller

Step 2

Think:

1 gal = 4 qt,
so 19 gal = (19 \times 4) qt.

Step 3

Multiply.

19 \times 4 = 76

So, 19 gallons = 76 quarts.

Customary Units of Capacity

1 cup (c) = 8 fluid ounces (fl oz)

1 pint (pt) = 2 cups

1 quart (qt) = 2 pints

1 quart = 4 cups

1 gallon (gal) = 4 quarts

Convert.

1. 14 pt = _____ qt

2. 32 qt = _____ c

3. 7 c = _____ fl oz

4. 28 c = _____ pt

5. 9 gal = _____ qt

6. 16 c = _____ qt

Compare. Write <, >, or =.

7. 16 qt 60 c

8. 88 fl oz 11 c

9. 3 gal 10 qt

10. 36 qt 54 c

11. 66 fl oz 9 c

12. 16 gal 64 qt