7.3 Linear Functions

Warm-Up Wednesday

1. Find the domain of $f(x)=\frac{1}{\sqrt{x+4}}$

$x+4 > 0$

$x > -4$

$(-4, \infty)$

2. Find f(x-1) if $f(x) = x^2 - 2x + 4$

$(x-1)^2 - 2(x-1) + 4$

$x^2 - 2x + 1 - 2x + 2 + 4$

$x^2 - 4x + 7$

About Me

1. European sight-seeing adventure or relaxing Caribbean vacation?

2. Would you rather find your true love or $10million?

7.3 Linear Functi

EQ: How do I write the equation of a line?

Linear Function:

slope-intercept form (solve for y)

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

slope y-intercept

Slope

$$\frac{\text{Rise}}{\text{Run}} = \frac{\Delta y}{\Delta x} = m = \frac{y_2 - y_1}{x_2 - x_1}$$

7.3 Linear Functions

EQ: How do I write the equation of a line?

Example 1: Find the slope between the following pairs of points:

a) $(-3,6)$, $(2,-3)$

$x_1\ y_1\ \ x_2\ y_2$

$m = \frac{-3-6}{2+3} = \boxed{\frac{-9}{5}}$

+

b) $(-4,8)$, $(-4,-1)$

$x_1\ y_1\ \ x_2\ y_2$

$m = \frac{-1-8}{-4+4} = \frac{-9}{0}$

undefined

$\frac{N}{0}$

c) $(3,2)$, $(-1,2)$

$x_1\ y_1\ \ x_2\ y_2$

$m = \frac{2-2}{-1-3} = \frac{0}{-4}$

$\boxed{0}$

$\frac{0}{K}$

7.3 Linear Functions

EQ: How do I write the equation of a line?

V ertical line

U ndefined slope

X = equation

H orizontal line

O (zero) slope

Y = equation

Example 2: Describe the graph of each of the relations defined below:

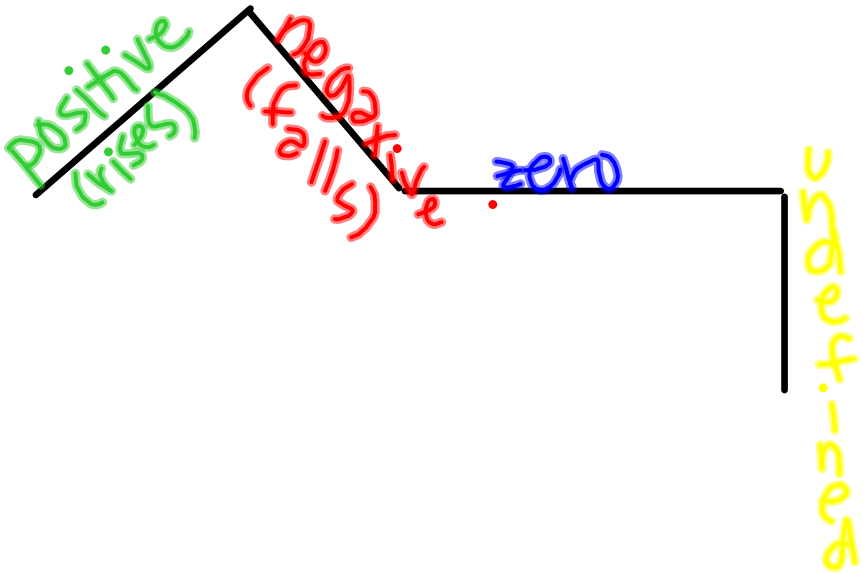
a) $y = 4$

b) $x = -2$

7.3 Linear Functions

EQ: How do I write the equation of a line?

Types of Slope



7.3 Linear Functions

EQ: How do I write the equation of a line?

Writing Equations of Lines

Write the equation of a line with slope m, passing through the point (x_1, y_1)

$y - y_1 = m(x - x_1)$ ← point-slope form

Example 4: Write the equation of the line with slope $-\frac{1}{3}$, passing through the point $(2, 5)$

$m = -\frac{1}{3}$

$(2, 5)$

$x_1 \quad y_1$

$y - 5 = -\frac{1}{3}(x - 2)$

$y - 5 = -\frac{1}{3}x + \frac{2}{3}$

$+5 \qquad +\frac{15}{3}$

$y = -\frac{1}{3}x + \frac{17}{3}$

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

$m(x_2 - x_1) = y_2 - y_1$

7.3 Linear Functions (Day 1) Name _____

Determine which equations have graphs that rise (going from left to right) and which have graphs that fall. Check your answers by graphing each equation on your calculator.

positive slope

neg. slope

1. $y = 3x,\ y = \frac{1}{3}x,\ y = -3x$ (+, +, −)

2. $y = -4x,\ y = 2x,\ y = -\frac{1}{4}x$

3. $y = -2x - 1,\ y = -4x + 3,\ y = 2x + 5$

4. $y = 3 - 2x,\ y = -2x + 3,\ y = 5 + 3x$

Find the slope of the line through each pair of points.

5. (-1, 2) and (2, -6)

6. (-3, 1) and (-1, -5)

Determine the slope and y-intercept for each equation. solve for y first

7. $y = 2x - 4$

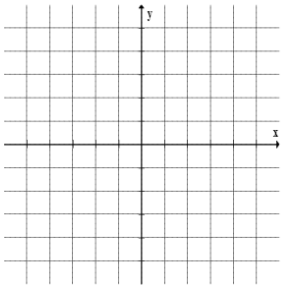
8. $2x + 3y = 2$

9. $-x + 3y + 2 = 0$

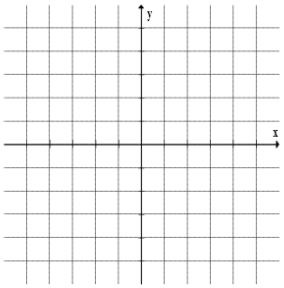
10. $-x - 3y = 8$

Draw the line that contains the given point P and has slope *m*.

11. (1, 2) and *m*=2



12. (3, -1) and *m* = undefined



Write an equation of the line passing through the given point and having slope *m*.

13. (-1, 0) and $m = \frac{2}{3}$

14. (-1, 3) and $m = 10$

15. Write an equation of the line with slope, $m = -\frac{3}{4}$, and y-intercept, $b = -3$.

Write an equation of both the vertical and horizontal line through the given point.

16. (-2, 3)

17. (0, -2)

HOY VUX

Write an equation of the line through the given pair of points.

18. (-1, 0) and (3, 1)

19. (8, 1) and (8, -4)

20. (1, 1) and (0, 2)

21. (0, 300) and (10, 365)