

Good morning!

1. "Here"

2. Notes on Characteristics of Linear Functions

4. Upload Practice to CTLS

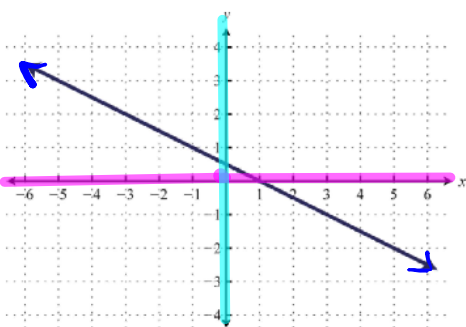
DeltaMath

Unit 1 – Part 2
Linear Functions

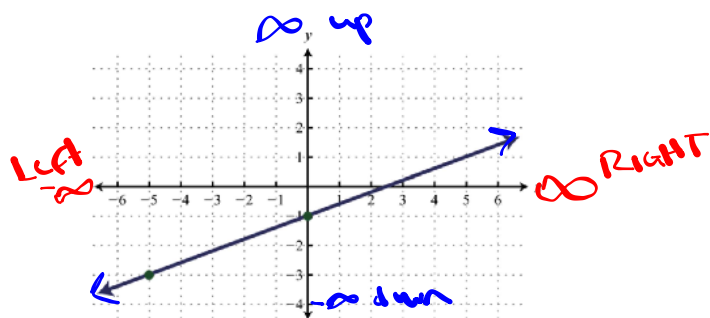
Monday	Tuesday	Wednesday	Thursday	Friday
Jan. 18 th	Jan. 19 th	Jan. 20 th	Jan. 21 st	Jan. 22 nd
No School	Unit 1 Part 1 Test	Unit 1 Part 1 Test	Graphing Linear Functions	Characteristics of Linear Functions
Jan. 25 th	Jan. 26 th	Jan. 27 th	Jan. 28 th	Jan. 29 th
Function Notation	PSAT Day – No Class	Arithmetic Sequences	Review Quiz due at midnight	Solving Systems by Graphing
Feb. 1 st	Feb. 2 nd	Feb. 3 rd	Feb. 4 th	Feb. 5 th
Solving Systems by Substitution	Solving Systems by Elimination Quiz	Quiz due at midnight	Systems of Equations Word Problems	Graphing Systems of Inequalities
Feb. 8 th	Feb. 9 th	Feb. 10 th	Feb. 11 th	Feb. 12 th
Graphing Systems of Inequalities	Review Test	Test due at midnight	Factoring by GCF	Factoring

Characteristics of Linear Functions

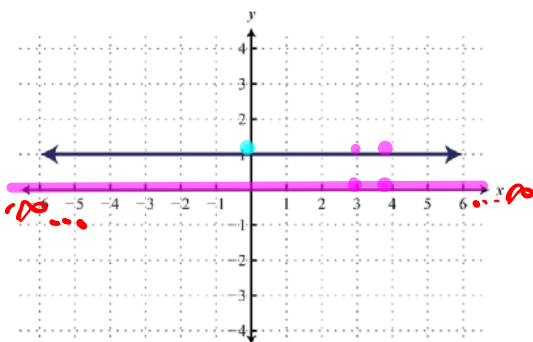
Domain and Range		
Domain $\longleftrightarrow x$		
Define: All possible values of x	Think: How far left to right does the graph go?	Write: $x: \text{all real numbers}$
Range $\updownarrow y$		
Define: All possible values of y	Think: How far down to how far up does the graph go?	Write: $y: \text{all reals } (-\infty, \infty)$



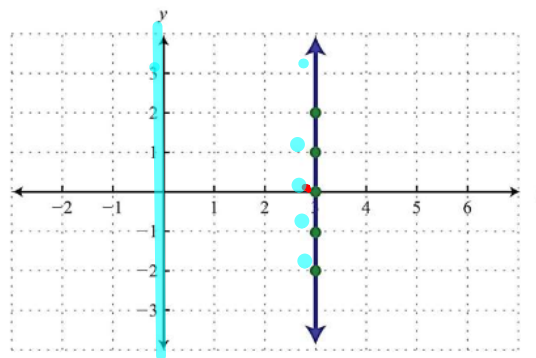
Domain: all reals
Range: all reals



Inequality
Domain: $-\infty < x < \infty$
Range: $-\infty < y < \infty$



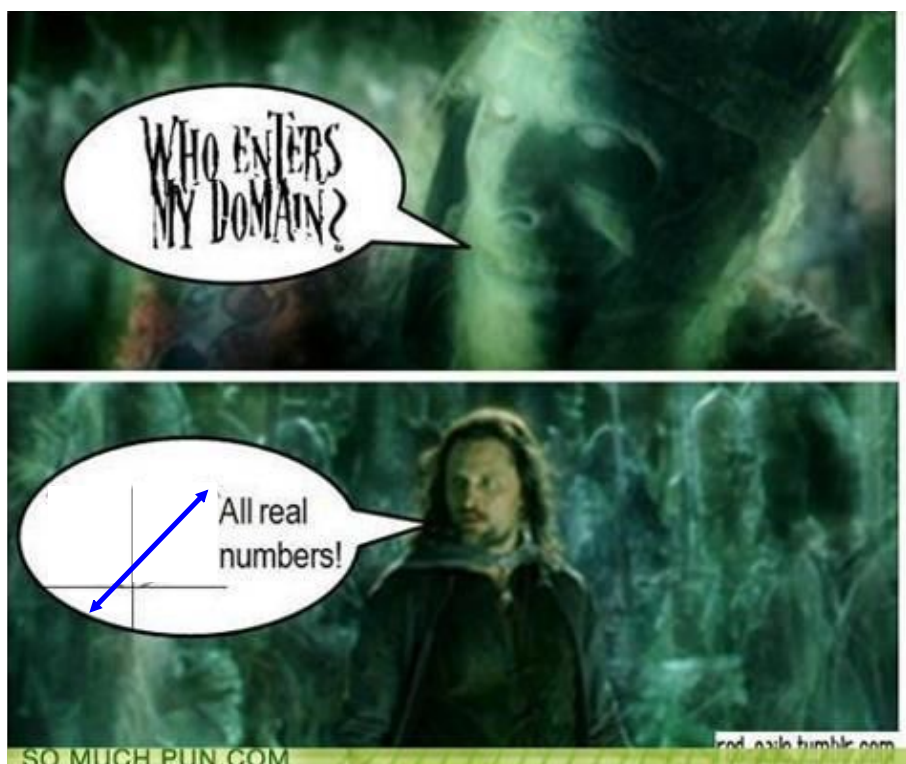
Domain: all reals
Range: $y = 1$

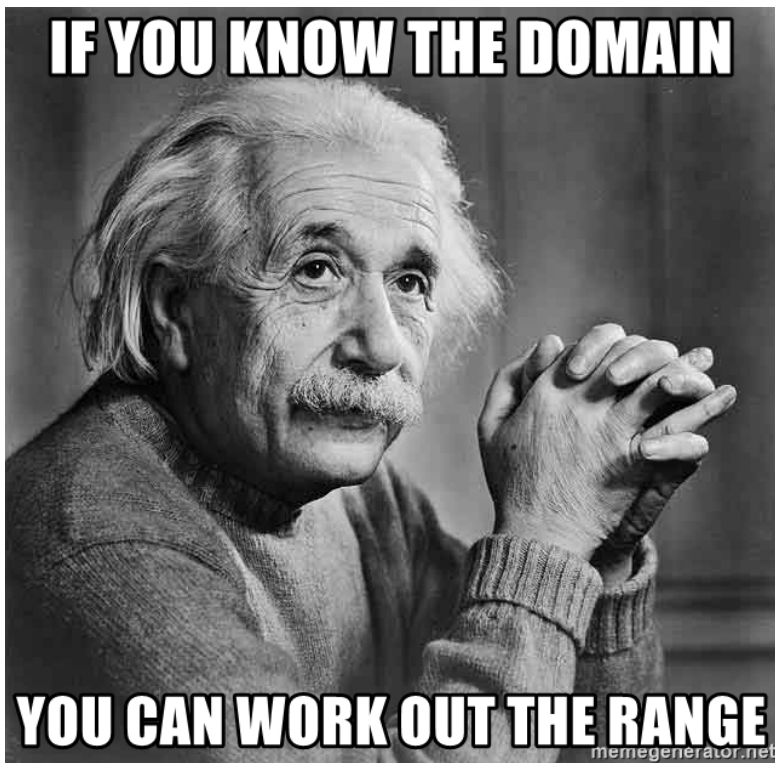


Domain: $x = 3$
Range: all reals

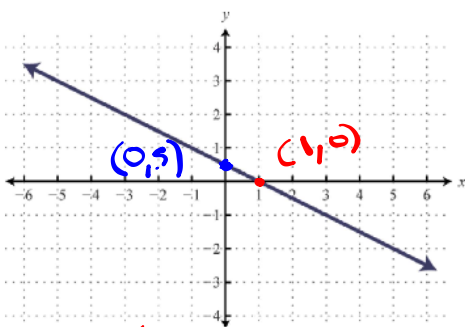
Inequality notation "all real numbers"
 \mathbb{R}

Domain $-\infty < x < \infty$
Interval notation $(-\infty, \infty)$

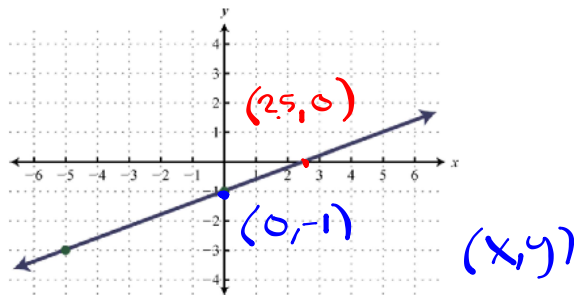




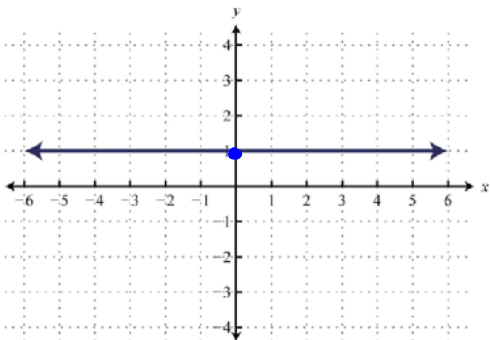
Zeros and Intercepts		
Y-Intercept		
Define: Point where the graph crosses the y-axis	Think: At what coordinate point does the graph cross the y-axis?	Write: $(0, y)$ or $(0, b)$ $y = mx + b$
X-Intercept		
Define: Point where the graph crosses the x-axis	Think: At what coordinate point does the graph cross the x-axis?	Write: $(x, 0)$



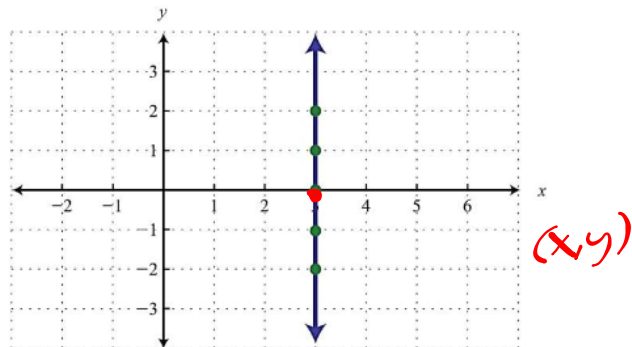
x-axis
X-intercepts: $(1, 0)$ Y-intercept: $(0, 5)$



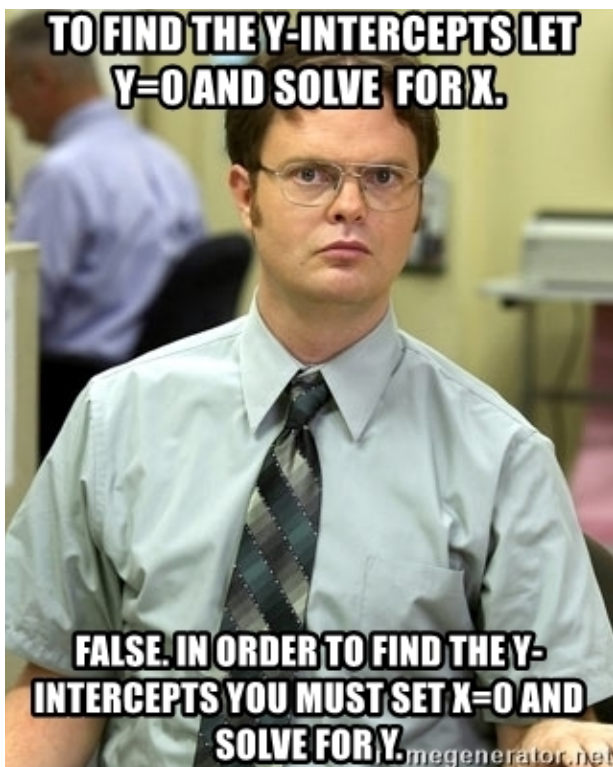
X-intercepts: $(2.5, 0)$ Y-intercept: $(0, -1)$



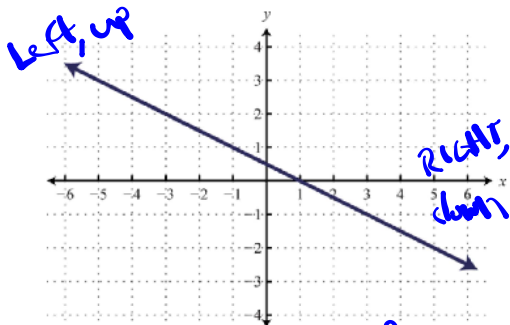
X-intercepts: *none* Y-intercept: $(0, 1)$



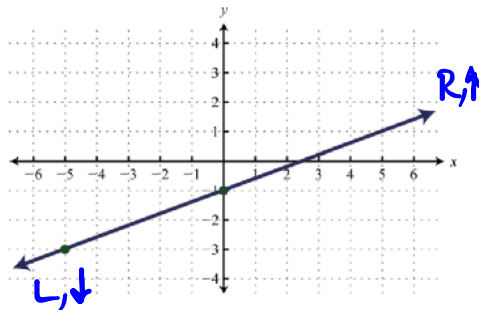
X-intercepts: $(3, 0)$ Y-intercept: *none*



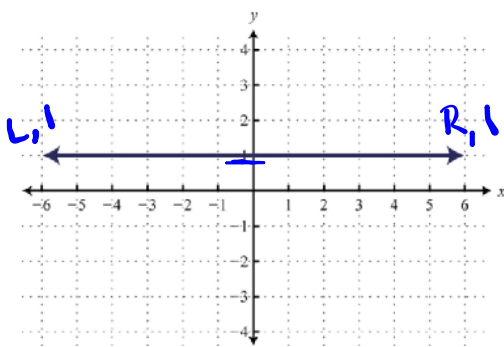
End Behavior	
End Behavior	
Define: Behavior of the ends of the function (what happens to the y-values or $f(x)$) as x approaches positive or negative infinity. The arrows indicate the function goes on forever so we want to know where those ends go.	
Think: As x goes to the left (negative infinity), what direction does the left arrow go?	Write: <i>goes left</i> $x \rightarrow -\infty, y \rightarrow$ <i>down</i> $-\infty$ or <i>up</i> ∞
Think: As x goes to the right (positive infinity), what direction does the right arrow go?	Write: $x \rightarrow \infty, y \rightarrow$ <i>down</i> $-\infty$ or <i>up</i> ∞



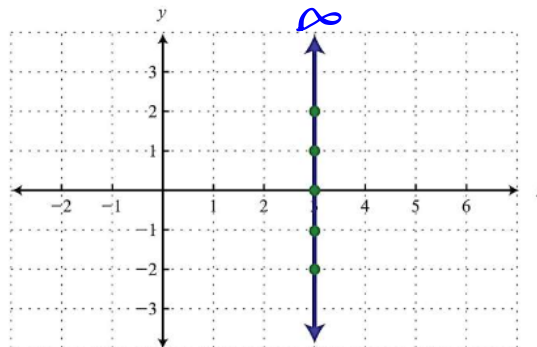
Left $As x \rightarrow -\infty, f(x) \rightarrow$ *up* ∞ .
Right $As x \rightarrow \infty, f(x) \rightarrow$ *down* $-\infty$.



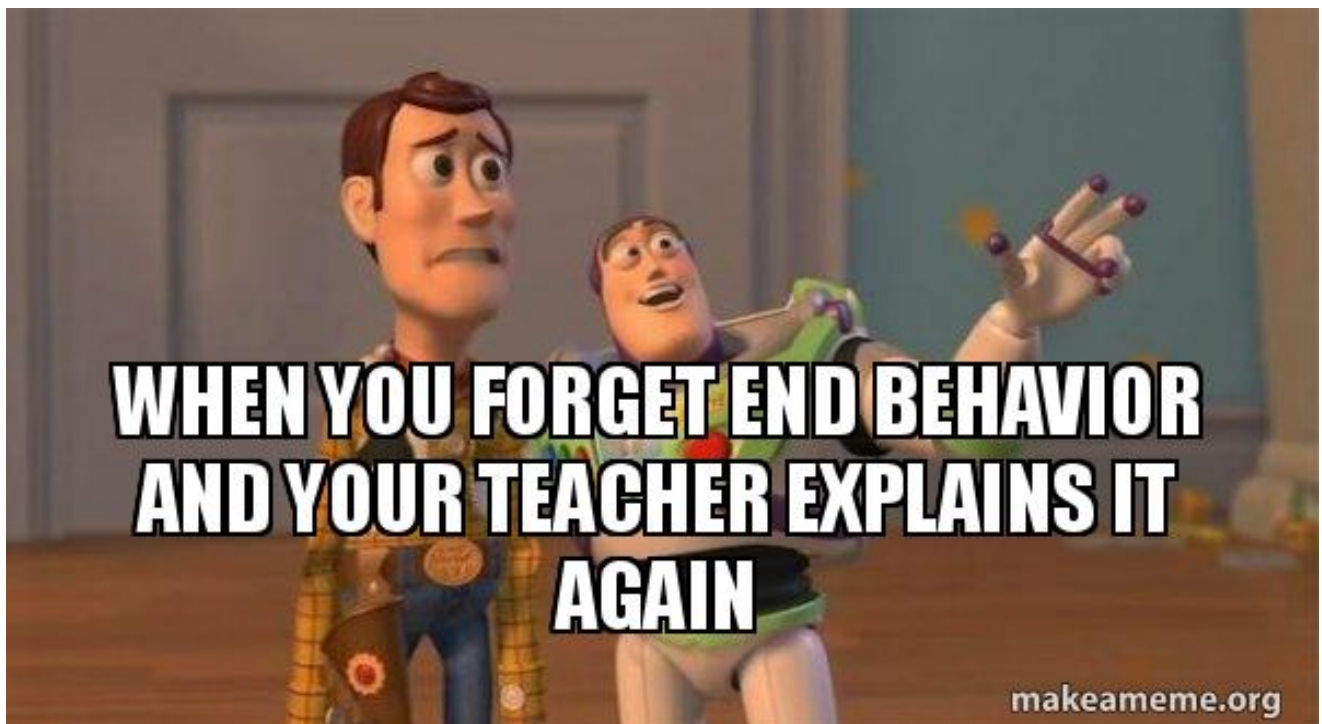
$As x \rightarrow -\infty, f(x) \rightarrow -\infty$.
 $As x \rightarrow \infty, f(x) \rightarrow \infty$.



$As x \rightarrow -\infty, f(x) \rightarrow 1$.
 $As x \rightarrow \infty, f(x) \rightarrow 1$.

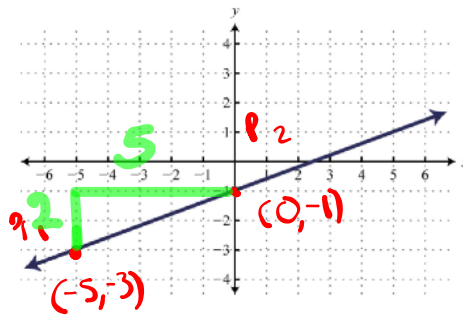
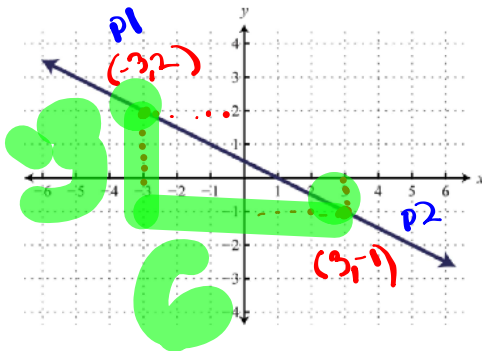


~~$As x \rightarrow -\infty, f(x) \rightarrow$ _____~~ $x \rightarrow 3, f(x) \rightarrow \infty$
 ~~$As x \rightarrow \infty, f(x) \rightarrow$ _____~~ $x \rightarrow 3, f(x) \rightarrow -\infty$



Average Rate of Change ROC

Average Rate of Change		
Define: Rate of change or <u>slope</u> for a given interval on a graph	Think: How is the graph changing over the given interval?	Write: $m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

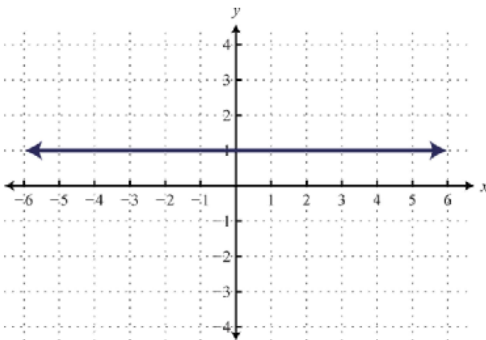


Calculate the average rate of change for the interval $-3 \leq x \leq 3$.

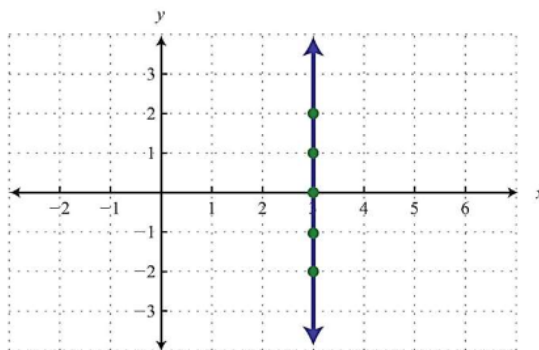
$$m = \frac{-1 - 2}{3 - (-3)} = \frac{-3}{6} = \frac{-1}{2} \text{ or } -\frac{1}{2}$$

Calculate the average rate of change for the interval $-5 \leq x \leq 0$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - (-3)}{0 - (-5)} = \frac{-1 + 3}{0 + 5} = \frac{2}{5}$$



A horizontal line has a slope of 0.



A vertical line has a slope of undefined.

Calculate the average rate of change for the function $f(x) = 3x$ for the interval $1 \leq x \leq 3$.



Characteristics of Linear Functions Practice

1) Domain: all reals
 Range: all real
 X-Intercept: (3, 0)
 Y-Intercept: (0, 3)

to left
to right

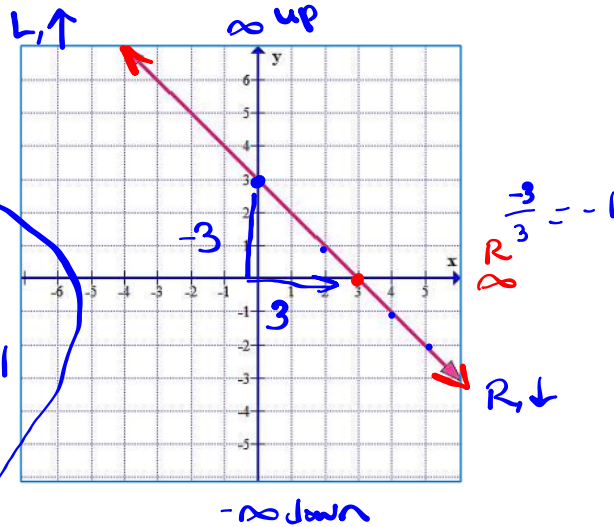
Increasing: _____
 Decreasing: ✓
 Constant: _____

Slope: $m = -1$ $m = \frac{3-0}{0-3} = \frac{3}{-3} = -1$

As $x \rightarrow -\infty, f(x) \rightarrow \infty$.
 As $x \rightarrow \infty, f(x) \rightarrow -\infty$.

Equation: $y = -1x + 3$

$y = mx + b$



2) Domain: all reals
 Range: all reals
 X-Intercept: (-3, 0)
 Y-Intercept: (0, 1)

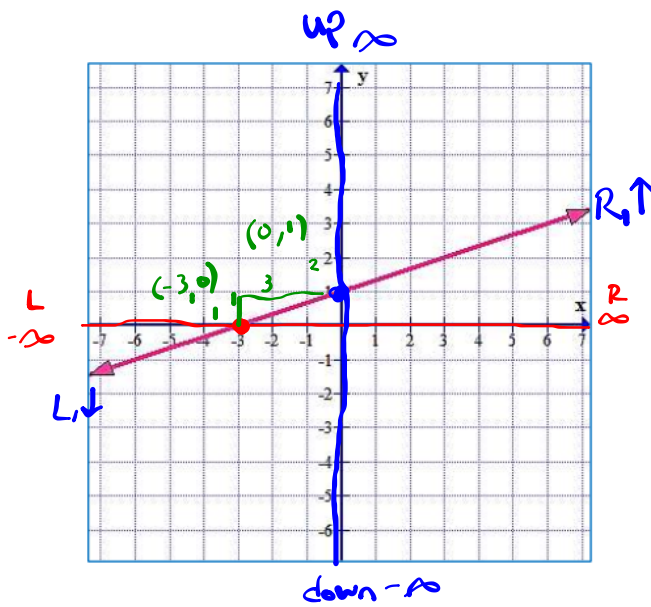
Increasing: ✓ $x \rightarrow \infty$
 Decreasing: _____

Slope: $m = \frac{1-0}{0-(-3)} = \frac{1}{3}$

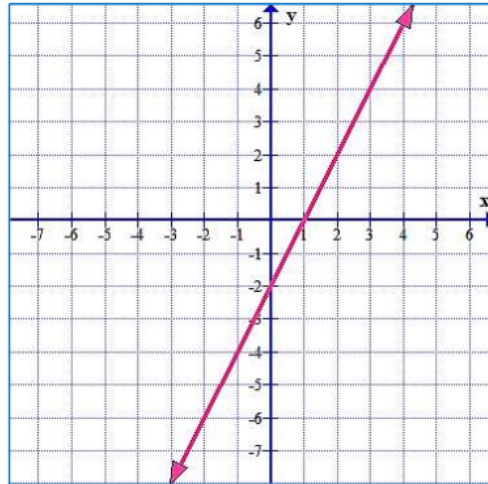
As $x \rightarrow -\infty, f(x) \rightarrow -\infty$.
 As $x \rightarrow \infty, f(x) \rightarrow \infty$.

Equation: $y = \frac{1}{3}x + 1$

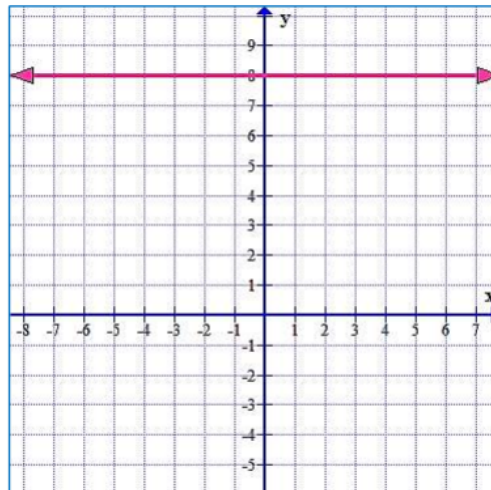
$y = mx + b$



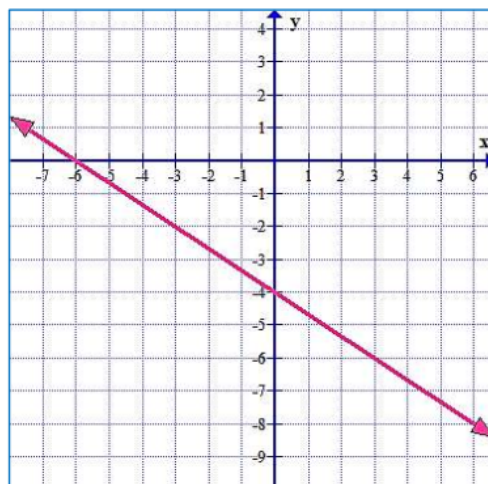
- 3) Domain: _____
 Range: _____
 X-Intercept: _____
 Y-Intercept: _____
 Increasing: _____
 Decreasing: _____
 Constant: _____
 Slope: _____
 As $x \rightarrow -\infty, f(x) \rightarrow$ _____.
 As $x \rightarrow \infty, f(x) \rightarrow$ _____.
 Equation: _____



- 4) Domain: _____
 Range: _____
 X-Intercept: _____
 Y-Intercept: _____
 Increasing: _____
 Decreasing: _____
 Constant: _____
 Slope: _____
 As $x \rightarrow -\infty, f(x) \rightarrow$ _____.
 As $x \rightarrow \infty, f(x) \rightarrow$ _____.
 Equation: _____



- 5) Domain: _____
 Range: _____
 X-Intercept: _____
 Y-Intercept: _____
 Increasing: _____
 Decreasing: _____
 Constant: _____
 Slope: _____
 As $x \rightarrow -\infty, f(x) \rightarrow$ _____.
 As $x \rightarrow \infty, f(x) \rightarrow$ _____.
 Equation: _____



6) Graph $y = 2x - 2$ and identify the characteristics.

Domain: _____

Range: _____

X-Intercept: _____

Y-Intercept: _____

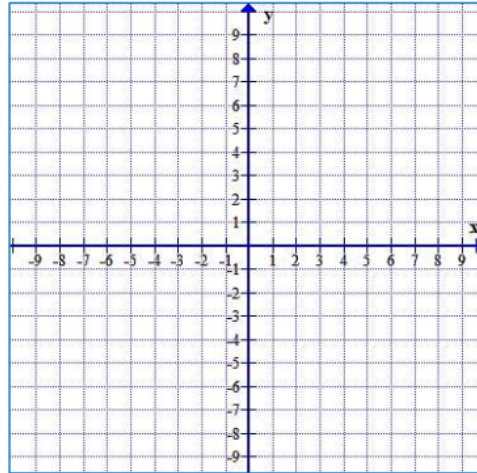
Increasing: _____

Decreasing: _____

Constant: _____

As $x \rightarrow -\infty, f(x) \rightarrow$ _____.

As $x \rightarrow \infty, f(x) \rightarrow$ _____.



7) Graph $f(x) = 3x - 6$ and identify the characteristics.

Domain: _____

Range: _____

X-Intercept: _____

Y-Intercept: _____

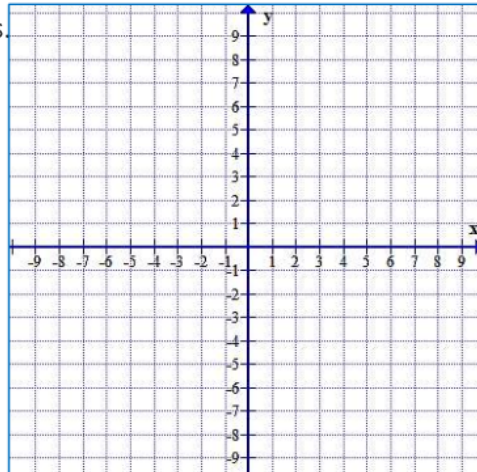
Increasing: _____

Decreasing: _____

Constant: _____

As $x \rightarrow -\infty, f(x) \rightarrow$ _____.

As $x \rightarrow \infty, f(x) \rightarrow$ _____.



8) Graph $f(x) = -x + 2$ and identify the characteristics.

Domain: _____

Range: _____

X-Intercept: _____

Y-Intercept: _____

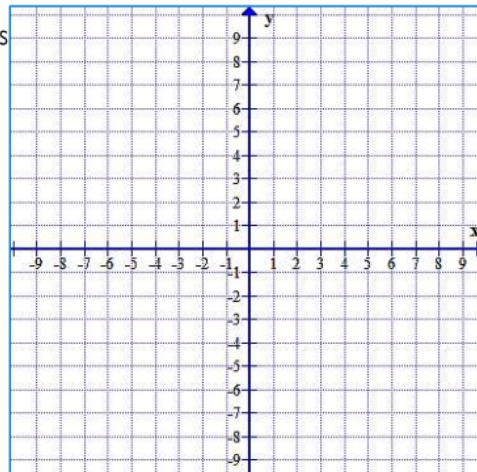
Increasing: _____

Decreasing: _____

Constant: _____

As $x \rightarrow -\infty, f(x) \rightarrow$ _____.

As $x \rightarrow \infty, f(x) \rightarrow$ _____.



9) Graph $y = -\frac{3}{4}x$ and identify the characteristics.

Domain: _____

Range: _____

X-Intercept: _____

Y-Intercept: _____

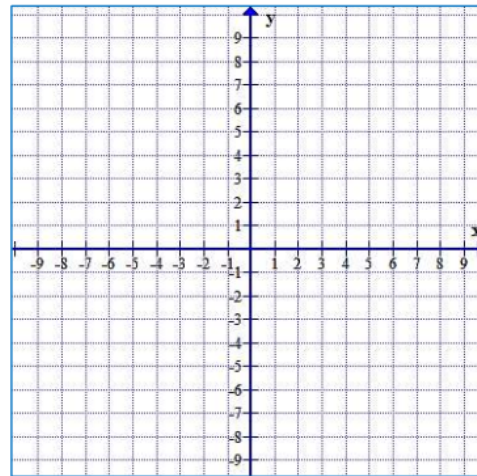
Increasing: _____

Decreasing: _____

Constant: _____

As $x \rightarrow -\infty, f(x) \rightarrow$ _____.

As $x \rightarrow \infty, f(x) \rightarrow$ _____.



10) Graph $f(x) = -\frac{1}{2}x + 4$ and identify the characteristics.

Domain: _____

Range: _____

X-Intercept: _____

Y-Intercept: _____

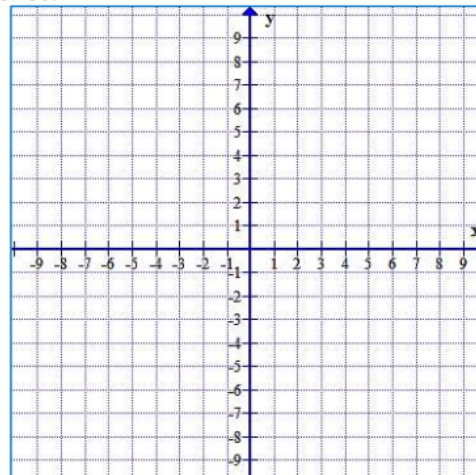
Increasing: _____

Decreasing: _____

Constant: _____

As $x \rightarrow -\infty, f(x) \rightarrow$ _____.

As $x \rightarrow \infty, f(x) \rightarrow$ _____.



8) Graph $f(x) = \frac{3}{2}x - 5$ and identify the characteristics.

Domain: _____

Range: _____

X-Intercept: _____

Y-Intercept: _____

Increasing: _____

Decreasing: _____

Constant: _____

As $x \rightarrow -\infty, f(x) \rightarrow$ _____.

As $x \rightarrow \infty, f(x) \rightarrow$ _____.

