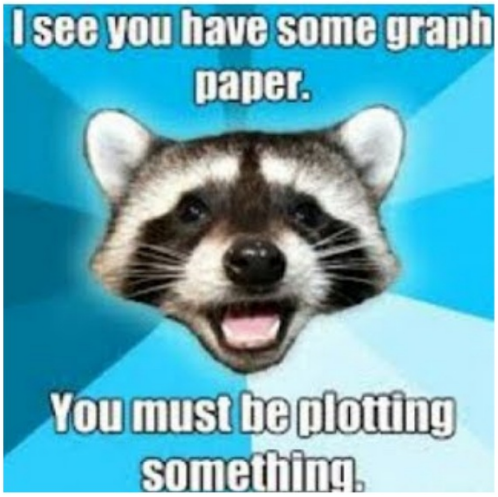
Algebra 1 SOL Review Session

Day 2 Agenda:

1. Overview Day 2
2. Relations and Functions
3. Slope
4. Graphing Linear Functions



Algebra 1 SOL Review Session

Day: 2 **Topics**: Linear Functions and Slope

Key Concepts:

- Relations and Functions, Evaluating Functions
  - Domain and Range
- Slope
  - Parallel and Perpendicular Lines
- Graphing Linear Functions
  - Intercepts, Zeros, Slope-Intercept Form

Guided Practice:

Relations and Functions

Activity 1: Slope Identification (Handout)

Graphing Linear Functions

Independent Practice:

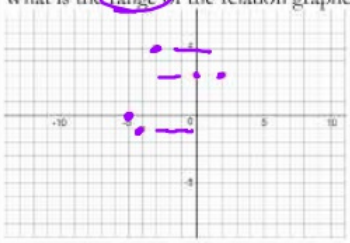
What is the slope of the line represented by the equation $3x-2y=-8$?

Let $f(x)=x$ and $g(x)=6x-1$, complete the statements to compare the graph of $g(x)$ to the graph of $f(x)$.

The graph of $g(x)$ is shifted up/down from the graph of $f(x)$.

The graph of $g(x)$ is steeper/less steep than the graph of $f(x)$.

What is the range of the relation graphed below?



What is the slope of the line that is perpendicular to the line that is represented by the equation $\frac{2}{3}x-2y=8$.

Using the ordered pairs shown, create a relation containing three ordered pairs with a domain of $\{-1,2,4\}$

$(-3,-1)$	$(-1,0)$	$(-2,2)$
$(4,-2)$	$(3,4)$	$(2,3)$

Identify each function that has an x-intercept of 3.

$f(x)=\frac{-4x+15}{5}$
$g(x)=3-\frac{1}{2}x^2$
$h(x)=\frac{5}{3}x-5$
$j(x)=(x+3)(x-5)$
$k(x)=3x^2-11x+6$

Algebra 1 SOL Review Session

More Independent Practice (Multiple Choice)

Which relation is a function?

X does not repeat

X A. $\{(2,3),(-3,5),(3,0),(2,6)\}$

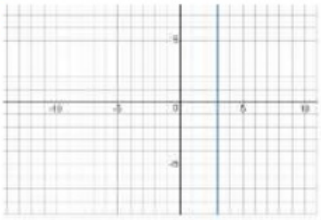
X B. $\{(2,4),(-4,2),(0,0),(2,3)\}$

X C.

x	y
-2	5
0	6
3	6
4	8
3	2

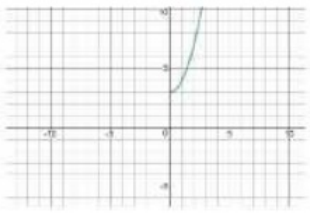
None

X D.

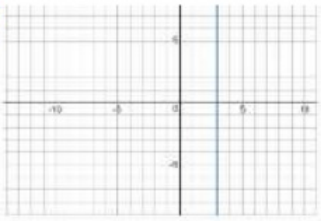


Which of the following graphs appears to show a relation that is not a function?

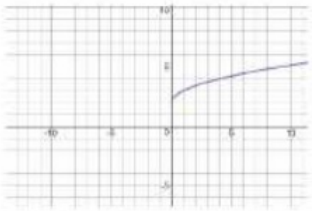
A.



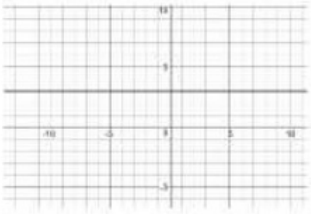
B.



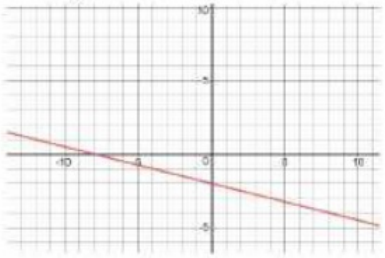
C.



D.



The graph of line p is shown. Which of the following is the closest value of the slope of line p?



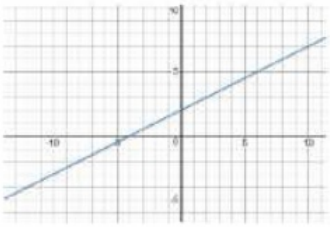
A. 4

B. -4

C. $\frac{1}{4}$

D. $-\frac{1}{4}$

Let $f(x)=x$. The graph of $g(x)$ is shown. The slope of $g(x)$ is _____ the slope of $f(x)$.



A. Twice

B. One-half

C. Two more than

D. Two less than

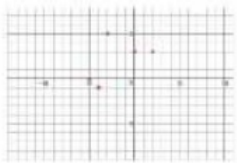
Relations and Functions

Definitions

Relation: Set of ordered pairs

$\{(3,2),(2,5),(0,4),(-3,2)\}$

x	y
2	5
3	7
-6	2
8	0



Domain: Set of all x-values (input) of a relation — independent

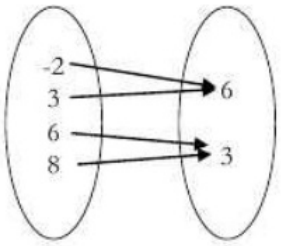
Range: Set of all y-values (output) of a relation — dependent

Function: Relation where each element of the domain is paired with exactly on element of the range.

Vertical Line Test — (X) ↳ shows one time

Directions: Identify the domain and range given each of the following relations.

1.



Domain $\{-2,3,6,8\}$

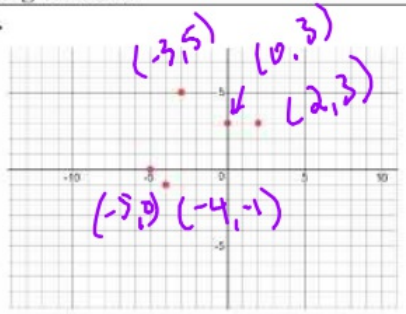
Range $\{3,6\}$

x	y
2	3
-6	3
8	3
10	3
2	5

Domain $\{-6,2,8,10\}$

Range $\{3,5\}$

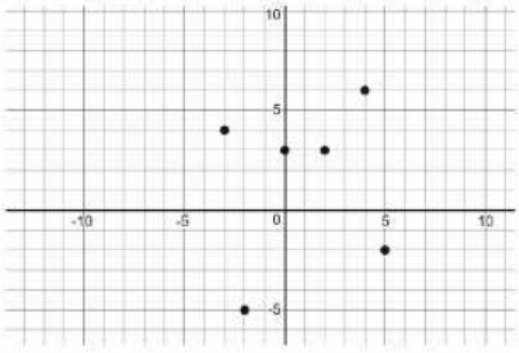
3.



Domain $\{-5,-4,-3,0,2\}$

Range $\{-1,0,3,5\}$

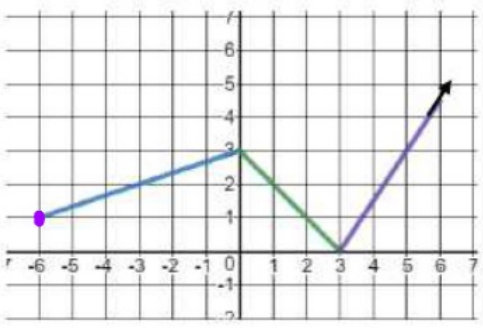
4.



Domain

Range

5.



(write as an inequality)

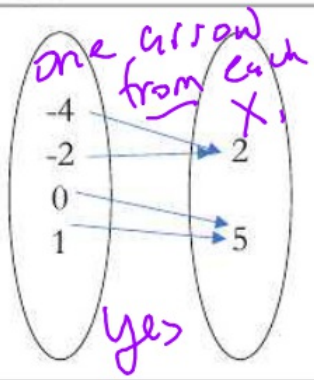
Domain $x \geq -6$

Range $y \geq 0$

Relations and Functions

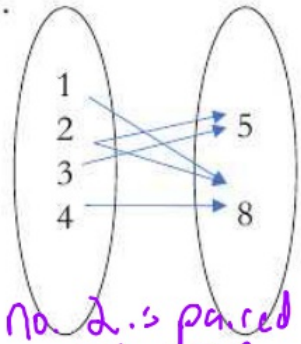
Directions: Determine if the relation is a function. If it is not a function, state why it does not meet the definition.

6.



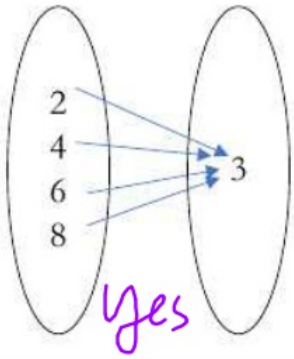
one arrow from each x; yes

7.



no 2.'s paired w/ 5 & 8

8.



yes

9.

x	y
1	6
2	6
3	6
4	6

yes

10.

x	y
-2	2
0	3
2	4
4	5

yes

11.

x	y
-2	3
0	4
4	5
0	6

no

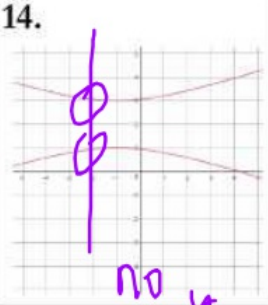
12. $\{(2,-3),(3,5),(-3,5),(-2,6),(7,0)\}$

yes

13. $\{(-2,8),(5,-7),(4,9),(5,0),(9,6)\}$

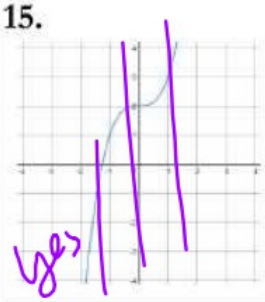
no

14.



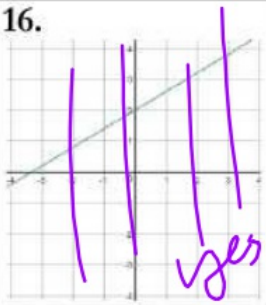
no

15.



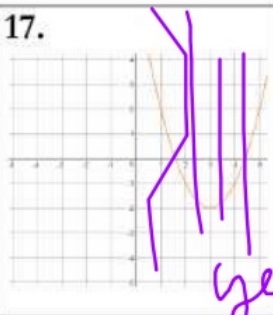
yes

16.



yes

17.



yes

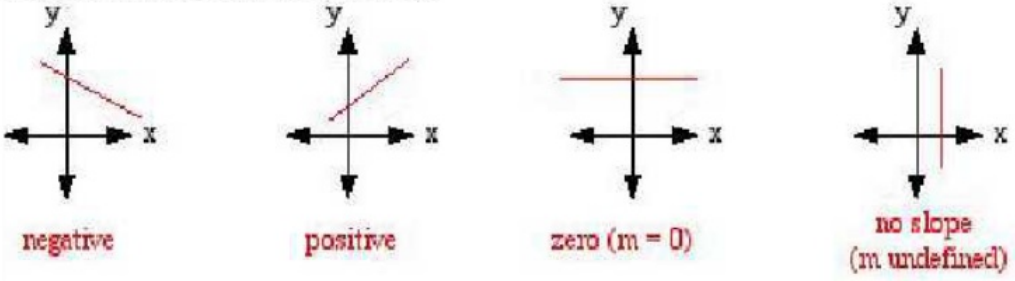
18. What is the range of $f(x)=(x-2)^2+3$ given that the domain is $x>0$?

$y \geq 3$

19. Given $f(x)=x^2-2x+3$, find $f(-2)$.

SOL Review: Slope Identification

What is slope?

Definition Describes the steepness and direction of a line
Finding slope given two points on the line: (x_1, y_1) and (x_2, y_2) Method 1: $m = \frac{y_2 - y_1}{x_2 - x_1}$ Rise / Run Method 2: $m = \frac{\Delta y}{\Delta x}$ where Δ means "change in"-subtraction.
Finding the slope of a line given an equation: Solve the equation for y (slope-intercept form). The coefficient of x is the slope of the line.
Slope can be one of four different things: 

HOY-VUX

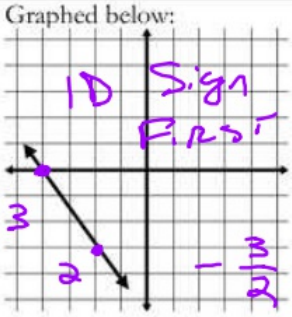
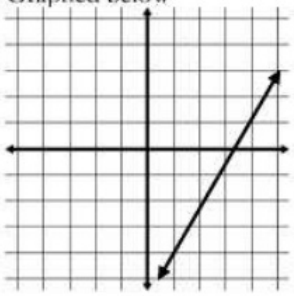
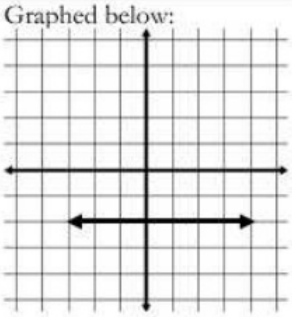
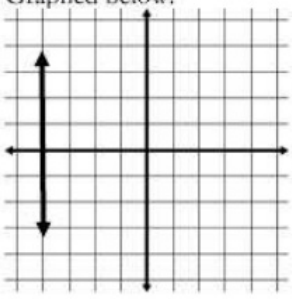
Horizontal Lines (HOY) 0 slope $y = \#\#$	Vertical Lines (VUX) Undefined slope $x = \#\#$

Parallel and Perpendicular Lines

Parallel Lines have the same slope	Perpendicular lines have negative reciprocal slopes. opposite flip & change sign

SOL Review: Slope Identification

Directions: Find the slope given the information.

1. Contains the points: $(-2,5);(3,-4)$	2. Graphed below: 	3. Has the equation: $y=-\frac{2}{3}x+2$
4. Graphed below 	5. Parallel to the line that has the equation: $-2x+4y=24$	6. Contains the points $(5,5);(-3,5)$
7. Has the equation: $x=-5$	8. Perpendicular to the line that contains the points: $(-2,3);(-4,-1)$	9. Graphed below: 
10. Contains the points: $(-3,-5);(-3,-2)$	11. Graphed below: 	12. Has the equation: $y=-2$

Graphing Linear Functions

Terminology

What is a Linear Function? A function whose graph is that of a line.

Standard Form
$ax+by=c$
a,b,c are integers and a is a positive

Slope-intercept form
$y=mx+b$
m is the slope of the line
b is the y-coordinate of the y-intercept

Intercepts: Where the graph crosses an axis

y-intercept: graph crosses y-axis and $x=0$

x-intercept: graph crosses the x-axis and $y=0$

Zeros: x-coordinate of an x-intercept

Graphing using Desmos:
Type the equation in the box exactly as it is written

Graphing Linear Inequalities

1. Use Desmos. Type the equation in exactly as it is written
2. By hand:
   Solid $(\leq,\geq)$ or dotted $(>,<)$
   Shade above $(>,\geq)$ or below $(<,\leq)$

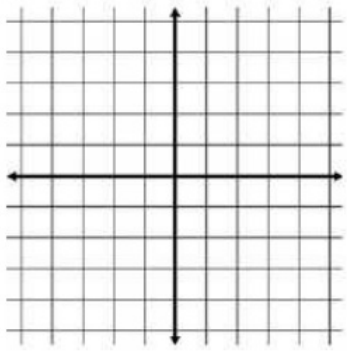
Identify the x-intercept and y-intercept of the relation: $3x-2y=12$

x-intercept y-intercept

What is the zero of the function below?

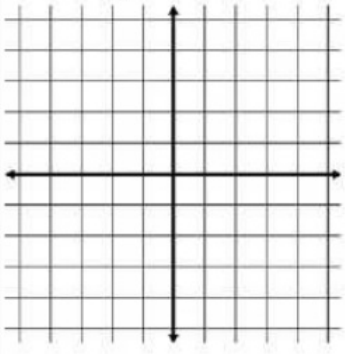
$$f(x)=\frac{3}{2}x-9$$

Sketch the graph of the linear function below:
$3y=2x-6$



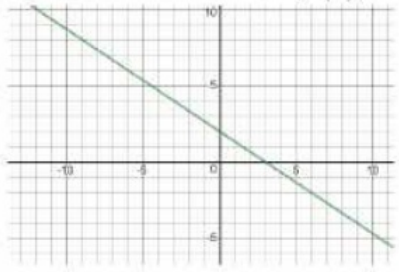
Sketch the graph of the linear function:

$$g(x)=-\frac{3}{2}x+2$$



Graphing Linear Functions

Let $f(x)=x$. The graph of $g(x)$ is shown. The slope of $g(x)$ is _____ the slope of $f(x)$ and the graph is shifted _____ from $f(x)$.

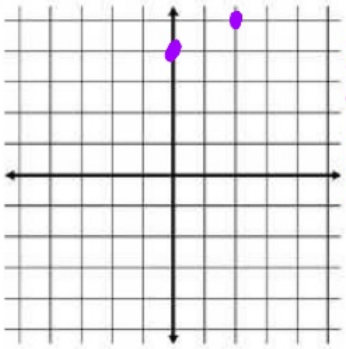


Let $f(x)=x$ and $g(x)=-3x-4$, complete the statements to compare the graph of $g(x)$ to the graph of $f(x)$.

The graph of $g(x)$ is shifted up/down from the graph of $f(x)$.

The graph of $g(x)$ is steeper/less steep than the graph of $f(x)$.

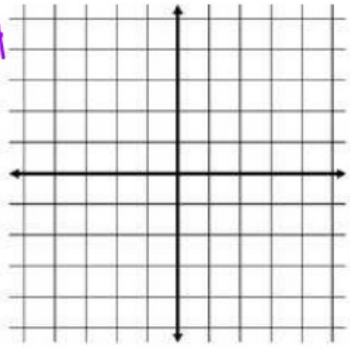
Let $f(x)=x$ and $g(x)$ is up 4 units and $\frac{1}{2}$ as steep as $f(x)$, graph two points that are on $g(x)$.



$g(x)=x+4$

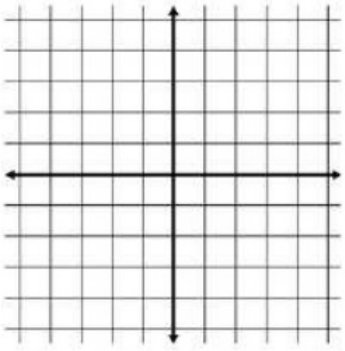
$g(x)=\frac{1}{2}x+4$

Graph the line that is perpendicular to $y=\frac{2}{3}x-2$ and contains the point $(-4,1)$.



Graph the following inequality:

$y<\frac{2}{3}x-2$



Graph the following inequality:

$y\geq -2x+2$