

Applications of Linear Equations

$$y = mx + b \quad \left\{ \begin{array}{l} \uparrow \text{rate} \quad \uparrow \text{value} \end{array} \right. \quad y - y_1 = m(x - x_1) \quad \left\{ \begin{array}{l} \uparrow \text{coordinates} \end{array} \right.$$

To earn some money Sahara takes a job in a ski shop working primarily with her specialty--snowboards. She is paid a monthly salary of \$950 plus a commission of \$25 for each snowboard she sells.

a) Write an equation that models her monthly earnings E .

$$E = 25x + 950$$

b) Determine the number of snowboards she must sell to have a monthly income of \$1500.

$$1500 = 25x + 950$$

$$\frac{550}{25} = \frac{25x}{25}$$

$$22 = x$$

22 snowboards

Joe purchased his dream car for \$37,000 in 2012. By 2015, the book value was only \$24,400. Write a linear equation modeling the value of the car.

$$\begin{aligned}
 y - y_1 &= m(x - x_1) & V &= \text{---} & (\text{year, value}) \\
 y - 37,000 &= -4200(x - 2012) & & & (2012, 37,000) \\
 y - 37,000 &= -4200x + 8,484,000 & m &= \frac{\$ 37,000 - 24,400}{2012 - 2015} & (2015, 24,400) \\
 y - 37,000 &= -4200x + 8,484,000 & & & \\
 V &= -4200x + 8,484,000 & & = \frac{12,600}{-3} = -4200 \frac{\$}{\text{yr}}
 \end{aligned}$$

What will be the car's value in 2020?

$$\begin{aligned}
 V &= -4200(2020) + 8,484,000 \\
 V &= \$3400
 \end{aligned}$$