Linear Equations Project

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Word Problem A
$ax = b$

Julie is looking for a dress to wear to a co-worker's party. Aritzia has a summer sale at 40% off the original prices on dresses. If she buys a dress on sale for $165.25, what was the original price of the dress?

Solution

$$0.60x = 165.25$$

$$\frac{0.60x}{0.60} = \frac{165.25}{0.60}$$

$$x = 275.42$$

$275.42 is the original price of the dress.

Common mistake

(Highlighted portions are the mistakes)

$$-1.6x = -3.24$$

$$(-1.6) - 1.6x = -3.24(-1.6)$$

$$x = 5.18$$

- The common mistake is multiplying -1.6 by itself and -3.24 by -1.6 as well. But we are supposed to divide here, <u>not</u> multiply. So, the correct solution would be to divide -1.6x by -1.6 and do the same thing to the other side-> -3.24/-1.6 which would then equal 2.025. Therefore, x should equal 2.025.

Word Problem B

$$\frac{x}{a} = b$$

Sarah works at a local ice cream shop. The chill room must be kept at an average temperature of -18 degrees Celsius. The lowest temperature the ice cream can be stored at is -28 degrees Celsius. What is the highest temperature the ice cream can be stored at in the chill room?

Solution

$$x = the\ highest\ temperature$$

$$\frac{x - 28}{2} = -18$$

$$\frac{(2)x - 28}{2} = -18(2)$$

$$x - 28 = -36$$

$$x = -36 + 28$$

$$x = -8$$

The highest temperature the ice cream can be stored at (in the chill room) is -8°C.

Common mistake

(Highlighted portions are the mistakes)

$$\frac{h}{3.1} = 4.6$$

$$\frac{h}{3.1} = \frac{4.6}{3.1}$$

$$h = 1.49$$

- The common mistake is dividing the other number by 3.1 as well instead of multiplying it by itself and the 4.6 to find the value of **h**. So, the correct solution would be to multiply 3.1 by itself and do the same thing to the other side, 4.6(3.1), which would then equal 14.26. Therefore, x should equal 14.26.

Word Problem C

$ax + b = c$

Duke needs to buy a new skateboard for his competition that is in a month. The skateboard he needs costs $230 plus $12 for grip tape. He currently has $98 and gets paid an additional $8 everyday. In how many days/weeks will Duke have enough money to buy the skateboard? Will he have it in time for the competition?

Solution

$$8x + 98 = 242$$
$$8x = 242 - 98$$
$$8x = 144$$
$$\frac{8x}{8} = \frac{144}{8}$$
$$x = 18$$

Duke will enough to buy the skateboard in 18 days/2 weeks and 4 days. Yes, he will have the skateboard in time for the competition.

Common mistake

(Highlighted portions are the mistakes)

$$\frac{2}{3}x - 4 = 3$$
$$\frac{2}{3}x = 7$$
$$x = \frac{7}{1} - \frac{3}{2}$$
$$x = \frac{11}{2}$$

- The common mistake is subtracting or adding the fractions. The correct solution would be to multiply $\frac{2}{3}x$ by it's reciprocal $\frac{3}{2}$ and do the same thing to the other side, $\frac{7}{1} \times \frac{3}{2}$ which would then equal $\frac{21}{2}$, which would be the value of x.

Word Problem D ( )

Johnny bought five books from Chapters. He purchased a gift card for a part of his daughter's Christmas present. He wanted three bookmarks as well. The total cost came to $128.65. How much money did Johnny put on the gift card?

Solution

$$5(x+3) = 128.65$$

$$5x + 15 = 128.65$$

$$5x + 15 - 15 = 128.65 - 15$$

$$5x = 113.65$$

$$\frac{5x}{5} = \frac{113.65}{5}$$

$$x = 22.73$$

Johnny put $22.73 on the gift card.

Common mistake

(Highlighted portions are the mistakes)

$$4(y-3) - 2(y+1) = -4.2$$

$$4y - 3 - 2y + 1 = -4.2$$

$$4y - 2y = -4.2 + 3 - 1$$

$$2y = -2.2$$

$$\frac{2y}{2} = \frac{-2.2}{2}$$

$$x = -1.1$$

- The common mistake with brackets is forgetting to distribute the coefficient to the other number. My mistake is that I did not multiply 4 by -3, I only multiplied 4 by y. The same is wrong about -2y+1, which should be -2y-2. This mistake made the whole equation different (and wrong).

Word Problem E

Variables on both sides

Jodie and Carl are looking to buy a new couch from IKEA. Jodie has $28.50 and is saving $8.75 per week. Carl has $104.75 and is saving $6.50 per week. In how many weeks from now will they have the same amount of money to buy the couch?

Solution

$$28.50 + 8.75w = 104.75 - 6.50w$$
$$8.75w + 6.50w = 104.75 - 28.50$$
$$15.25w = 76.25$$
$$\frac{15.25w}{15.25} = \frac{76.25}{15.25}$$
$$w = 5$$

They will have the same amount of money to buy the couch in 5 weeks.

Common mistake

$$\frac{1}{4}(3x - 1) = \frac{1}{2}(3x + 1)$$
$$\frac{3x}{4} - \frac{1}{4} = \frac{3x}{2} + \frac{1}{2}$$
$$\frac{3x}{4} - \frac{3x}{2} = \frac{3x}{4} - \frac{6x}{4} = -\frac{3x}{4}$$
$$\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$
$$-\frac{3}{4}x = \frac{3}{4}$$
$$-x = \frac{3}{4} \times \frac{4}{3} = -1$$
$$x = -1$$

- The common mistake is adding and subtracting first. We always need to follow **BEDMAS** and multiply/divide first. So, we would find the lowest common denominator between 4 and 2, which is 4 and multiply it by the coefficients. Then we would follow the rest of the steps to get the correct answer.

Thank you for watching!