

Business Finance: Graphing Equations

Using an equation to plot the points makes graphing easier.



Lesson Objective

Students will learn how to use equations to plot the line on a graph.



Charting Data

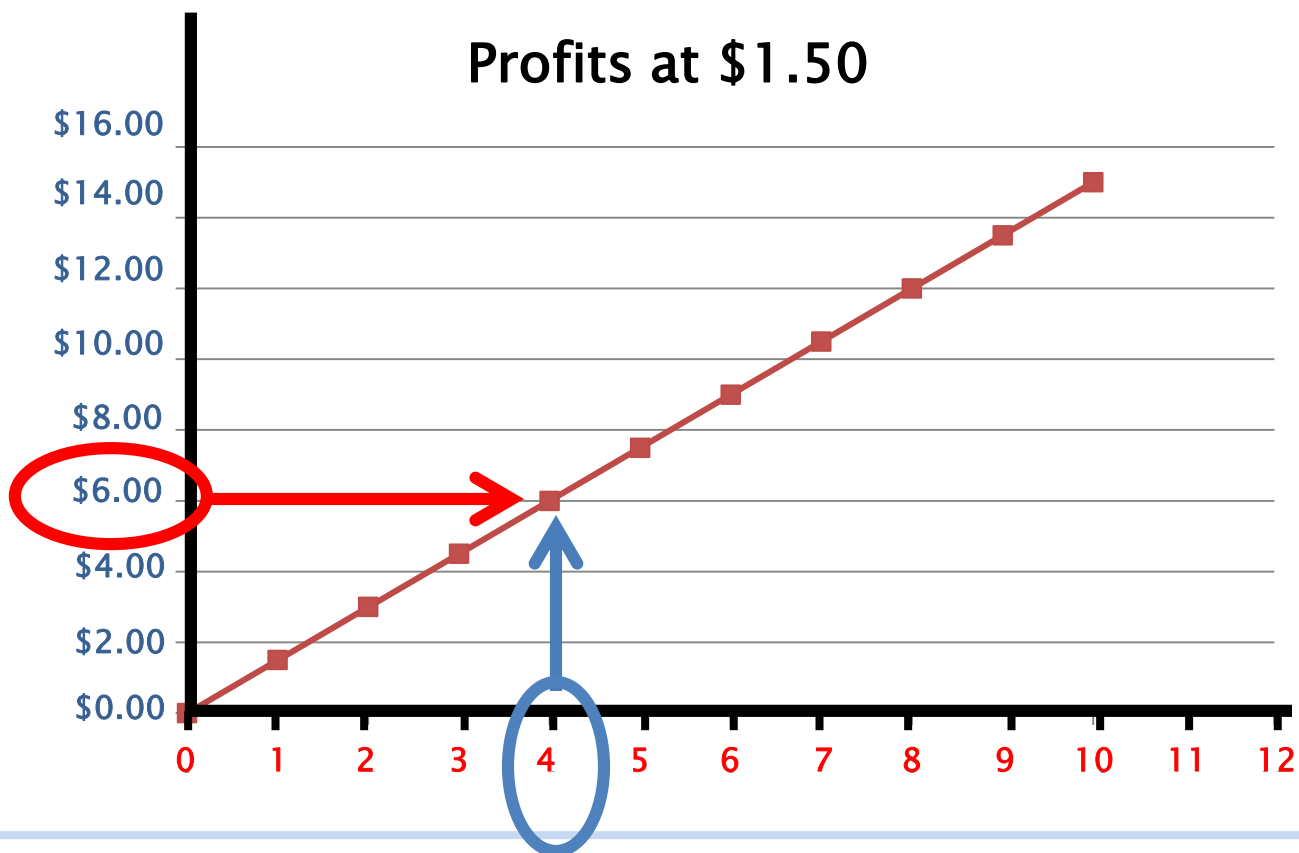
Remember this from Lesson 14.3?

$$\text{Slope} = \frac{\text{Rise}}{\text{Run}}$$

$$\text{Slope} = \frac{6}{4}$$

$$\text{Slope} = \frac{3}{2}$$

$$\text{Slope} = 1.5$$





Charting Data

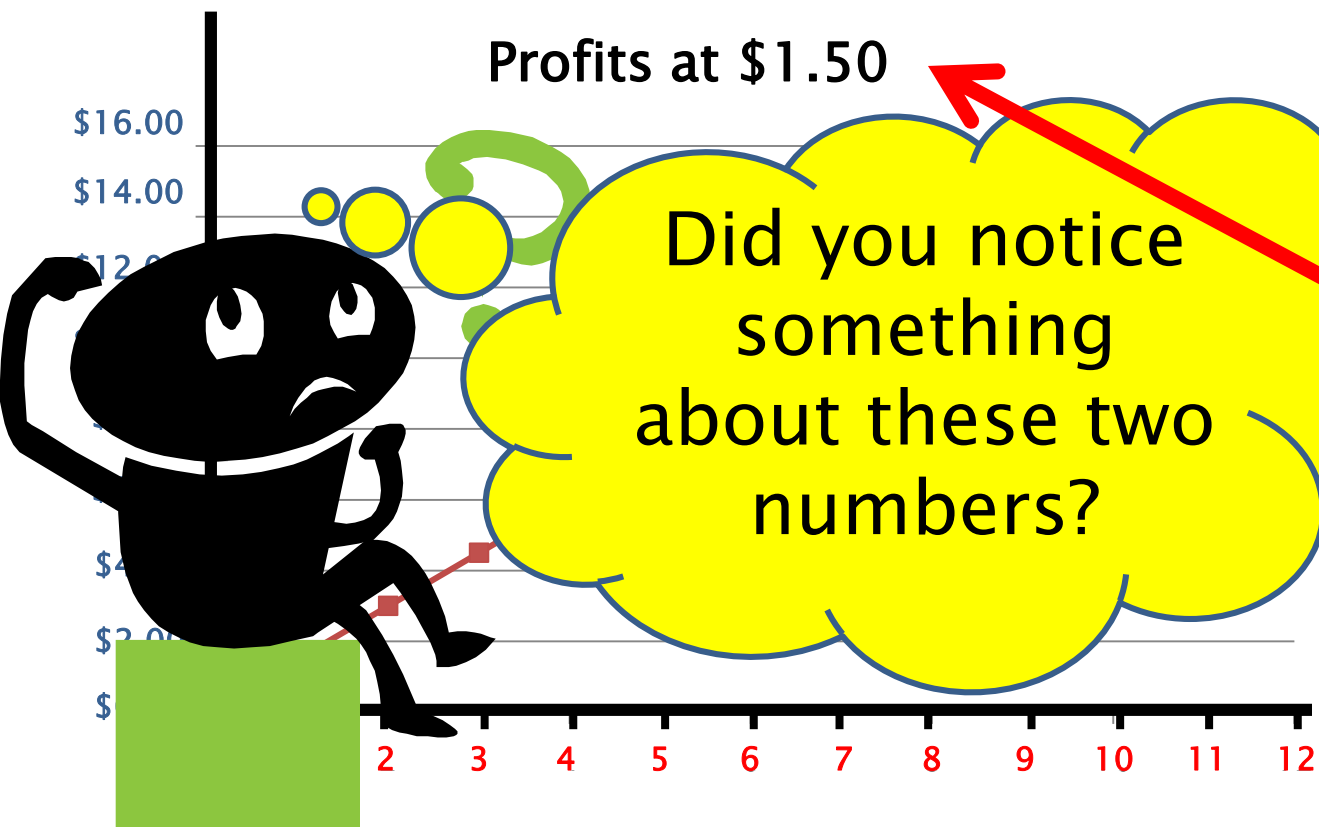
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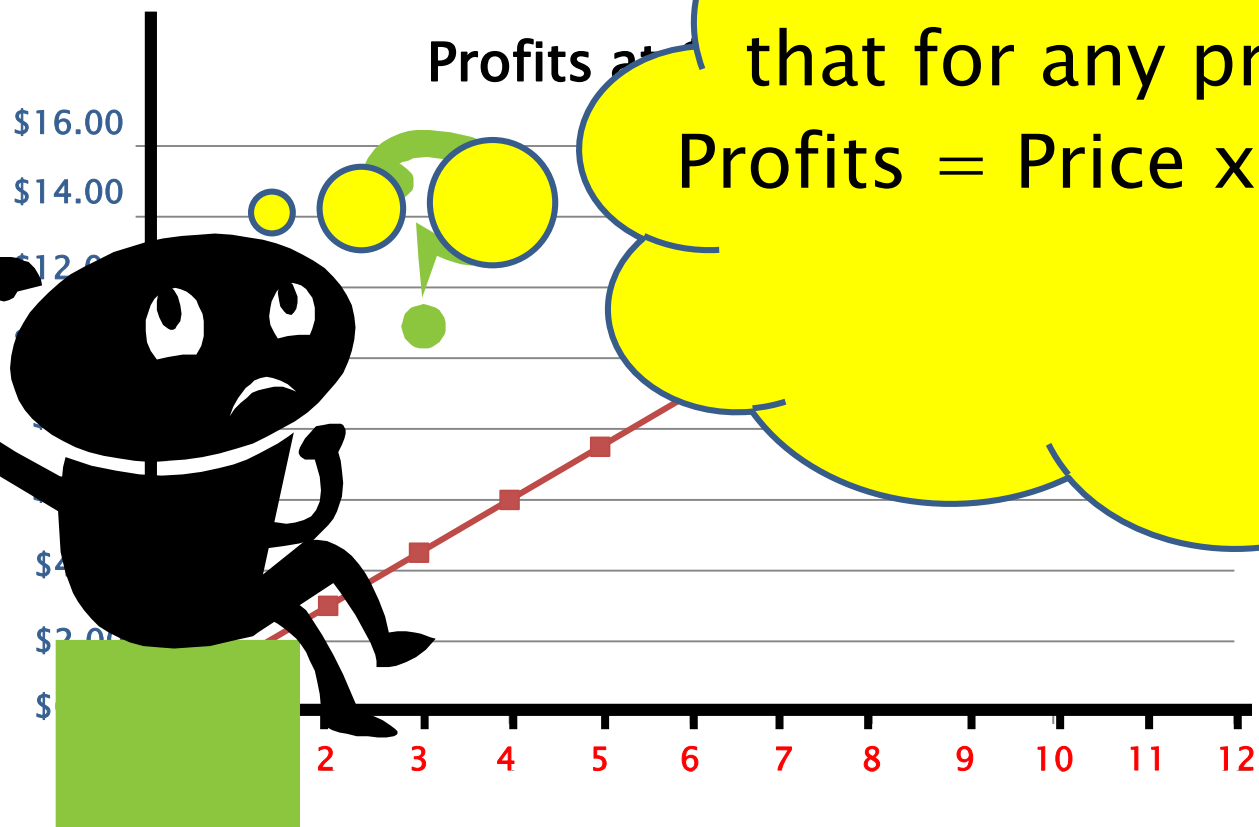




Charting Data

Calculate the slope for Profits at \$1.50.

Would it be accurate to say that for any price we sell at:
 $\text{Profits} = \text{Price} \times \text{Number Sold}$?



slope = 1.5



Charting Data

Let's check the theory:

$$\text{Profits} = \text{Price} \times \text{Number Sold}$$



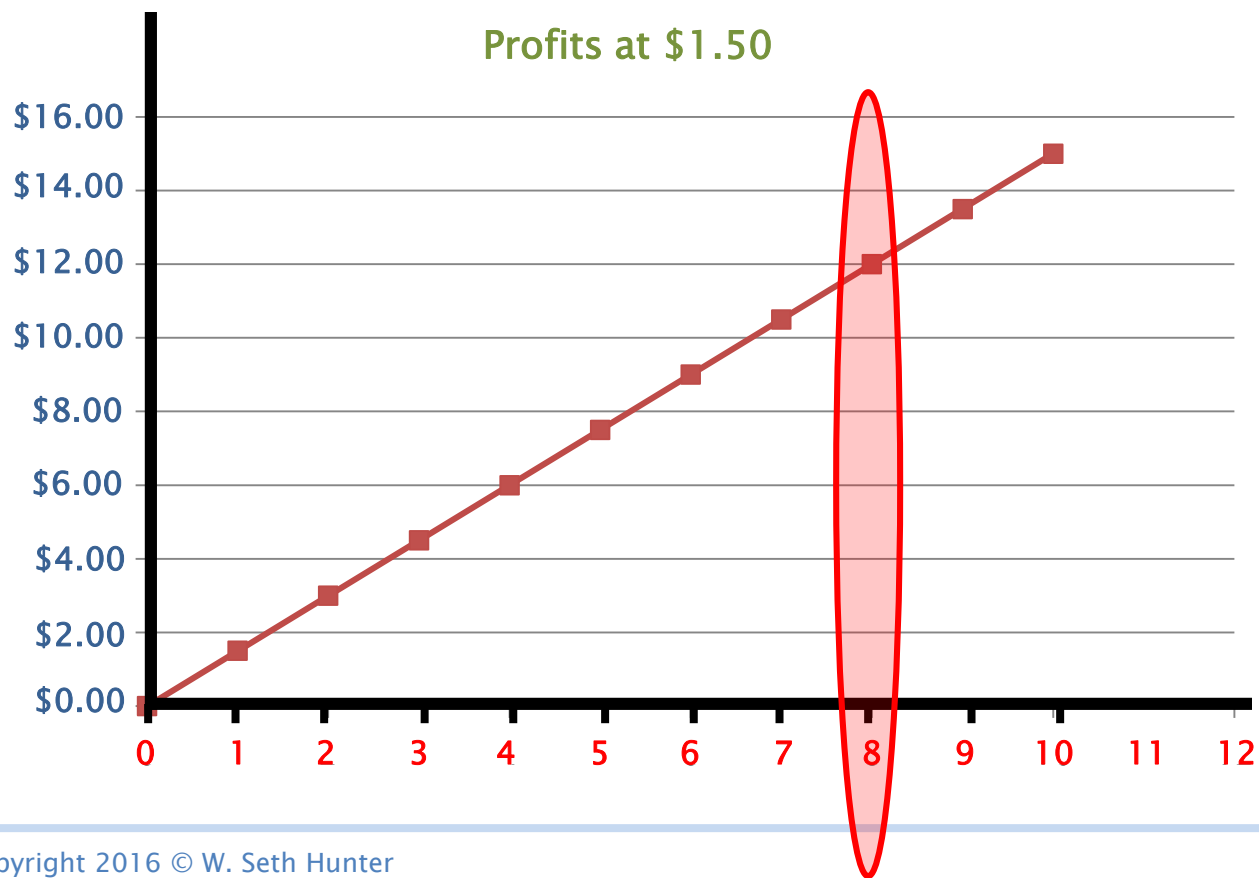


Charting Data

Let's check the theory:

$$\text{Profits} = \text{Price} \times \text{Number Sold}$$

$$\text{Profits} = \$1.50 \times 8$$





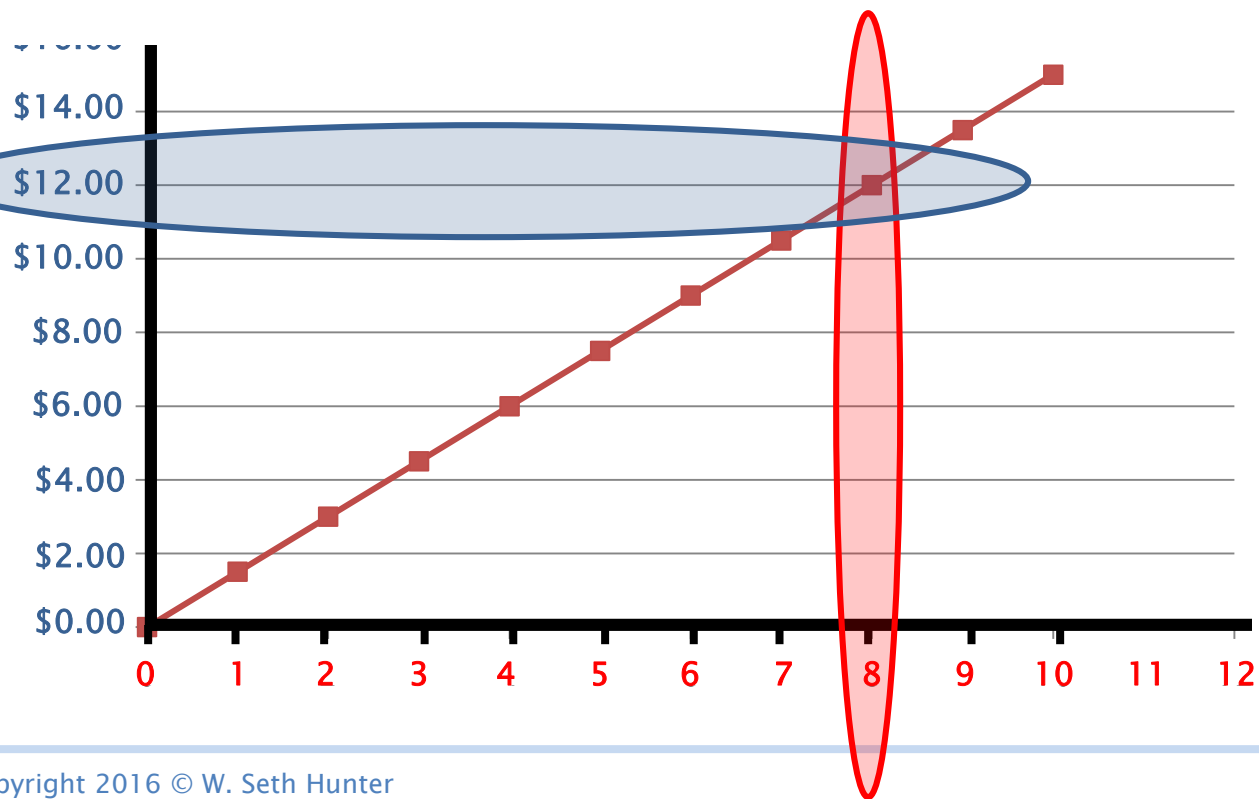
Charting Data

Let's check the theory:

$$\text{Profits} = \text{Price} \times \text{Number Sold}$$

$$\text{Profits} = \$1.50 \times 8$$

$$\text{Profits} = \$12.00 \text{ It worked!}$$





Graphing Equations

Another way to write this equation is with these variables:

y = Net Profits

x = Number of Items Sold

m = Slope or Profits per Item



The equation for profits now looks like this:

$$y = mx$$



Graphing Equations

Let's put a few values into this equation:

y = Net Profits

x = Number of Items Sold

m = Profits per Item = \$2.00

What would y be if $x = 3$?

$$y = mx$$

$$y = \$2.00(3)$$

$$y = \$6.00$$





Graphing Equations

Let's put a few values into this equation:

$y =$ Net Profits

$x =$ Number of Items Sold

$m =$ Profits per Item = \$2.00

What if $x = 567$?

$$y = mx$$

$$y = \$2.00(567)$$

$$y = \$1,134$$





Practice

y = Net Profits

x = Number of Items Sold

m = Slope or Profits per Item

$$y = mx$$



You sold 134 Candy bars at \$1.75 profit. What are your net profits?

$$x = 134$$

$$m = \$1.75$$

$$y = ?$$



Practice

y = Net Profits

x = Number of Items Sold

m = Slope or Profits per Item

$$y = mx$$



You sold 134 Candy bars at \$1.75 profit. What are your net profits?

$$x = 134$$

$$m = \$1.75$$

$$y = \$234.50 \quad \$234.50 = \$1.75(134)$$



Practice

We can use the equation to create a chart which we would then plot on a graph... or we could skip the chart and save time by using the equation to plot points directly on the graph.

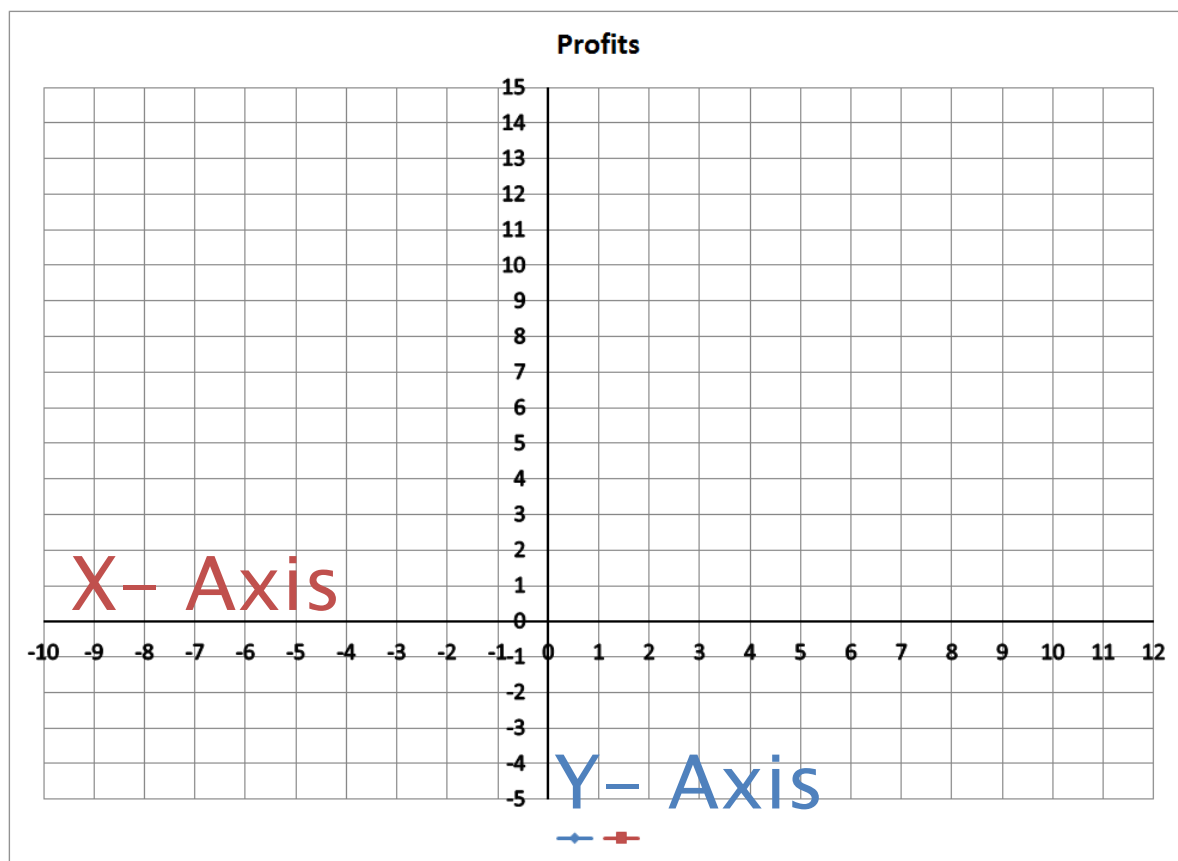
X	Y
1	\$1.00
2	\$2.00
3	\$3.00
4	\$4.00
5	\$5.00
6	\$6.00
7	\$7.00
8	\$8.00
9	\$9.00
10	\$10.00



Back to Graphing

This is how it works...

$$y = mx$$





Back to Graphing

This is how it works...

I sale candy bars
at \$1.00 each.

Movement on the
X-Axis will be:

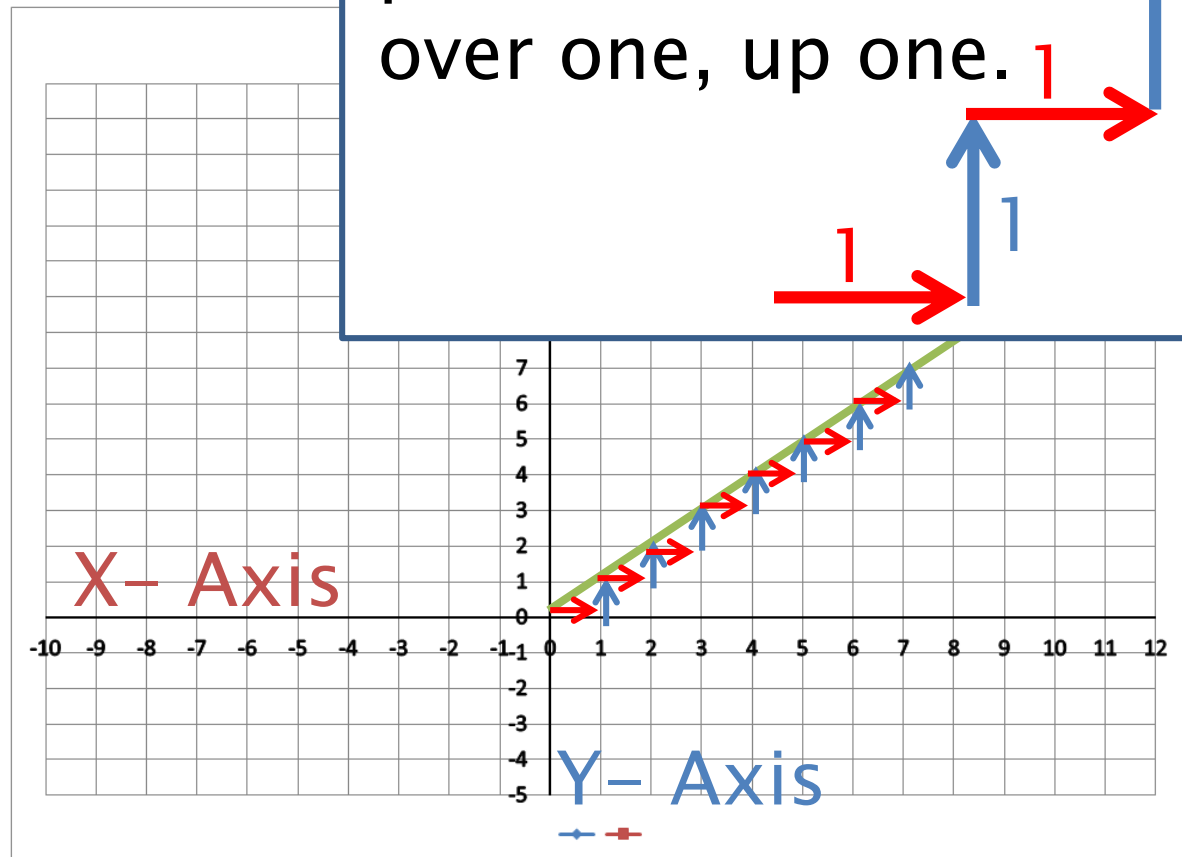
$x = 1$ candy bar
sold

Movement on the
Y-Axis will be:

$$y = mx$$

$$y = \$1.00(1) = 1$$

Do you see the
pattern...
over one, up one.





Back to Graphing

What about if I sell 2 candy bars at \$3.00 each.

Movement on the X-Axis will be:

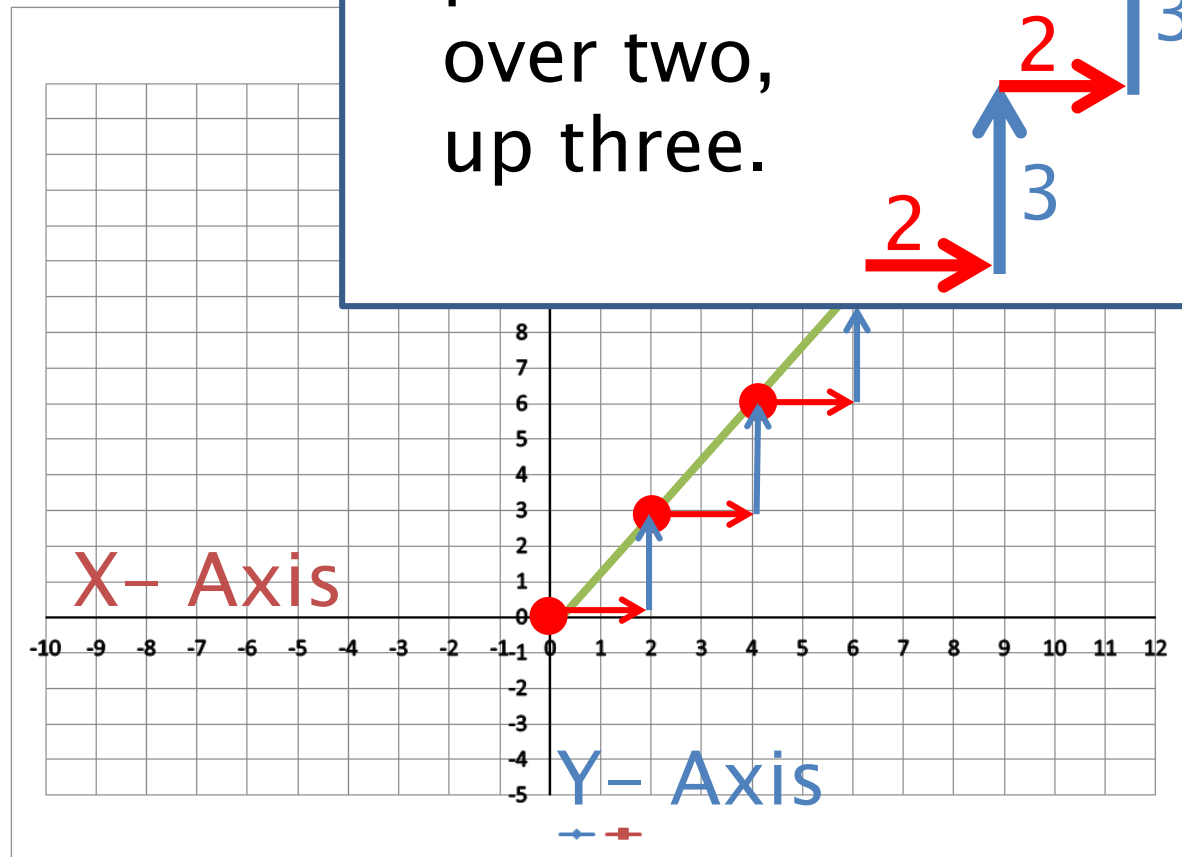
$x = 2$ candy bars sold

Movement on the Y-Axis will be:

$$y = mx$$

$$y = \$1.50(2) = 3.0$$

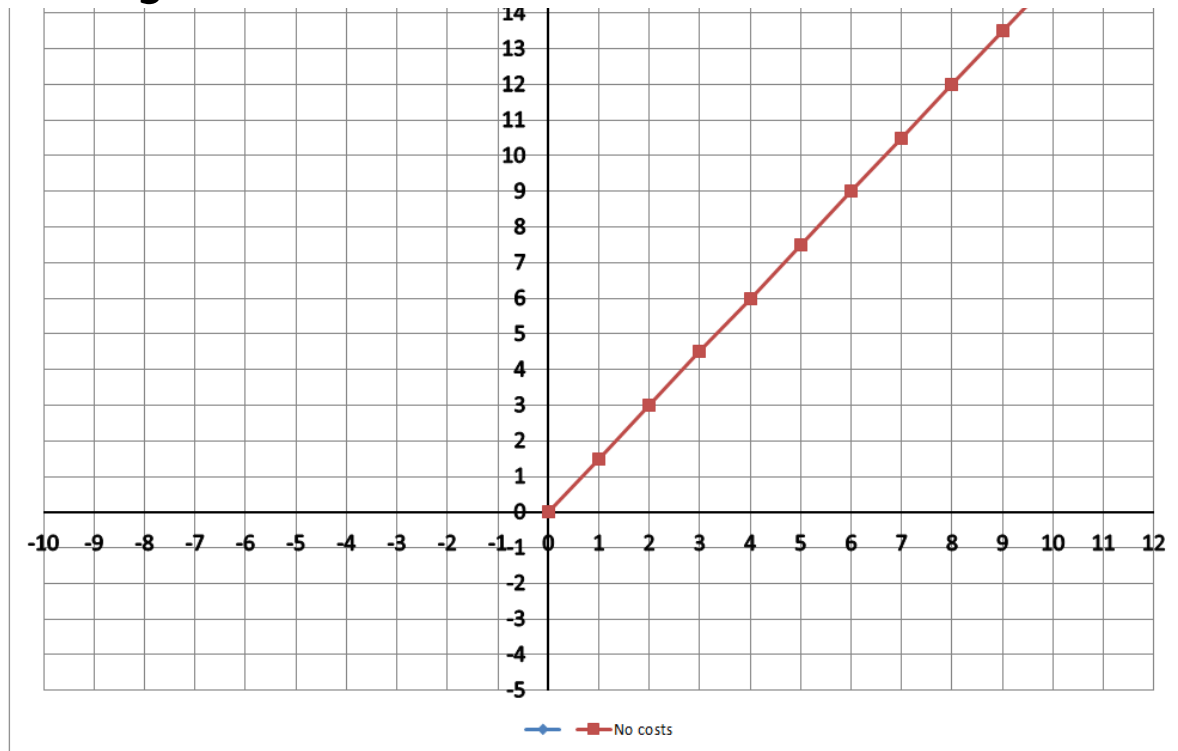
Do you see the pattern...
over two,
up three.





A bit more tricky: Include original expenses

I decide that I need a sign to advertise my candy. If the sign cost me \$5.00 to purchase, what will happen to the graph I just made?

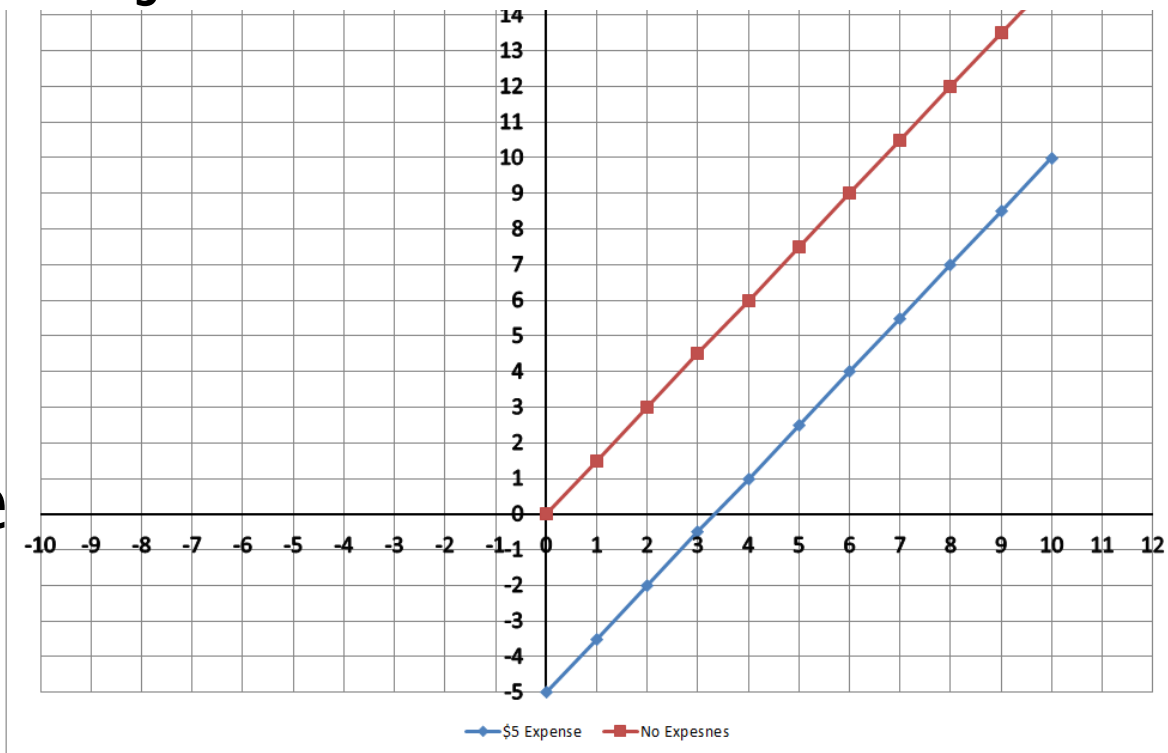




A bit more tricky: Include original expenses

I decide that I need a sign to advertise my candy. If the sign cost me \$5.00 to purchase, what will happen to the graph I just made?

The slope stays the same, but the **line** shifts down to -5 to reflect the \$5.00 I spent.





Graphing Equations

The equation I used to graph the profits changed slightly to account for expenses.

y = Net Profits

x = Number of Items Sold

m = Slope or Profit per Item

b = Expenses (will always be negative)

The equation for profits now looks like this:

$$y = mx + b$$





Graphing Equations

Because my expenses took away from my profits, they are a negative number.

$y =$ Net Profits

$x = 0$ (I haven't sold any yet)

$m = \$1.50$

$b = -\$5.00$

The equation for profits now looks like this:

$$y = \$1.50(0) - \$5.00$$





Graphing Equations

Because my expenses took away from my profits, they are a negative number.

$y =$ Net Profits

$x = 0$ (I haven't sold any yet)

$m = \$1.50$

$b = -\$5.00$

The equation for profits now starts like this:

$$y = -\$5.00$$





Practice

y = Net Profits

x = Number of Items Sold

m = Slope or Profit per Item

b = Expenses

$$y = mx + b$$



I sold 4 cups of lemonade today. Each one sold at a \$1.50 profit. But in order to sell them, I spent \$3.00 on a sign to advertise them. What are my net profits?



Practice

y = Net Profits

x = Number of Items Sold

m = Slope or Profit per Item

b = Expenses

$$y = mx + b$$



I sold 4 cups of lemonade today. Each one sold at a \$1.50 profit. But in order to sell them, I spent \$3.00 on a sign to advertise them. What are my net profits?

$$y = \$1.50(4) + (-\$3.00)$$



Practice

y = Net Profits

x = Number of Items Sold

m = Slope or Profit per Item

b = Expenses

$$y = mx + b$$



I sold 4 cups of lemonade today. Each one sold at a \$1.50 profit. But in order to sell them, I spent \$3.00 on a sign to advertise them. What are my net profits?

$$y = \$1.50(4) + (-\$3.00)$$

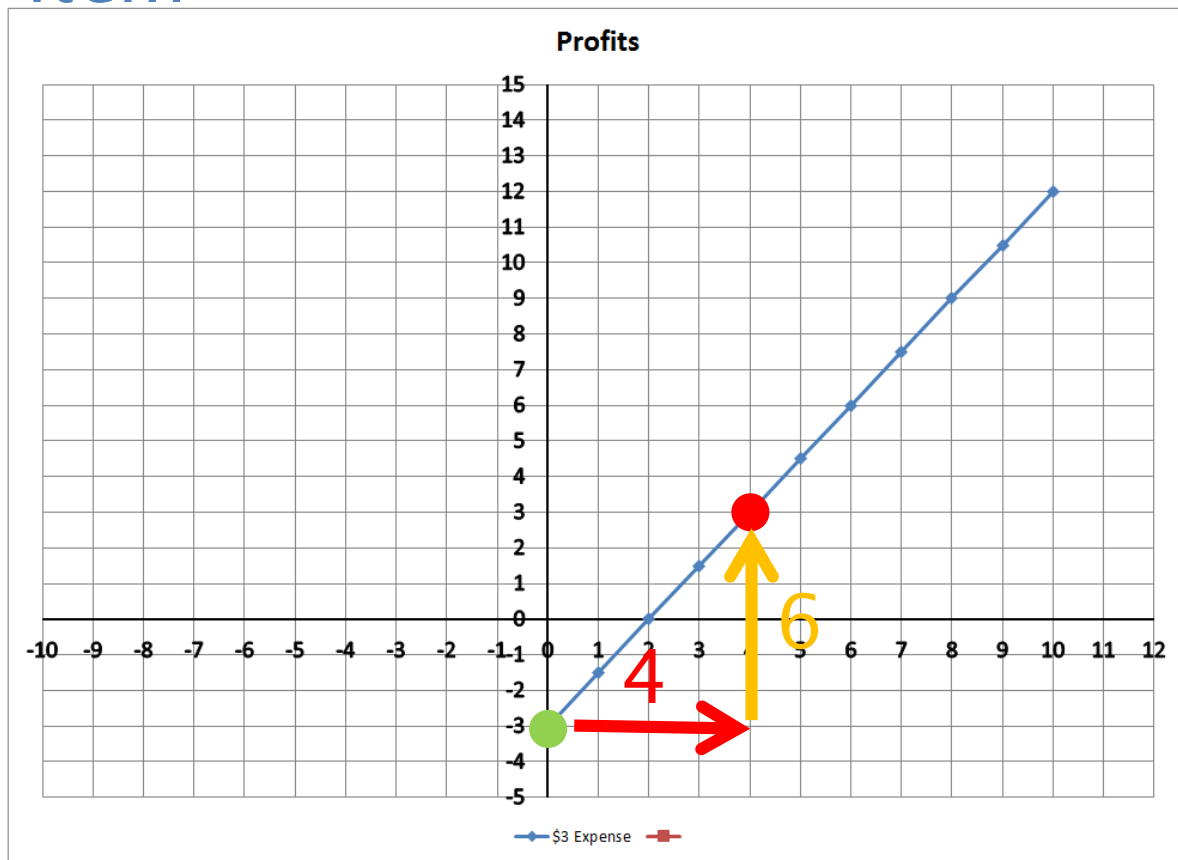
$$y = 3.00$$

Now graph it.



Practice

- With 0 sold, it starts at a -3 value.
- With 4 sold, I made \$6 in profit
- \$1.50 Profit per item





Review:

1. What is the equation for profits with expenses?
2. Create an equation for, and graph the results of, this information:

I sold 2 sandwiches.

Each one sold at a \$4.00 profit. But in order to sell them, I spent \$5.00 on a sign to advertise them.

What are my gross profits?



Review:

1. What is the equation for profits with expenses?

$$y = mx + b$$

2. Create an equation for, and graph the results of, this information:

I sold 2 sandwiches.
Each one sold at a \$4.00 profit. But in order to sell them, I spent \$5.00 on a sign to advertise them.
What are my gross profits?

$$y = 2(\$4.00) + (-\$5.00)$$

$$y = \$3.00$$

