



Nikita needs to buy notebooks for the 9 classes he's taking this year. At ACME Office Supply, he finds both one-subject and three-subject notebooks. If he buys 2 three-subject notebooks and 3 one-subject notebooks, he will spend all his money. If he buys 3 three-subject notebooks, he will have \$2.50 left over. If one-subject notebooks cost \$5 each, how much money did Nikita bring to the store?

- A) \$12.50
- B) \$35.00
- C) \$37.50
- D) \$40.00
- E) Cannot be determined from the information provided

This is a classic sort of SAT or ACT math question – a word problem that can be translated into algebraic equations, which can then be solved to find the answer. In this case, if we define x , y , and M to be the cost of a three-subject notebook, the cost of a one-subject notebook, and the amount of money he brought with him, respectively, we can write the following equations:

$$\begin{aligned}2x + 3y &= M \\3x &= M - 2.50\end{aligned}$$

The second equation could also be written with M alone on the right-hand side:

$$3x + 2.50 = M$$

This would allow us to set the left sides of the first and last equations above equal to each other:

$$3x + 2.50 = 2x + 3y$$

Since the problem gives us the cost of a one-subject notebook, we can plug in \$5 for y , then solve for x :

$$\begin{aligned}3x + 2.50 &= 2x + 3(5) \\3x + 2.50 &= 2x + 15 \\x + 2.50 &= 15 \\x &= 12.50\end{aligned}$$

Notice that this is choice (A)! Students who picked (A) made a critical error: they did not Read The Full Question (RTFQ)!

Choice (A) is not the only wrong answer based on an error: also notice that choice (C) is the cost of 3 three-subject notebooks – again, this is a possible RTFQ mistake, with the student mistakenly thinking that this represents the amount of money Nikita brought with him. If the student erroneously subtracts \$2.50 from this value instead of adding it, then they would end up with choice (B).

Choice (E) is a different mistake, which we would call Fool's Gold – although it may *seem* like the problem is too complicated to solve with the small amount of definite information we're given, there certainly is enough data to find the answer.

A-LIST EDUCATION



All of these errors can be avoided with the use of Backsolve! We'll start in the usual place, with choice (C) \$37.50: this means that Nikita brought \$37.50 with him to the store. From this, we can find the cost of a three-subject notebook by applying the second piece of information:

If he buys 3 three-subject notebooks, he will have \$2.50 left over.

He had \$37.50, but he now has \$2.50 left over, so we can subtract to find the cost of 3 three-subject notebooks:

$$\$37.50 - \$2.50 = \$35.00$$

Next, we can divide by 3 to find the cost of each three-subject notebook:

$$\$35/3 = \$11.67$$

Now that we have the cost of a three-subject notebook, we can use the first piece of information to find the cost of a one-subject notebook:

If he buys 2 three-subject notebooks and 3 one-subject notebooks, he will spend all his money.

First, the cost of 2 three-subject notebooks would be \$23.34, which we get by doubling \$11.67. Subtract this from \$37.50 to find the cost of 3 one-subject notebooks:

$$\$37.50 - \$23.34 = \$14.16$$

Finally, divide by 3 to find the cost of a single one-subject notebook:

$$\$14.16/3 = \$4.72$$

But we know that the cost of a single one-subject notebook is \$5! Thus, choice (C) is wrong, and we should try again. Since \$4.72 is too low, go to a bigger number – choice (D) \$40.00 – and repeat!

$$\$40.00 - \$2.50 = \$37.50$$

$$\$37.50/3 = \$12.50$$

$$\$40.00 - 2(\$12.50) = \$15.00$$

$$\$15/3 = \$5.00$$

Bingo! After running through the exact same process, we find a single one-subject notebook is the correct cost, \$5.00, so the answer is (D) \$40.00!

A-LIST EDUCATION

Test Prep • Academic Tutoring • Admissions • Professional Development • Direct Instruction • Consulting • Content Licensing
29 W 36th Street, 7th Floor • New York, NY 10018 • T: (646) 216-9187 • F: (212) 661-0487

www.alisteducation.com