

Name: 2nd Hour

Converting Units Day 1

DEFINITION

A unit ratio, or a conversion factor, is a unit rate where the denominator is one unit. The numerator and the denominator of each of the unit ratios are equal (so the value of each ratio is 1).

Examples: $\frac{12\text{in}}{1\text{ft}} = \frac{24\text{in}}{2\text{ft}}$ $\frac{3\text{ft}}{1\text{yd}}$ $\frac{60\text{sec}}{1\text{min}}$ $\frac{24\text{hrs}}{1\text{day}}$ $\frac{365\text{days}}{1\text{year}}$

You can convert one rate to an equivalent rate by multiplying by a unit ratio or its reciprocal (the ratio flipped). Since conversion factors equal 1, multiplying by them does not change the value of a measurement.

When you convert rates, you include the units!

Customary Units Chart

label

Length
12 in = 1 ft
3 ft = 1 yrd
5,280 ft = 1 mi
1,760 yrd = 1 mi

Weight
16 oz = 1 lb
2000 lb = 1 ton

Capacity
128 fl oz = 1 gal
2 pt = 1 qt
8 pt = 1 gl
4 qt = 1 gal

Time
60 sec = 1 min
60 min = 1 hr
24 hr = 1 day
7 days = 1 wk
52 wk = 1 yr
12 mon = 1 yr
365 days = 1 yr

The "How To" -SET UP THE PROBLEM NO MATTER HOW EASY!

Example 1: How many inches are there in 7 feet?

Step 1: Setup the "given," the "get," and the "ratios" (or conversion factors).

What you are given:

Ratios used to get you from here to there

What you want to get:

Step 2:

Ensure that the units cancel correctly.

$$\frac{7\cancel{\text{ft}}}{1} \times \frac{12\cancel{\text{in}}}{1\cancel{\text{ft}}} = \frac{7 \times 12 \text{ inches}}{1 \times 1} = \frac{84\text{in}}{1} \quad 84 \div 1 =$$

Step 3: Multiply (tops), multiply (bottoms), and divide!!

So the answer is "There are 84 inches in 7 feet."

Example 2: How many quarts are there in 24 cups?

Step 1: Setup the "given," the "get," and the "ratios" (or conversion factors).

What you
are given:

Ratios used to get you from
here to there

What you
want to get:

Step 2:

Ensure
that the
units cancel
correctly.

$$\frac{24 \cancel{\text{c}}}{1} \times \frac{1 \text{ qts}}{4 \cancel{\text{c}}} = \text{---} \text{ qts}$$

$$\frac{24 \cdot 1}{1 \cdot 4} = \frac{24}{4} \text{ qts}$$

Step 3: Multiply (tops), multiply (bottoms), and divide!!
Always top \div bottom!

There are 6 qts in 24 cups.

Example 3 You Try: How many pounds are there in 80 ounces?

Step 1: Setup the "given," the "get," and the "ratios" (or conversion factors).

What you
are given:

Ratios used to get you from
here to there

What you
want to get:

Step 2:

Ensure
that the
units cancel
correctly.

$$\frac{80 \cancel{\text{oz}}}{1} \times \frac{1 \text{ lbs}}{16 \cancel{\text{oz}}} = \frac{80 \cdot 1}{1 \cdot 16} \text{ lbs}$$

$$\frac{80}{16} = 5$$

Step 3: Multiply (tops), multiply (bottoms), and divide!!

There are 5 pounds in 80 ounces.

Example 4: How many feet are there in 150 inches?

$$150 \cancel{\text{in}} \times \frac{1 \text{ ft}}{12 \cancel{\text{in}}} = \frac{150 \text{ ft}}{12}$$

$$= 12.5 \text{ ft}$$