**Homework # 14 review**

A farmer has a cow, a goat and a goose. The cow and the goat will eat all the grass on his meadow in 45 days, the cow and the goose will eat all the grass on the same meadow in 60 days, and the goat and the goose will eat all the grass on the meadow in 90 days. How many days will it take them altogether to eat all the grass on the meadow? (we assume that the new grass is not growing.)

First, we need to find out how much grass these pairs of animals will eat per each hour.

$$\frac{1}{45} + \frac{1}{60} + \frac{1}{90} = \frac{4+3+2}{180} = \frac{9}{180} = \frac{1}{20}$$

By adding these numbers we are counting the fraction of the grass eaten in one hour

(but each animals contribution is counted twice) *so we have to divide the result by* 2

$$\frac{1}{20} : 2 = \frac{1}{20} \, x \, \frac{1}{2} = \frac{1}{40}$$

40 days

**How we multiply decimals?**

- **Alight the numbers normally (<span style="color:red">Do not align decimal points</span>)**
- **Multiply, ignoring decimal points**
- **Add the products.**
- **Count how many numbers in total you have after decimal point**
- **Use that number for putting the decimal point on your product**

$3.77 \times 2.8 = ?$

$$
\begin{array}{r}
3.77 \ (2\,decimal\,places) \\
\times \quad 2.8 \ (1\,decimal\,place) \\
\hline
3016 \\
+754 \quad \\
\hline
10.556 \ (3\,decimal\,places)
\end{array}
$$

**Ratio**

A ratio describes a proportional relationship

We use ratios to make comparisons between two things. When we express ratios in words, we use the word "to"--we say "the ratio of something to something else." A ratio says how much of one thing there is compared to another thing.

Example #1:



- ratio of squares to circles is 3/6
- ratio of squares to circles is 3 to 6
- ratio of squares to circles is 3:6

Example #2:

 In a fourth grade, there are 80 boys and 100 girls. The ratio of boys to girls is 80 to 100. We can use equivalent fractions to show that $\frac{80}{100} = \frac{4}{5}$.   So the ratio of boys to girls is 4 to 5.

We also can say that the  number of boys is $\frac{4}{5}$ of the number of girls ($\frac{4}{5}x80 = 100$),  the number of boys (80) contains the number of girls (100) $\frac{4}{5}$ times.

When we compare things using the division we also use the word *ratio*.

We can write the ratio of two numbers in the several ways:

$$a\ to\ b, \qquad a:b, \qquad \frac{a}{b}$$

**Example: To make pancakes we use 3 cups of flour and 2 cups of milk (there are other ingredients too).**

So the ratio of flour to milk is **3 : 2,** which means that for each 2 cups of milk we need to have 3 cups of flour. To make pancakes for a LOT of people we might need 4 times the quantity, so we multiply the numbers by 4:

$$(3 \cdot 4) : (2 \cdot 4) \; = \; 12 : 8 \qquad \left( \frac{3 \cdot 4}{2 \cdot 4} = \frac{12}{8} \right) \quad \textbf{12 cups of flour and 8 cups of milk}$$

## Percent

1 percent of quantity is a $\frac{1}{100}$ th part of it.

One percent (**1%**) means 1 per 100.

Finding 10% of a number is dividing this number by 10.

Different problem:

- 40% of what number is 12?     $40\% \cdot x = 12$

  $\frac{40}{100} \cdot x = 12 \qquad 12 : \frac{40}{100} = x \qquad 12 \cdot \frac{100}{40} = 30$

- What percent of 48 is 12?

$X\% \; x \; 48 = 12 \qquad x = \frac{12}{48}$ . Simplify this fraction and you will get $\frac{1}{4}$

We have to create a fraction equivalent to $\frac{1}{4}$ , but with denominator 100 to find how many percent.

$$\frac{1}{4} = \frac{1x25}{4x25} = \frac{25}{100}$$     The answer is 12 is 25% of 48.

$$\frac{x}{100} \cdot 48 = 12$$     To solve this equation $\frac{12}{48} = \frac{x}{100}$ , then cross multiply:

$12 \cdot 100 = 48x$

$x = 1200 : 48 = 25$