Percents

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

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

$$\frac{50}{100} = 0.50 \text{ (x 100 to turn it into percent)} = 50\%$$

50%, while technically a pass, isn't all that good.

In my Apprenticeship Program, 75% was a pass. If I scored 13/17 on my "Transmission" test, what is my percent?

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

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

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

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

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

*In this case, I do **not** pass, because in that program, 75% was a pass!*

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?

Another way to ask this is “What is 80% of 29?” (a well-worded question makes for an easy equation)

X (what, the unknown)	= (is)	80%	x (of)	29

Let’s solve it:

X (the unknown)	= (is)	80%	x (of)	29

$$X = \frac{80}{100} \times 29$$

Turns it into a "useable number"
You can probably do it in your head

$$X = 0.80 \times 29$$

$$X = 23.2$$

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

Or what if I got a 5% raise at work? (If I’m being paid 100%, a 5% bonus would be 105%):

“What is 105% of $20/hour?”

"What is 105% of $20/hour?"

$$X = 105\% \times \$20$$

$$X = \frac{105}{100} \times \$20$$

$$X = 1.05 \times \$20$$

$$X = \$21$$

I now make $21 per hour

I couldn't think of a situation in real life where you would actually have to solve for this, but you never know. Here goes:

40 is 50% of what number?

$$40 = 50\% \times X$$

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

$$\frac{40}{0.50} = \frac{0.50 \times X}{0.50}$$

$$80 = X$$

73 is 64.2% of what number?

$$73 = 64.2\% \text{ of } X$$

$$73 = \frac{64.2}{100} \text{ of } X$$

$$\frac{73}{0.642} = \frac{0.642 \text{ of } X}{0.642}$$

$$113.71 = X$$

Ratios

Using Ratios is a good way of comparing two equations.

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 1 six inch, how much should a 160lb old man have to eat?

$$\frac{1 \text{ six inch}}{45\text{lbs}} = \frac{X}{160}$$

160 x

$$\frac{1}{45} = \frac{X}{160} \quad \text{x 160}$$

$$3.6 = X$$

I would have to eat a foot-long AND a six-inch to eat the same amount of food. I don't think I'd feel well.....

Let's try a couple of examples:

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

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

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

$$15 = X$$

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

You –can- use Algebra to move the X up top, but if you want to cheat a bit, just flip both sides.

Trust me, it works.

But you ***HAVE TO FLIP BOTH SIDES!***

Each side is shaking hands. If we flip both sides, they're still shaking hands.

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

X on the bottom?
BLECH!
FLIP BOTH

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

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

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

$$X = 12$$

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

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.

$$\frac{6}{10} = \frac{X-4}{35}$$

$$35x \quad \frac{6}{10} = \frac{X-4}{35} \quad x35$$

$$\frac{210}{10} = X-4$$

$$4+ \quad 21 = X-4 \quad +4$$

$$\boxed{84 = X}$$

Uh-oh. Here's that nasty "Unknown on the Bottom" issue. Probably need to flip out!

$$\frac{12}{3X+5} = \frac{20}{32}$$

FLIP BOTH

$$\frac{3X+5}{12} = \frac{32}{20} \quad \times 12$$

$$3X+5 = \frac{384}{20}$$

$$3X+5 = 19.2$$
$$-5 \qquad -5$$

$$\frac{3X}{3} = \frac{14.2}{3}$$

$$X = 4.7\dot{3}$$

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.