**Lesson 4-8 Notes**
**Changing Units in the Customary System**

| Type | Length | Capacity | Weight |
|---|---|---|---|
| **Unit** | Inch (in.)<br>Foot (ft)<br>Yard (yd)<br>Mile (mi) | Fluid ounce (fl oz)<br>Cup (c)<br>Pint (p)<br>Quart (qt)<br>Gallon (gal) | Ounce (oz)<br>Pound (lb)<br>Ton (t) |
| **Equivalents** | 1 ft = 12 in.<br>1 yd = 3 ft.<br>1 mi = 5,280 ft | 1 c = 8 fl oz<br>1 pt = 2 c<br>1 qt = 2 pt<br>1 gal = 4 qt | 1 lb = 16 oz<br>1 t = 2,000 lb |

**We can write think of some measurements as mixed numbers or fractions:**

1 in. is $\frac{1}{12}$ of a foot.

3 in. is $\frac{1}{4}$ of a foot. $\frac{3}{12} = \frac{1}{4}$

6 in. is $\frac{1}{2}$ of a foot. $\frac{6}{12} = \frac{1}{2}$

2 ft is $\frac{2}{3}$ of a yard.

4 ft. is $1\frac{1}{3}$ yard. $\frac{4}{3} = 1\frac{1}{3}$

1 qt. is $\frac{1}{4}$ of a gallon.

**We can use fractions and mixed numbers to change units of length in the Customary System.**

A carpenter has a board 10 ft long. A piece 5 ft 3 in. long is cut from the board. What is the length in feet of the remaining piece?

Step 1: Write 5 ft 3 in. as a fraction. $5\frac{3}{12} \rightarrow 5\frac{1}{4}$ ft.

Step 2: Rewrite your whole number as a fraction.

$10 - 5\frac{1}{4} \rightarrow \frac{10}{1} \times \frac{4}{4} - \frac{21}{4}$

Step 3: Find a common denominator.

$\frac{40}{4} - \frac{21}{4} = \frac{19}{4}$

$4\overline{)19}$ R 3, $-16$, $3$ $= 4\frac{3}{4}$ ft.

Step 4: Solve.

# Dimensional Analysis

**How many one cup servings are in a 36 fl oz bottle of juice?**

**Step 1:** What units are you being asked to use? cups and fl. oz.

**Step 2:** What is the relationship between these unit? 8 fl. oz = 1 c

**Step 3:** Set up the problem by starting with the amount you are converting. Then use the unit relationship to solve.

$$\frac{36\ oz}{1} \times \frac{1\ c}{8\ oz} = \frac{36}{8} = 4\frac{4}{8} = 4\frac{1}{2}\ c$$

**Don't forget!** We want the LIKE units to be diagonal from one another so they "cancel" out.

$$\frac{3\ lb}{1} = \frac{16\ oz}{1\ lb}$$

**You Try!**

**How many one-cup servings are there in a 50 fl oz bottle of juice?**

8 oz = 1 c

$$\frac{50\ oz}{1} \times \frac{1\ c}{8\ oz} = \frac{50}{8} = 6\frac{2}{8} = 6\frac{1}{4}\ c$$

**You have 17 pints of milk. How many gallons is this?**

$$\frac{17\ pt}{1} \times \frac{1\ qt}{2\ pt} \times \frac{1\ gal}{4\ qt} = \frac{17}{8} = 2\frac{1}{8}\ gal$$

**The lighter the frame of a mountain bike, the easier it is to cycle. Which bike shown in the ad will be easier to cycle?**


$\frac{76\text{ oz}}{1} \times \frac{1\text{ lb}}{16\text{ oz}} = \frac{76}{16} = 4\frac{12}{16}$

$12 \div 4$
$16 \div 4$

$4\frac{3}{4}$ lb

$4\frac{1}{4} < 4\frac{3}{4}$

lightest

3 16 x 5 = 80

16 x 4 = 64

4 r 12
16 | 76
-64
12