Warm-Up   3/17/2021

Evaluate and write in proper function notation:

1. p(d) = 4d – 2, given p(3)

$$P(3) = 4(3) - 2$$
$$p(3) = 10$$

2. f(x) = -(x - 3)^2 + 5, given f(-5)

$$f(-5) = -(-5-3)^2 + 5$$
$$f(-5) = -59$$

3. How many calories do you burn on the exercise bike? (Hint: Find the slope)

Number of Minutes on an Exercise Bike	Total Number of Calories Burned
15	180
30	360
45	540
60	720

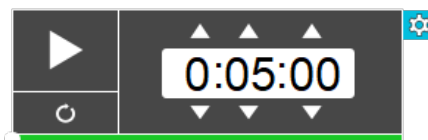$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{360 - 180}{30 - 15}$$

$$m = 12$$

I burn 12 calories per minute.

Quick Check!!!

0:05:00

How Much Do You Know?

Evaluate the expressions for the given values. (4 questions).

Slide 1

Evaluate the following expressions for the given value:

a. $y = (x - 4)^2$ when $x = -2$ $y = \underline{\quad 36 \quad}$

$$y = (-2 - 4)^2$$
$$y = (-6)^2$$

b. $y = -(x + 2)^2 - 3$ when $x = 1$ $y = \underline{\quad -12 \quad}$

$$y = -(1 + 2)^2 - 3 \qquad y = -9 - 3$$
$$y = -(3)^2 - 3$$

c. $y = 3x^2 - 5$ when $x = -3$ $y = \underline{\quad 22 \quad}$

$$y = 3(-3)^2 - 5 \qquad y = 27 - 5$$
$$3(9) - 5$$

d. $y = -x^2 + 4$ when $x = -4$ $y = \underline{\quad -12 \quad}$

$$y = -(-4)^2 + 4$$
$$y = -(16) + 4$$
$$-16 + 4$$

Essential Question   3/17/2021

How can I create and Interpret Function Rules?

Learning Target

Write equations from a graph, table, and ordered pairs.

Writing Linear Functions

Day 3a&b: Writing Linear Functions (Slopes and Y-intercepts)

Standard(s): MGSE9-12.F.BF.1 Write a function that describes a relationship between two quantities.

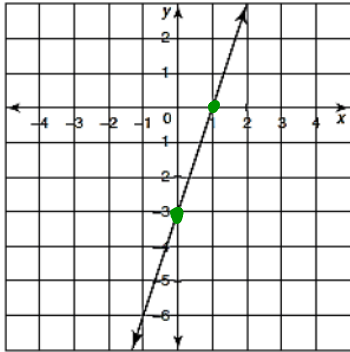**Slope-Intercept Form**

(Gives the equation of a linear function)

$$f(x) = mx + b$$

m: slope   b: y=intercept

Calculating Slope

Representation	Formula	Example
Table	$$\frac{change\ in\ y}{change\ in\ x} = \frac{\Delta y}{\Delta x}$$ $$\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$ where (x_1, y_1) & (x_2, y_2) are coordinate points	<table><tr><th>Number of Carnival Ride Tickets</th><th>Cost (dollars)</th></tr><tr><td>4 x_1</td><td>9 y_1</td></tr><tr><td>8 x_2</td><td>12 y_2</td></tr><tr><td>16</td><td>18</td></tr><tr><td>32</td><td>30</td></tr></table>
Graph	$$m = \frac{rise}{run}$$ $$m = \frac{y_2 - y_1}{x_2 - x_1}$$ where (x_1, y_1) & (x_2, y_2) are coordinate points	$m = \frac{3}{1}$ $b = (0, -3)$
Ordered Pairs	$$m = \frac{y_2 - y_1}{x_2 - x_1}$$ where (x_1, y_1) & (x_2, y_2) are coordinate points	$(-2, 1)$ and $(3, 6)$ $x_1\ y_1 \quad x_2\ y_2$

Finding x & y intercepts

X –intercepts
Written as (a, 0)
The value of the y-coordinate is always 0.

Y-intercepts
Written as (0, b)
The value of the x-coordinate is always 0.

I do

Practice: Find the x and y intercepts of each equation. Then graph.

a. $2x - 5y = 10$

x-intercept: $(5, 0)$
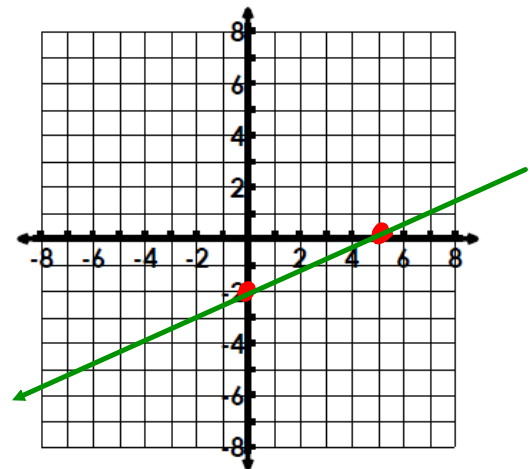
$2x - 5(0) = 10$

$\dfrac{2x}{2} = \dfrac{10}{2}$

$x = 5$

y-intercept: $(0, -2)$

$2(0) - 5y = 10$

$\dfrac{-5y}{-5} = \dfrac{10}{-5}$

$y = -2$

You do

b. $3x + 6y = -18$

x-intercept: $(-6, 0)$
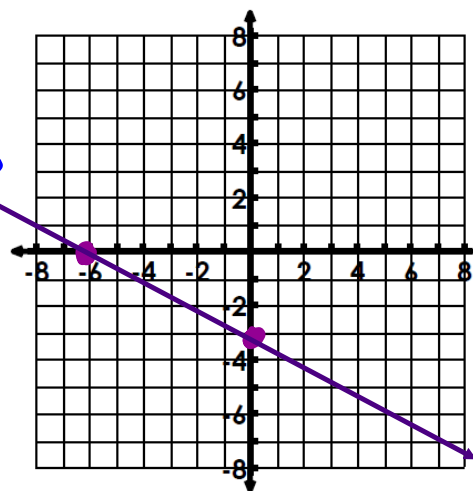
$3x + 6(0) = -18$

$\dfrac{3x}{3} = \dfrac{-18}{3}$

$\boxed{x = -6}$

y-intercept: $(0, -3)$

$3(0) + 6y = -18$

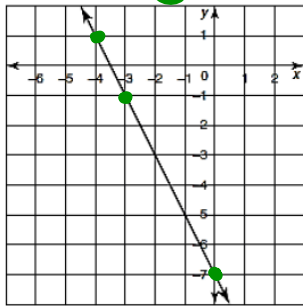$\dfrac{6y}{6} = \dfrac{-18}{6}$

$\boxed{y = -3}$

$y = mx + b$

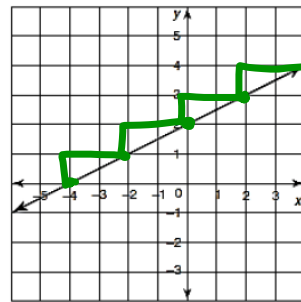## Writing a Linear Equation from Graph

Find the slope and y-intercept of each graph and write the equation of the line in slope-intercept form.

A. Slope: $\frac{-2}{1}$ y-intercept: $(0, -7)$
Equation: $y = -2x - 7$

B. Slope: $\frac{1}{2}$ y-intercept: $(0, 2)$
Equation: $y = \frac{1}{2}x + 2$

Practice - I do

Practice - You do

Writing a Linear Equation Given 2 Points

Slope Formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

where (x_1, y_1) & (x_2, y_2) are coordinate points

Ex. Calculate the slope of two points using the slope formula.

A. (9, 3), (19, -17)

$$\underset{x_1 \; y_1 \; x_2 \; y_2}{}$$

$$y = mx + b$$

B. (1, -19), (-2, -7)

$$\underset{x_2 \; y_2 \; x_1 \; y_1}{}$$

$$m = \frac{-17 - 3}{19 - 9}$$

$$m = \frac{-20}{10}$$

$$\boxed{m = -2}$$

$$m = \frac{-19 - (-7)}{1 - (-2)}$$

$$m = \frac{-12}{3}$$

$$\boxed{m = -4}$$

Slide 4

How do you find the equation of the line in slope-intercept form?
- Plug in one ordered pair (x, y) and the slope, m into the equation y = mx + b
- Find b
- Write in slope-intercept form (y = mx + b)

What is the equation of the line in A?

$$m = -2$$

choose pt: $(9,3)$
       x, y

$$y = mx + b$$
$$3 = -2(9) + b$$
$$3 = -18 + b$$
$$+18 \quad +18$$
$$\overline{21 = b}$$
$$\boxed{b = 21}$$

$$\boxed{y = -2x + 21}$$

What is the equation of the line in B?

$$m = -4$$

Choose a point: $(-2, -7)$
             x, y

$$y = mx + b$$
$$-7 = -4(-2) + b$$
$$-7 = 8 + b$$
$$-8 \quad -8$$
$$\overline{-15 = b}$$
$$\boxed{b = -15}$$

$$\boxed{y = -4x - 15}$$

Writing a Linear Equation from a Table

Writing a Linear Equation from a Table

Find the slope and y-intercept of each table and write the equation of the line in slope-intercept form.

A. Slope: -15 y-intercept: $(0, -2)$
Equation: $y = -15x - 2$

x	y
-1 x_1	13 y_1
0 x_2	-2 y_2
4	-62
10	-152

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{-2 - 13}{0 - (-1)}$$

$$m = \frac{-15}{1} \quad \boxed{m = -15}$$

B. Slope: 2 y-intercept: $(0, 8)$
Equation: $y = 2x + 8$

x	y
0 x_1	8 y_1
3 x_2	14 y_2
7	22
9	26

$$m = \frac{14 - 8}{3 - 0} = \frac{6}{3} = 2$$

What if the y-intercept is not in the table???

What do you do when the y-intercept cannot be found in the table?

C. Slope: -2 y-intercept: $(0, 39)$

Equation: $y = -2x + 39$

D. Slope: $3/4$ y-intercept: $(0, 6)$

Equation: $y = \frac{3}{4}x + 6$

How many pills were in the bottle to start?

How much was admission to the carnival?

X Days Passed	y Vitamins Remaining in Bottle
7 x_1	25 y_1
8 x_2	23 y_2
9	21
10	19

$$M = \frac{y_2 - y_1}{x_2 - x_1}$$

$$y = mx + b$$

Number of Carnival Ride Tickets	Cost (dollars)
4 x_1	9 y_1
8 x_2	12 y_2
16	18
32	30

$$m = \frac{23 - 25}{8 - 7} = \frac{-2}{1}$$

$$\boxed{m = -2}$$

choose a point: $(9, 21)$
$\qquad\qquad\qquad x, y$

$$y = mx + b$$

$$21 = -2(9) + b$$

$$21 = -18 + b$$

$$\begin{array}{r} +18 \quad +18 \\ \hline 39 = b \end{array}$$

$$\boxed{b = 39}$$

There were 39 pills at the beginning

$$m = \frac{12 - 9}{8 - 4} = \frac{3}{4}$$

$$\boxed{m = 3/4}$$

choose a point: $(4, 9)$
$\qquad\qquad\qquad x, y$

$$y = mx + b$$

$$9 = \frac{3}{4}(4) + b$$

$$9 = 3 + b$$

$$\begin{array}{r} -3 \quad -3 \\ \hline 6 = b \end{array}$$

$$\boxed{b = 6}$$

The admission fee is $6

Go to Deltamath.com and start your HW

Attachments

Functions notation.ppt

Functions Practice HW.docx

Functions notation notes.ppt