Unit 1 Day 9 Notes on Applications

"When will I use this stuff in real life?"
Let's conquer our fear of word problems!

How much do you lift??

You decide to join a gym over the summer. You have $600 in your saving account. *Big Muscles Gym* charges a $95 startup fee and $75/month to belong. How many months can you afford to be a member?

Helpful Hints!
- Read each word problem *at least* two to three times.
- Underline what you know and assign a variable to what you're looking for.
- Set up an equation and solve for the unknown (your variable).
- Determine if your answer is *reasonable.* Does it make sense??
- Most importantly...*don't get discouraged* if you cannot figure the problem out right away. Struggling and persevering through problems will make you a much better problem solver!

Equation: $600 = 75x + 95$

Define your variable (*be specific!*):

$x = \#\text{ of months}$

$600 = 75x + 95$

$\dfrac{505}{75} = \dfrac{75x}{75}$

$6.73 = x$

> You can afford to join for 6 months

(7 months is more than you can afford)

We're going to the zoo!

Your school is planning a field trip to a zoo. There are two different bus companies that the school can use. The school wants to know how many students will need to go in order for the two companies to cost the same. Bus A charges a $40 rental fee, plus $4 for each student. Bus B charges a $100 rental fee, plus $2 for each student.

Equation:
$40 + 4x = 100 + 2x$

Define your variable (*be specific!*):
$x = \#\text{ of students}$

$$40 + 4x = 100 + 2x$$
$$ -4x \qquad\quad -4x$$
$$40 = 100 - 2x$$
$$-100 \quad -100$$
$$-60 = -2x$$

$x = 30$

> 30 students would have to ride to make the cost the same

Going Once! Going Twice! SALE!

Your favorite skateboarding hoodie is on sale for $25.50 after being marked down 30%. Write an equation that can be used to find the original price, *p*, of the hoodie before the sale.

↳ you pay 70% of the original

Equation: $\dfrac{25.50}{x} = \dfrac{70}{100}$ / $.7x = 25.50$

Define your variable (*be specific!*):
$x = \text{original price}$

$$70x = 25.50 \cdot 100$$
$$70x = 2550$$
$$\boxed{x = \$36.43 \text{ is the original price}}$$

Starting to get the hang of it? Let's try a few on our own!

1. Megan is comparing two cell phone plans with the goal of finding the cheapest option. Plan 1 has a $20 fee plus $0.05 per text. Plan 2 charges a $5 fee plus $0.10 per text. How many texts does Megan need to use for the plans to cost the same?

Equation:

$$.05x + 20 = .10x + 5$$

Define your variable (*be specific!*):

$$x = \text{\# of texts}$$

$$.05x + 20 = .10x + 5$$
$$\quad -20 \qquad\quad -20$$
$$.05x = .10x - 15$$
$$-.10x \qquad -.10x$$
$$-.05x = -15$$
$$x = 300$$

Megan would need to send 300 texts for the plans to cost the same

2. You are an avid baseball card collector and just made a super exciting purchase online. Each pack of cards cost you $3.50, not including the $5.00 flat rate shipping fee. If your total order cost $50.50 (including shipping), how many packs of cards did you order?

Equation:

$$3.50x + 5 = 50.50$$

Define your variable (*be specific!*):

$$x = \text{\# of packs of cards}$$

$$3.50x = 45.50$$
$$x = 13$$

13 packs of baseball cards

Up for a challenge? THINK about it!

3. Michelle Tanner has $14.55 in nickels and quarters saved in her piggy bank. She sorts through all of her change and determines that she has <u>21 more quarters than nickels</u>. How many quarters does little Michelle have?

$$\overset{.05}{\downarrow} \qquad \overset{.25}{\swarrow}$$
$$q = n + 21$$

Equation:

$$.05n + .25(n+21) = 14.55$$

Define your variable (*be specific!*):

$$= \text{\# of nickels}$$

$$.05n + .25n + 5.25 = 14.55$$
$$\#nickels \qquad \#quarter$$

$$.05n + .25n + 5.25 = 14.55$$
$$.30n + 5.25 = 14.55$$
$$.30n = 9.30$$
$$n = 31$$

Michelle has 31 nickels and 52 quarters