


MATH DOESN'T SUCK



Solution Guide – Chapter 21

Introduction to “Solving for x ” in Word Problems

Doing the Math from p. 261-3

2) Let's go in order of what we know:

If the price of one poster is “ p ” then the price of 4 posters would be “ $4 \times p$ ”, or $4p$.

Brandon also bought a book that cost \$15.

So the total price Brandon paid at the store would be: $4p + 15$.

2a) Answer: $4p + 15$

2b) Now the problem says that the total cost was \$95, so we can set up the equality:

$$4p + 15 = 95$$

We're playing the “what if” game: “*What if* the total were \$95, then what would the cost of the posters have to be to make this a true statement?” And once we find out the value of “ p ”, then we'll have the answer to that question. Let's solve it:

$$4p + 15 = 95$$

In an attempt to get the p 's by themselves, let's subtract **15** from both sides of the equation:

$$4p + 15 - 15 = 95 - 15$$

$$\rightarrow 4p = 80$$

Now let's divide both sides by 4:

$$\frac{4p}{4} = \frac{80}{4}$$

And now we cancel the 4's, taking a factor of 4 out of 80, leaving 20 behind:

$$\frac{\cancel{4}p}{\cancel{4}} = \frac{20\cancel{4}0}{\cancel{4}}$$
$$\rightarrow p = 20$$

Let's check our answer, by plugging in 20 for "p" in the equation, and see if we get a true statement:

$$4p + 15 = 95$$

substituting 20 for p

$$4 \times 20 + 15 = 95$$

$$\rightarrow 80 + 15 = 95$$

$$\rightarrow 95 = 95$$

2b) Answer: Each poster cost \$20.

3) If each box has c chocolates in it, then 5 boxes would have a total of $5 \times c$, or $5c$ chocolates. If I ate 6 individual chocolates out of one box, then I'd be left with a total number of chocolates equal to: $5c - 6$.

3a) Answer: "5c - 6" pieces of chocolate are left.

3b) Now, if I told you that there are 69 pieces left, we could write down the math sentence:

$$5c - 6 = 69$$

And now we can solve for "c"!

First, we want to get all the numbers on one side, so let's add 6 to both sides:

$$5c - 6 + 6 = 69 + 6$$

$$\rightarrow 5c = 75$$

And now we can divide both sides by 5:

$$\frac{5c}{5} = \frac{75}{5}$$

And then cancel the 5's, canceling the factor "5" from 75, leaving us with 15

(since $5 \times 15 = 75$)

$$\frac{\cancel{5}c}{\cancel{5}} = \frac{15 \cancel{75}}{\cancel{5}}$$
$$\rightarrow c = 15$$

If $c = 15$, this means there are **15** chocolates in a full box. Let's test that answer by plugging in 15 where there used to be a c , in the original equation:

$$5c - 6 = 69$$

(substituting 15 for c)

$$5 \times \mathbf{15} - 6 = 69$$

$$\rightarrow 75 - 6 = 69$$

$$\rightarrow 69 = 69$$

Yep! For the original equation to give us a true statement, it means we indeed found the right value for c !

3b) Answer: There are 15 chocolates in each full box; $c = 15$.

4) What's Lucy's age *one year from now*?

Well, she said that *one year from now*, her age would be double Victoria's age today, which is v . So Lucy's age will be double " v ." That's $2 \times v$ or $2v$.

4a) Answer: Lucy's age one year from now will be $2v$.

4b) What is Lucy's age *today*? It will be 1 year less than her future age, right? So her age today would be: $2v - 1$.

4b) Answer: Lucy's age today is $2v - 1$.

4c) If we know that Lucy's age today is 15, then we can set up the equality:

$$2v - 1 = 15$$

...and solve for “v”!

We want to get v by itself, so first let's add 1 to both sides:

$$2v - 1 + 1 = 15 + 1$$

$$\rightarrow 2v = 16$$

You can probably already see that $v = 8$, but I'll take you through the process. Alright, to continue in our quest to get v all by itself, next let's divide both sides by 2:

$$\frac{2v}{2} = \frac{16}{2}$$

Now let's cancel the 2's from top and bottom, and take a factor of 2 out of 16, leaving 8 behind:

$$\frac{\cancel{2}v}{\cancel{2}} = \frac{8}{\cancel{2}}$$

$$\rightarrow v = 8$$

So Victoria's age today is 8.

Sure, we could plug in $v = 8$ to our original equation and see if we get a true statement, but what if we set up our original equation incorrectly? For this one, let's talk it out logically:

Hm... If Lucy is 15 today, and Victoria is 8 today, then next year, Lucy will be 16 – twice Victoria's age today, which is 8. Yep, that's what the original problem said should happen!

4c) Answer: Today, Victoria is 8 years old; $v = 8$