

Vertical and Horizontal Lines Linear Applications

PART I: Horizontal and Vertical Lines

Think-Pair-Share. Take 90 seconds *on your own* to write down everything you know about horizontal and vertical lines.

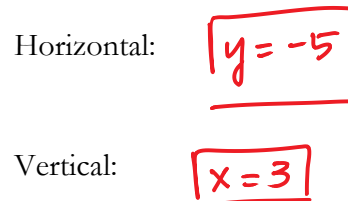
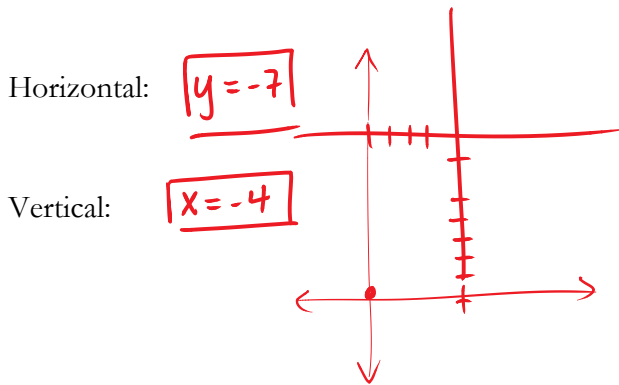
Horizontal Lines

Vertical Lines

Partner Think Tank! With your partner, use what you know about lines to create equations for the horizontal and vertical lines that pass through the given point. A sketch may help...

a. $(-4, -7)$

b. $(3, -5)$



PART II: Applications

A few helpful hints – which form of a line makes the most sense based on the information?

Slope-Intercept

- starting pt? (b)
- slope (m) or can you find one?

Point-Slope

- two points
- OR
- one point & the slope

Standard

- two variables whose sum or difference equal a constant

- You just got your first job at an ice cream shop and are an awesome ice cream cone maker. At your shop, the base cost for a waffle cone is \$2.20 plus \$1.50 for each scoop of ice cream.
 - Write an equation that represents the cost of an ice cream cone that changes with each additional scoop of ice cream. Which form makes the most sense here? *Define your variables!*

$x = \# \text{ of scoops}$
 $y = \$$

Slope-Intercept

$$y = 1.50x + 2.20$$

- Should there be any domain or range restrictions here?

y would have to be greater than (or equal) to 2.50. x (in reality) would have some restrictions \rightarrow can't be negative OR too large



2. Your parents give you a monthly budget for gas for your new car. Any amount you spend over the budget you have to pay for on your own. The first month you get 30 gallons of gas and spend \$65 of your own money. The second month, you get 20 gallons of gas and spend \$30 of your own money. $(30, 65)$ $(20, 30)$

- a. Define your variables.

$x = \# \text{ of gallons}$

$y = \$ \text{ out of my pocket}$



- b. Write an equation that represents cost as a function of days. Which form would make the most sense here? $m = \frac{65-30}{30-20} = \frac{35}{10} = \frac{7}{2}$
pt.-slope!

$$y - 65 = \frac{7}{2}(x - 30)$$

- c. Interpret the meaning of your slope

\$ out of my pocket for each gallon of gas

- d. Interpret the meaning of your y-intercept

$$y = \frac{7}{2}x - 40$$

the amount of \$ your parents give you

- e. If you don't want to spend any money out of your own pocket, how many gallons of gas can you get?

$$0 = \frac{7}{2}x - 40$$

$$x = 11.43 \text{ gallons}$$

3. Griffin Car Rental is offering a special of \$45 a day for a convertible as long as you purchase the car damage protection insurance for \$30.

- a. Define your variables.

$x = \# \text{ of days}$

$y = \text{cost of the car}$



- b. Write an equation that represents cost as a function of days. Which form would make the most sense here? slope-intercept

$$y = 45x + 30$$

- c. Interpret the meaning of your slope.

it costs \$45 per day to rent the car

- d. You will need the car for 11 days. How much will this cost you?

$$y = 45(11) + 30$$

$$y = \$525$$

4. A 100-point test has two different types of questions on it – 2-point multiple choice questions and 4-point free response questions.

- a. Define your variables.

$m = \# \text{ of mc q's}$

$f = \# \text{ of free response}$



- b. Write an equation to represent the breakdown of questions on the test. Which form would make the most sense here? standard

$$2m + 4f = 100$$

- c. If there are 16 free response questions on the test, how many multiple choice questions are there?

$$2m + 4(16) = 100$$

$$m = 18 \text{ mc questions}$$

- d. What is the slope of this model? What does it represent?

$$4f = -2m + 100$$

$$f = -\frac{1}{2}m + 25$$

$$\text{OR } 2m = -4f + 100$$

$$m = -2f + 50$$

one less free response question for every 2 mc questions on the test