7.2 Linear Functions

Warm-Up Tuesday

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

$\sqrt{x+4} > 0$

$x+4 > 0$

$x > -4$

$(-4, \infty)$

About Me

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

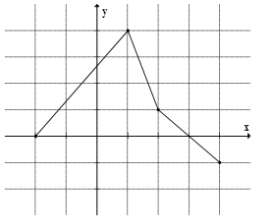
2. Would you rather find your true love or $10million?

Questions, comments, concerns??

7.1 – Functions, Domain and Range Name _____

Determine the domain and range for each graph. Put all answers in interval notation. Ex

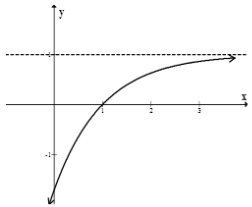
1.



Domain: _____

Range: _____

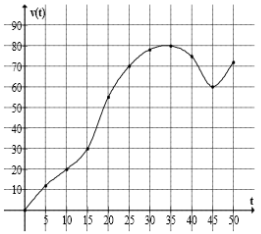
2.



Domain: _____

Range: _____

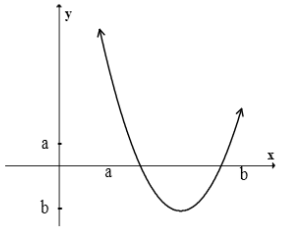
3.



Domain: _____

Range: _____

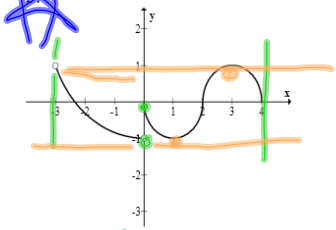
4.



Domain: _____

Range: _____

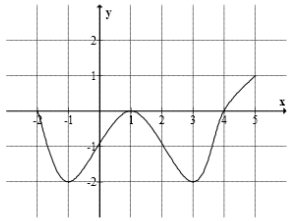
5



Domain: (-3, 4]

Range: [-1, 1]

6

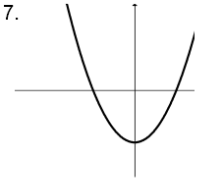


Domain: _____

Range: _____

In questions 7-12, use the vertical line test to decide which are graphs of functions of x.

7.



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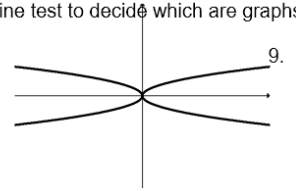

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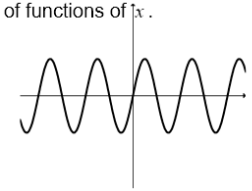

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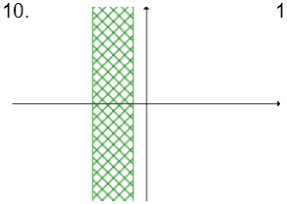

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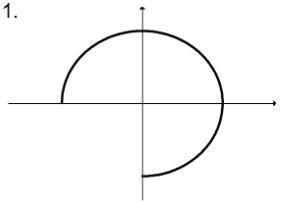

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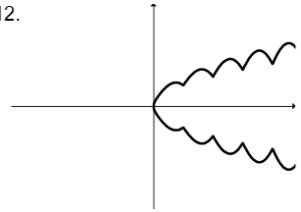


Determine the domain for each function:

13. $f(x)=\frac{1}{3}x^3+5x^2+24$

14. $f(x)=\sqrt{x}$

15. $f(x)=\frac{1}{\sqrt{2x+1}}$

16. $f(x)=\frac{x^3+1}{2x}$ $(-\infty,0)\cup(0,\infty)$

$\frac{2x}{2}=\frac{0}{2}$

$\mathbb{R}, x\neq 0$

17. $x=4$

18. $f(x)=\sqrt{1-x^2}$

19. $f(x)=\sqrt{x}$

20. $f(x)=\frac{2}{(x-3)}$

21. $f(x)=x^2-3$

$\sqrt{\frac{4}{9}}=\frac{\sqrt{4}}{\sqrt{9}}$

22. $h(x)=\sqrt{\frac{1}{x+1}}=\frac{1}{\sqrt{x+1}}$

$x+1>0$

23. $f(x)=x^2-5x-10$

24. $f(x)=\sqrt{8-x}$

7.2 Linear Functions

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

Linear Function:

Slope-Intercept Form (solve for y)

$f(x) = mx + b$ ← y-intercept

y, slope

ex. $y = -\frac{1}{2}x + 12$

$m = -\frac{1}{2}$ y-int: (0,12)

Slope

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

7.2 Linear Functions

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

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

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

$x_1\ y_1\quad x_2\ y_2$

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

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

$x_1\ y_1\quad x_2\ y_2$

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

undefined

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

$x_1\ y_1\quad x_2\ y_2$

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

$\boxed{0}$

7.2 Linear Functions

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

V ertical Line

U ndefined Slope

X = equation
x-intercept

H orizontal Line

0 (zero) Slope

Y = equation
y-intercept

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

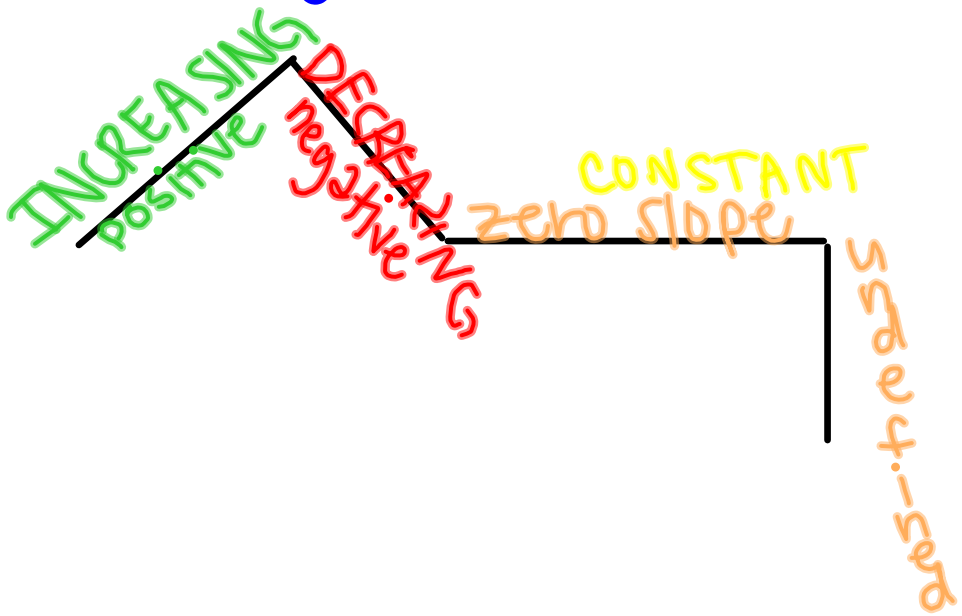
a) $y = 4$

b) $x = -2$

7.2 Linear Functions

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

Types of Slope



7.2 Linear Functions

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

Example 3: Find the slope and y-intercept of each of the following linear functions. State which ones have graphs which rise (increase) and which have graphs which fall (decrease).

a) $y = -\frac{3}{2}x - 2$ ☺ y=mx+b

m= -3/2

yint= -2

inc. or dec.?

neg. slope

b) $x - 2y = 8$ ☹ solve for y

$-x \quad -x$

$\frac{-2y}{-2} = \frac{-1x}{-2} + \frac{8}{-2}$

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

m= 1/2

yint= -4

inc or dec?

pos. slope

7.2 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)

$y - y_1 = m(x - x_1)$

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

$m(x - x_1) = y - y_1$

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

m x_1 y_1

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

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

$+5 \quad +5$

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

$\frac{2}{3} + \frac{15}{3}$

7.2 Linear Functions Name _____

Determine if the function is increasing (going from left to right) or decreasing.

1. $y = 3x$

2. $y = -4x$

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

4. $y = 3 - 2x$

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.

7. $y = 2x - 4$

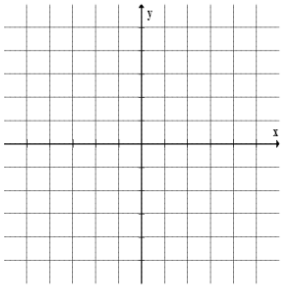
8. $2x + 3y = 2$

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

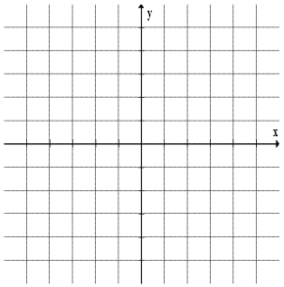
10. $-x - 3y = 8$

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)

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)

7.2 Linear Functions

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

Exit Ticket

on google classroom