

January 30, 2015 ^{1st} ^{2nd} Starter

There are 6 places set at each table for a big outdoor party. All the tables and all the chairs have 4 legs each. The tables and chairs together have a total of 196 legs. If there is one place set for each person who will attend, how many people are expected?



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1/29 - Converting between Units

First you need to understand UNIT FRACTIONS.

Definition: a unit fraction is a fraction where the numerator and the denominator are the same size but may be different units.

Examples: $\frac{1 \text{ ft}}{12 \text{ in}} = 1$

$$\frac{1 \text{ gal}}{4 \text{ qts}}$$

$$\frac{60 \text{ min}}{1 \text{ hr}}$$

$$\frac{5280 \text{ ft}}{1 \text{ mi}}$$

Convert 13 feet to inches using unit fractions.

$$\begin{aligned} 13 \text{ feet} &= \frac{13 \text{ ft}}{1} && \text{label goes in} \\ &&& \text{the numerator} \\ &= \frac{13 \text{ ft}}{1} \cdot 1 \\ &= \frac{13 \text{ ft}}{1} \cdot (\text{any unit fraction}) \\ &= \frac{13 \text{ ft}}{1} \cdot \frac{\text{any number}}{\text{itself}} \\ &= \frac{13 \cancel{\text{ft}}}{1} \cdot \frac{12 \text{ in}}{1 \cancel{\text{ft}}} \\ &= 156 \text{ in} \end{aligned}$$

Convert one unit to the other by using unit fractions.

$$2\frac{1}{2} \text{ ft} = \underline{\hspace{2cm}} \text{ in}$$
$$\frac{\cancel{5 \text{ ft}}}{2} \cdot \frac{\cancel{12 \text{ in}}}{\cancel{1 \text{ ft}}}$$
$$= 30 \text{ in}$$

$$7\frac{3}{4} \text{ in} = \underline{\hspace{2cm}} \text{ ft}$$
$$\frac{\cancel{31 \text{ in}}}{4} \cdot \frac{1 \text{ ft}}{\cancel{12 \text{ in}}}$$
$$= \frac{31}{48} \text{ ft}$$

$1 \text{ hr} = 60 \text{ min}$

$$1\frac{1}{4} \text{ hours} = \underline{\hspace{2cm}} \text{ min}$$
$$\frac{\cancel{5 \text{ hr}}}{4} \cdot \frac{\cancel{60 \text{ min}}}{\cancel{1 \text{ hr}}}$$
$$= 75 \text{ min}$$

$2 \text{ pts} = 1 \text{ qt}$

$$1\frac{1}{2} \text{ pints} = \underline{\hspace{2cm}} \text{ quarts}$$
$$\frac{\cancel{3 \text{ pts}}}{2} \cdot \frac{1 \text{ qts}}{\cancel{2 \text{ pts}}}$$
$$= \frac{3}{4} \text{ qts}$$

Convert 60 miles per hour to miles per minute using unit fractions.

$$\begin{aligned}60 \text{ mph} &= \frac{60 \text{ miles}}{1 \text{ hour}} \\&= \frac{60 \text{ miles}}{1 \text{ hour}} \cdot 1 \\&= \frac{60 \text{ miles}}{1 \text{ hour}} \cdot (\text{any unit fraction}) \\&= \frac{60 \text{ miles}}{1 \text{ hour}} \cdot \frac{\text{any number}}{\text{itself}} \\&= \frac{\cancel{60} \text{ miles}}{1 \cancel{\text{hour}}} \cdot \frac{1 \cancel{\text{hour}}}{\cancel{60} \text{ min}} \\&= 1 \text{ mi/min}\end{aligned}$$

Convert each unit rate using unit fractions.

$$20 \text{ mph} = \underline{\hspace{2cm}} \text{ ft/hr}$$
$$\frac{20 \text{ mi}}{1 \text{ hour}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}}$$
$$= 105,600 \text{ ft/hr}$$

$$1 \text{ mile} = 5280 \text{ ft}$$

$$20 \text{ mph} = \underline{\hspace{2cm}} \text{ miles/minute}$$
$$\frac{20 \text{ mi}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}}$$
$$= \frac{1}{3} \text{ mi/min}$$

$$1 \text{ hr} = 60 \text{ min}$$

$$20 \text{ gal/min} = \underline{\hspace{2cm}} \text{ gal/hr}$$

$$\frac{20 \text{ gal}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}}$$
$$= \boxed{1200 \text{ gal/hr}}$$

$$1 \text{ hr} = 60 \text{ min}$$

$$\frac{1200 \text{ gal}}{\text{hr}}$$

$$15 \text{ miles/gal} = \underline{\hspace{2cm}} \text{ miles/quart}$$

$$\frac{15 \text{ mi}}{\text{gal}} \cdot \frac{1 \text{ gal}}{4 \text{ qt}}$$
$$= \frac{15}{4} \text{ mi/qt}$$
$$= 3\frac{3}{4} \text{ mi/qt}$$
$$\text{or } 3.75 \text{ mi/qt}$$

$$4 \text{ qts} = 1 \text{ gal}$$

Homework

Gold WS6

Due Tuesday