

Answer on Question #82346 – Math – Algebra

Question

A Sociology instructor gives students points for each discussion-board post and points for each reply to a post. Ana wrote 9 posts and 15 replies and received 255 points. Jae wrote 6 posts and 5 replies and received 130 points. Determine how many points a discussion post is worth and how many points a reply is worth.

Solution

Let x be the number of points student receives for each discussion post, y be the number of points student receives for each reply to a post. So write equalities for Ana (1) and Jae (2):

$$9x + 15y = 255 \quad (1)$$

$$6x + 5y = 130 \quad (2)$$

We have the system of linear equations.

$$\begin{cases} 9x + 15y = 255 \\ 6x + 5y = 130 \end{cases}$$

Solve it with a help of the Gaussian elimination method (also known as row reduction).

Multiply the first equation by $2/3$, then subtract second equation from it.

$$\frac{2}{3}E_1 - E_2 \rightarrow E_2, \quad 6x + 10y - 6x - 5y = 170 - 130, \quad 5y = 40, \quad y = 8$$

Substitute $y = 8$ into the first equation of the system.

$$\begin{cases} 9x + 15y = 255 \\ y = 8 \end{cases} \Leftrightarrow \begin{cases} 9x + 120 = 255 \\ y = 8 \end{cases} \Leftrightarrow \begin{cases} 9x = 135 \\ y = 8 \end{cases} \Leftrightarrow \begin{cases} x = 15 \\ y = 8 \end{cases}$$

Thus, a discussion post is worth 15 points, a reply is worth 8 points.

Answer: a discussion post is worth 15 points, a reply is worth 8 points.