

Answer on Question #49685 – Math – Algebra

How do you use linear models?

Solution

After it has been established that there is a linear relationship between two variables, an equation can be written to model the situation. If the problem situation is presented verbally, the slope and the y-intercept can still be found, and the equation can be written using the form

$$y = ax + b.$$

From this equation we can predict the value of dependent variable (y) when we knew the value of independent variable (x)

Example:

Andrea earns extra money by proofreading research papers for her fellow students. She charges a set fee of \$8 per paper, plus \$1.50 per page for her services. How much would Andrea charge to proofread a 30-page paper?

Solution

It will be established that there is a linear relationship between the variables in this situation. A linear equation will be written and used to answer the question.

Step 1: *Identify the type of relationship between the quantities in the problem.*

There is a constant fee of \$8. This is a fixed initial amount before any pages are read.

There is a per-page fee of \$1.50. This means that every time Andrea reads one more page, her fee increases by a constant amount. This is a linear relationship.

Step 2: *Identify the independent and dependent variables, and then write a linear equation of the form*

$$y = ax + b.$$

The total charge depends on the length of the paper, so y will represent the charge, and x will represent the number of pages.

In this case, when $x = 0$ pages, $y = \$8$, so $b = 8$ and $a = 1.5$.

The model is $y = 1.5x + 8$.

Step 3: Use the model to answer the question.

The problem asks how much Andrea would charge for a 30-page paper, so the equation is being evaluated at $x = 30$. The total charge is \$53.