

Answer on Question #57097 – Math – Algebra

Question

The college bookstore sells CD for \$15.50 and study guides for \$21.50. One day, the number of study guides sold was for more than three times the number of CDs. If the total sale were \$566, how many of each did the bookstore sell?

Solution

Method 1

We need to find two integer numbers x (the number of CD) and y (the number of study guides) that satisfy equation $566 = 15.50 * x + 21.50 * y$. Besides, number y must be more than three times bigger the number x .

Let's start with $x = 1$. Other sold goods will be user guides and its number will be equal to $y = (566 - 15.50) / 21.50 = 25.60$ (but it isn't an integer number). So we should keep searching.

Then let's do the same for $x = 2, 3, 4, 5, 6, 7, 8$.

x	y
1	25,60
2	24,88
3	24,16
4	23,44
5	22,72
6	22
7	21,28
8	20,56

Thus, we get the answer $x = 6, y = 22$.

At the same time y is 3,67 times more than x . Observe that y decreases as x increases and starting from $x = 8$ values of y are not three times more than x .

Answer: the bookstore sold **6 CD's** and **22 study guides**.

Method 2

$$\begin{cases} 15.5x + 21.5y = 566 \\ y \geq 3x \end{cases}$$

$$\begin{cases} y = \frac{566 - 15.5x}{21.5} \\ y \geq 3x \end{cases}$$

$$\frac{566 - 15.5x}{21.5} \geq 3x$$

$$566 - 15.5x \geq 3x \cdot 21.5$$

$$566 \geq 3x \cdot 21.5 + 15.5x$$

$$566 \geq 80x$$

$$80x \leq 566$$

$$x \leq \frac{566}{80}$$

$$x \leq 7.075$$

On the other hand, y should be positive, hence

$$y = \frac{566 - 15.5x}{21.5} > 0$$

$$566 - 15.5x > 0$$

$$15.5x < 566$$

$$x < \frac{566}{15.5}$$

$$x < 36.51613$$

If $x \leq 7.075$ and $x < 36.51613$ hold true simultaneously, then $x \leq 7.075$. Notice that trying different integers x greater than 1 and less than 7, y is integer when $x = 6$ and in this case $y = 22$.

Answer: the bookstore sold **6 CD's** and **22 study guides**.