1.1 PERCENTS (and RATIOS)

What you'd get out of 100

Percents is figuring out what you'd get out of 100

"Percent" just means $\frac{X}{100}$

If you got 50 out of 100 on a test, you got 50%

$\frac{50}{100}$ = **0.5** **(x 100 to turn it into a percent)** **= 50%**

50% is technically a "pass", but it's not really that good.

In my apprenticeship days, 75% was a pass. If I scored 13/17 on my "Transmissions" test, what is my percent?

$\frac{13}{17}$ = **0.765** **(x 100 to turn it into a percent)** **= 76.5%**

What if I scored 16/17? What is my percent?

$\frac{16}{17}$ = **0.941** **(x 100 to turn it into a percent)** **= 94.1%**

What if I scored 9/17? What is my percent?

$\frac{9}{17}$ = **0.529** **(x 100 to turn it into a percent)** **= 52.9%**

In this case I DO NOT pass, because a pass in that program is 75%

In my shop classes, students need to get at least 80% to pass a safety quiz. That means 80% safe, 20% Band-Aids. If my safety test has 29 questions, what do they need to pass?

A better way to ask this question is "What is 80% of 29?" (A well-worded question makes for an easy equation)

WHAT IS 80% OF 29

$$X = \frac{80}{100} \times 29$$ **<<< 80/100 makes "%" a useable number**

$$X = 0.80 \times 29$$

$$X = 23.2$$

You need 24 correct answers to pass Mr. Wellwood's safety test.

OK. What if I get paid $25 per hour, and I get a 5% raise?

WHAT IS 5% OF 25

$$X = \frac{5}{100} \times 25$$ **<<< 5/100 makes "%" a useable number**

$$X = 0.05 \times 25$$

$$X = 1.25$$

$25 + $1.25 = $26.25

I could not think of a "real-life" situation where you would actually have to solve THIS, but you never know. Here you go:

40 IS 50% OF WHAT NUMBER?

$$40 = \frac{50}{100} \times n$$

$$\frac{40}{0.50} = \frac{\cancel{0.50}}{\cancel{0.50}} \times n$$

<<< Get the 0.50 off the n by dividing

$$80 = n$$

73 IS 64.5% OF WHAT NUMBER?

$$73 = \frac{64.5}{100} \times n$$

$$\frac{73}{0.645} = \frac{\cancel{0.50}}{\cancel{0.645}} \times n$$

$$113.7 = n$$

Continue….

1.1 (PERCENTS and) RATIOS

A Way of Comparing Things

Using Ratios is a good way of comparing two equations.

One side has to be the same RATIO as the other side.

"A is to B as C is to D"

$$\frac{A}{B} = \frac{C}{D}$$

Example 1:

When my two boys were little, they could eat half a six-inch Pizza sub each. How much would I need to eat to be comparable?

If a 45lb boy eats HALF a six inch sub, how much should a 160lb old man have to eat?

$$\frac{\text{FOOD}}{\text{KID}} = \frac{\text{FOOD}}{\text{ADULT}}$$

$$\frac{0.5 \text{ sub}}{45 \text{ lb}} = \frac{n}{160 \text{ lb}}$$

$$160 \times 0.111 = \frac{n \cancel{\times 160}}{\cancel{160}}$$

$$1.78 = n$$

I need to eat 1.78 6" subs, or one foot long and 78% of another 6"!

Example 2:

"Three relates to four, like WHAT relates to 20?"

"Three is to four - LIKE - x is to 20"

^^^ this is what I say in my head to remember this

$$\frac{3}{4} = \frac{X}{20}$$

$$20x \quad \frac{3}{4} = \frac{X}{20} \quad x20$$

$$\frac{60}{4} = X$$

$$\boxed{15 = X}$$

Example 3:

In this example, we have the X (unknown) on the bottom. Ugh.

You can use Algebra to move the X up top, but if you want an easy cheat, just Ninja Flip both sides.

Trust me, it works.

But you ***HAVE TO FLIP <u>BOTH</u> SIDES!***

$$\frac{8}{X} = \frac{20}{30}$$

X on the bottom?
BLECH!
FLIP <u>BOTH</u>

$$8x \quad \frac{X}{8} = \frac{30}{20} \quad x8$$

$$X = \frac{30}{20} \quad x8$$

$$X = \frac{240}{20}$$

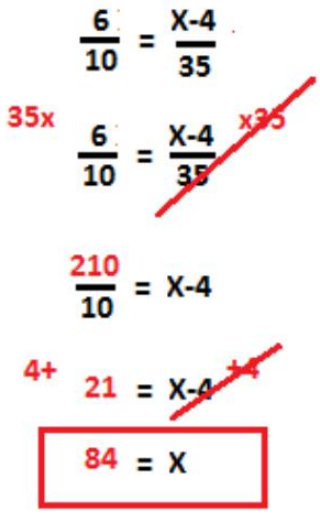
$$\boxed{X = 12}$$

So what if I flip it? It's still two men shaking hands. Nothing has changed. Sweet Pink Floyd Album, too.

Example 4:

In this example, the unknown is NOT on its own; you have an equation with it (X-4)

No worries, just get the equation on its own, and it will work.



Example 5:

Uh-oh. Here's that nasty "Unknown on the Bottom" issue. Probably need to Ninja Flip it!

Tips with Algebra:

- The only way to get good at math is to just do math.
- Everything is done just one step at a time.
- It's just a number puzzle that you can solve.
- Whatever you do to one side of the equation, you HAVE to do it to the other side (just like punching Siamese Twins, you're really hitting both).
- Two people shaking hands are still two people shaking hands, even in Australia.