

## Algebra RH

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**Essential Question:** How do we use dimensional analysis for unit conversion?

### Do Now:

You are riding your bike on a 3 mile trail. A sign says you have completed 1,500 feet. How many feet do you have left to bike? (1 mile = 5,280 feet)



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### Converting Units

To convert between units, you're usually given one measure and asked to convert to another measure. To change a given measurement from one unit to another, you can use a process called "Dimensional Analysis." This method involves multiplying the given measurement by a conversion factor, a ratio of two measurements that is equal to 1.

1) Convert 16 quarts to gallons. ( $\frac{1gal}{4qt}$ )

2) How many kilometers are in 20,000 meters? ( $1km = 1000m$ )

3) The body of a large male contains about 12 pints of blood. Convert this quantity to liters. (2.1 pints  $\approx$  1 liter)

4) Express the number of days in  $w$  weeks.

5) Express the number of cents in  $q$  quarters.

6) A gallon of gasoline weighs about 2.84 kg. How many pounds does a pint of gasoline weigh? (1 kg = 2.2 pounds, 8 pints = 1 gallon).

## Converting Rates

Sometimes you will need to convert not just one measurement, but a *ratio* of measurements. This requires two or more conversion factors.

7) A cyclist travels 105 kilometers in 4.2 hours. Convert the cyclist's speed to miles per minute. (1 mile = 1.61 kilometers)

Given Rate		Conversion Factor		Conversion Factor		Answer
_____	X	_____	X	_____	=	_____

*Set up conversion factors so that both km and hour units divide out*

8) If a rocket is launched at 64 feet per second, how many miles per hour is this?  
(1 mi = 5280 ft)

### Practice Problems:

9) Express the number of 4ths of a mile in  $m$  miles.

10) How many quarts are in 7000 milliliters? (1 L = 1000 mL, 1 L  $\approx$  1.06 qt)

11) Convert 6 gallons to pints. (1 gallon = 4 quarts, 1 quart = 2 pints)

12) Convert 2 miles to inches. (1 mile = 1760 yd, 1 yd = 36 in)

13) Express the number of hours in  $w$  weeks.

14) Which is faster, 80 miles an hour or 40 meters per second?

1 mile: 5280 feet

2.54 cm: 1 inch

100 cm: 1 meter