Handout #1

Rocio, let's take a sample problem:

Local Girl Scout Troop #121 is having a fund raiser. On Monday, they have raised 1/8 of their entire goal which is $400. How much have they raised?

Well, that's easy we just multiply the fraction by the total goal amount:

$400 × 1/8 = $400 × 0.125 = $50

But what if we **turn it around** like this:

A different Local Girl Scout Troop, Troop #99, is having a fund raiser. They have raised $300 which is 3/8 of their entire goal. What's their goal amount?

Now it's a bit harder. Let's look at **two ways** to solve this problem: by using **mathematical reasoning** and the more formal process of setting up *and* solving an **equation**.

1. Mathematical Reasoning

Well, if 3/8 of their goal is $300 what is 1/8 of their goal? Well, we just

$300 ÷ 3 = $100

So 1/8 of their goal is $100.

Now here's a the key: **their entire goal is 8/8 of their goal**, so their entire goal is:

8 × 1/8 of goal = 8 × $100 = $800

2. Set Up an Equation

How do we set up an equation? We just say it out loud and then write it down.

First, say it out loud: *3/8 **times** the total goal amount **equals** $300* .

Then, write it down:

$$\frac{3}{8} \times total\ goal\ amount = \$300$$

Then, instead of 'total goal amount' use a **variable**. Let's use the letter **g**:

$$\frac{3}{8} \times g = \$300$$

Now we solve it by **eliminating the 3/8 from the left side**. How? By: **multiplying both sides by the** *reciprocal* **8/3** .
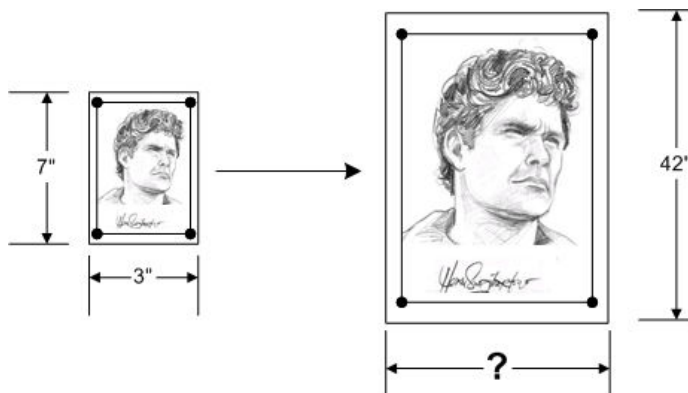
$$\frac{\cancel{8}}{\cancel{3}} \times \frac{\cancel{3}}{\cancel{8}} \times g = \frac{\overset{\$100}{\cancel{\$300}}}{1} \times \frac{8}{\cancel{3}} = \$100 \times 8 = \mathbf{\$800}$$

Let's take another problem that we call solve with both **mathematical reasoning** and **an equation**:

*You get your autographed picture of David Hasselhoff enlarged. Before, it was 3 inches by 7 inches (3" x 7"). After enlargement it's **height** is 42 inches (42").*

How many times did you get it enlarged?

*What is the **width** after enlargement?*

Again, let's solve this by both **mathematical reasoning** and by setting up and solving an **equation**:

Mathematical Reasoning

*First, find how **many times** you enlarged it*

→ 42" ÷ 7" = 6 times

*Then, **apply** that change to the width*

→ 3" x 6 = 18"

Equation

*First, set up an **equation***

$$\frac{w}{42} = \frac{3}{7}$$

*Then solve, by getting **w** by **itself**.*

$$\frac{42}{1} \times \frac{w}{42} = \frac{3}{\cancel{7}} \times \frac{\cancel{42}^{6}}{1} = 3 \times 6 = 18"$$

(?) *The Johnson have driven 625 miles. They are 5/9 done with their trip. How long is their entire trip? How much further do they have to go?*

*A playground is 12 feet (12') by 14 feet (14'). The school then makes it bigger. The new width is 36 feet. Assuming the height **grew by the same amount (the proportions stayed the same)** what is the new height?*

① Solving Equations with Decimals and Percents

Okay, what if instead of a **fraction** the problem has a **decimal** or **percent** in it?

Just set up the equation in the same way. Let's two examples:

Percentages

Jose weighs 180 pounds. He weighs 75% as much as Amal. How much does Amal weight?

First we set up the equation. Let's use the variable **w** for Amal's weight:

w × 75% = w × 0.75 = 180 pounds

Then we **need to get w by itself**. How do we do that? We divide both sides by 0.75. Let's do this is five steps:

1. w × 0.75 = 180 pounds
2. w × 0.75 ÷ 0.75 = 180 ÷ 0.75 pounds
3. w × (0.75 ÷ 0.75) = (180 ÷ 0.75) pounds
4. w × 1 = 250 pounds
5. w = 250 pounds

Decimals

Jose is 5.5 feet tall and he is 0.853 times as tall as Amal. How tall is Amal?

*Use the letter **h** for Amal's height and round your answer to the nearest tenth of a foot:*

1. h × 0.853 = 5.5 feet
2. h × 0.853 ÷ 0.853 = 5.5 ÷ 0.853 feet
3. h × (0.853 ÷ 0.853) = (5.5 ÷ 0.853) feet
4. h × 1 = 6.4 feet
5. h = 6.4 feet

Try these problems with your tutor:

After 1.4 hours, a movie is 7/10 over. How long is the movie?

After 1.4 hours, a movie is 70% over. How long is the movie?

Tom made 15 baskets in the game. He made 3/4 as many as Eduardo. How many did Eduardo make?

Keshanna made 22 baskets in the game. She made 0.89 as many as Daquisha. How many did Daquisha make?
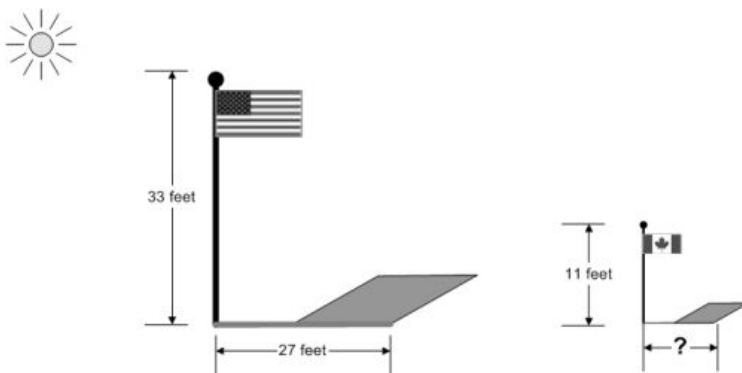
Tom made $55,423 last year. He made 5/7 what Rocio made. How much did Rocio make?

Julie made $70,230 last year. She made 82% of what Greg made. How much did Greg make?

? Questions

Q1 The shadow cast by a 33 foot pole is 27 feet. How big a shadow does an 11 foot pole cast?

Q2 Arthur is typing a paper that is 420 words long. He can type 30 words per minute. How long will it take him to type the paper (try without a calculator)?

Q3 In Whiteriver, there are 4 bicycles for every 20 people. There are about 72,000 people in Whiteriver. How many bicycles are there (try without a calculator)?

Q4 Sam can run 1800 yards in 6 minutes. At the same rate, how long will it take him to run 2250 yards?

Q5 A tire lost 2.5 millimeters of its tread in 2000 miles. At that rate, how much tread will it lose in 18,000 miles?

? **Questions**

Q6 A plane can fly from Minneapolis to Los Angeles -- a distance of 1500 miles -- in 3 hours. On average, how fast can the plan travel?

Q7 Keshaun can jump 0.95 as high as Micheal. Micheal can jump 22" high. How high can Keshaun jump?

Q8 A store is having a '1/3 off everything in the store' sale. How much will a toaster cost -- regular price $27.49 -- during the sale. Assume that there is 6.5% sales tax.

Q9 63% of all Americans like Summer more than Winter. In a room of 3,219 random Americans, how many will prefer Summer?

Q10 On average, 5 out of 60 parts produced at a local bolt plant are defective and need to be removed from the assembly line. Out of 480 parts, how many will be defective?

Q11 A runner has ran 20.8 miles. If he is 80% finished with the race, how long is the race?

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--   scratch paper   --

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