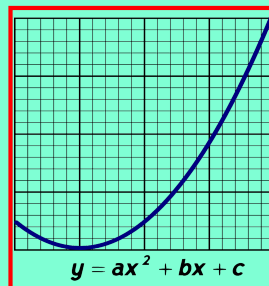


Math 125

Fall 2021

Lecture 6



Class QZ 4

$A(0, -6)$, $B(8, 0)$

1) Find slope $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - (-6)}{8 - 0} = \frac{6}{8} = \boxed{\frac{3}{4}}$

2) Find midpoint $M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) = M\left(\frac{0 + 8}{2}, \frac{-6 + 0}{2}\right)$
 $M(4, -3)$

3) Find distance

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} = \sqrt{(0 - 8)^2 + (-6 - 0)^2} = \sqrt{(-8)^2 + (-6)^2} = \sqrt{64 + 36} = \sqrt{100} = \boxed{10}$$

Graph

$$y - 5 = \frac{5}{4}(x + 4)$$

Point-Slope Form

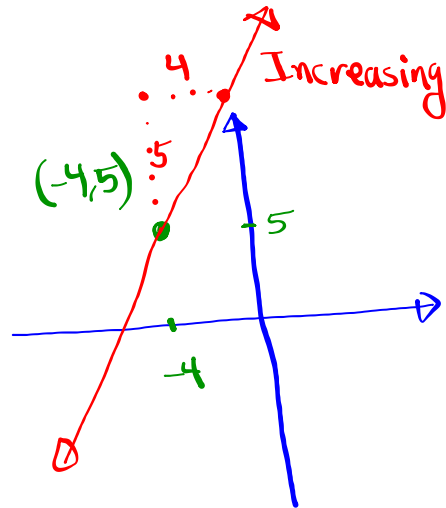
$$y - y_1 = m(x - x_1)$$

Point $(-4, 5)$

Rise

$$m = \frac{5}{4}$$

Run



Algebra Review

Solve $4(x - 3) + 8 = -2(x + 1) - 4$

$$4x - 12 + 8 = -2x - 2 - 4$$

$$4x - 4 = -2x - 6$$

$$4x + 2x = -6 + 4$$

$$6x = -2$$

$$x = \frac{-2}{6}$$

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

$$\left\{ \frac{-1}{3} \right\}$$

Solve & graph

$$-2 < 3x - 5 \leq 13$$

Add 5

$$-2 + 5 < 3x - 5 + 5 \leq 13 + 5$$

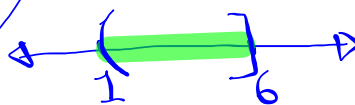
$$3 < 3x \leq 18$$

Divide by 3

$$\frac{3}{3} < \frac{3}{3}x \leq \frac{18}{3}$$

Hint: isolate x
in the middle.

$$\boxed{1 < x \leq 6}$$

Interval
notation $(1, 6]$

Solve and graph

$$-3 < -2x + 5 \leq 15$$

Subtract 5

$$-3 - 5 < -2x + 5 - 5 \leq 15 - 5$$

$$-8 < -2x \leq 10$$

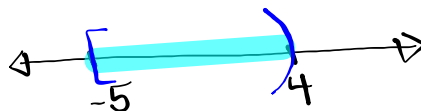
Divide by -2

$$\frac{-8}{-2} > \frac{-2}{-2}x \geq \frac{10}{-2}$$

Hint: Isolate x
in the middle

$$4 > x \geq -5$$

$$-5 \leq x < 4$$

Interval
Notation $[-5, 4)$

Simplify

$$1) (5x^4 - 6)(5x^4 + 6)$$

$$= 25x^8 + \cancel{30x^4} - \cancel{30x^4} - 36 = \boxed{25x^8 - 36}$$

Hint: Use
FOIL method

$$2) (3x^2 - 5)^2$$

$$= (3x^2 - 5)(3x^2 - 5)$$

$$= 9x^4 - 15x^2 - 15x^2 + 25$$

$$= \boxed{9x^4 - 30x^2 + 25}$$

Trinomial

Deg. 4

L.C. = 9

Const = 25

Binomial

Deg. 8

LC = 25

Const. = -36

Introduction to mathematical Functions:

Function is a formal that takes input value and returns an output value.

Input values \rightarrow Domain \rightarrow x-Values

output values \rightarrow Range \rightarrow y-Values

No input value can have more than one output value.

Function Notation

$$y = f(x) = \text{~~~~~}$$

\uparrow \uparrow
 output input

$$f(x) = \frac{x+6}{x-3}$$

$\frac{\text{Zero}}{\text{NonZero}} = \text{Zero}$

$$f(0) = \frac{0+6}{0-3} = \frac{6}{-3} = \boxed{-2}$$

$\frac{\text{NonZero}}{\text{Zero}} = \text{undefined}$

$$f(-6) = \frac{-6+6}{-6-3} = \frac{0}{-9} = \boxed{0}$$

$$f(3) = \frac{3+6}{3-3} = \frac{9}{0} \quad \boxed{\text{undefined}}$$

Some Special Functions

$f(x) = b$ Constant Function $y = b$
Horizontal line

$f(x) = mx + b$ Linear Function $y = mx + b$
Slant line

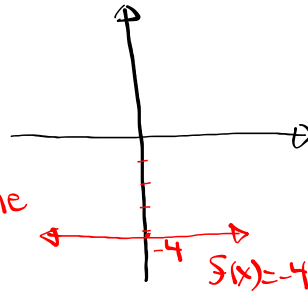
ex: $f(x) = 5 \Rightarrow y = 5$

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

Graph $f(x) = -4$

$$\hookrightarrow y = -4$$

Horizontal line



$$f(x) = \frac{3}{4}x - 3$$

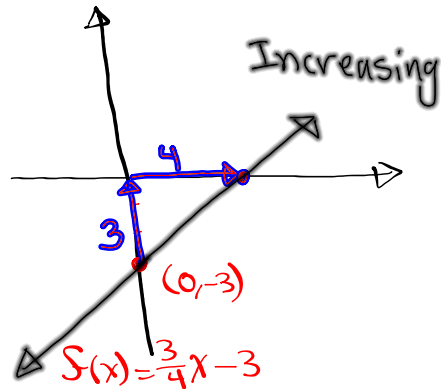
$$\hookrightarrow y = \frac{3}{4}x - 3$$

Slope-Int Form

$$m = \frac{3}{4} \text{ Rise}$$

$$\text{Run}$$

$$y\text{-Int } (0, -3)$$



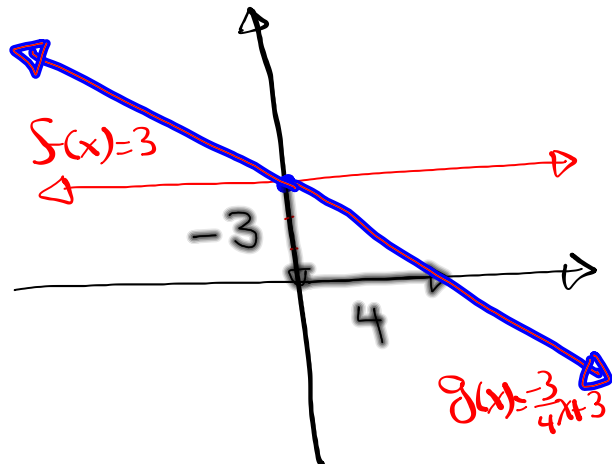
Graph $\rightarrow y = 3$

$$f(x) = 3$$

$$g(x) = -\frac{3}{4}x + 3$$

$$\hookrightarrow y = -\frac{3}{4}x + 3$$

$$y = mx + b$$



Graph

$$f(x) = -2 \rightarrow y = -2$$

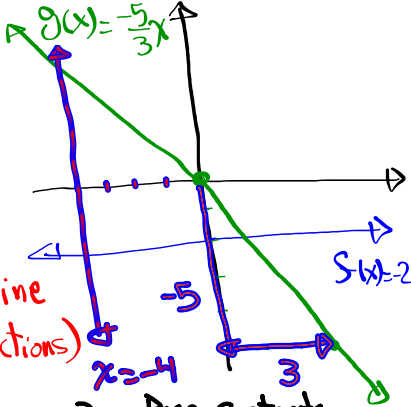
$$g(x) = -\frac{5}{3}x \rightarrow y = -\frac{5}{3}x$$

$$x = -4 \rightarrow x = -4$$

Vertical line

(Not Functions)

WORK on
SG 1 & SG 2

- 
- 1) Page-Per-Page contents
 - 2) one file only
 - 3) Pages must be in order
 - 4) portrait style
 - 5) Final Ans in designated area

$$A(-3, -2) \quad B(5, 8)$$

1) Draw \overline{AB}

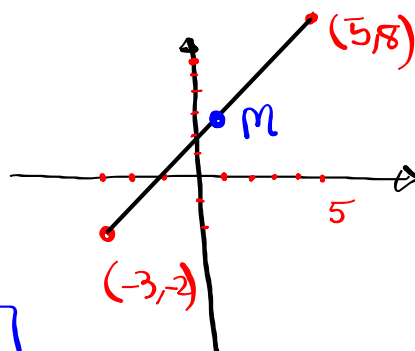
$$m = \frac{-2 - 8}{-3 - 5} = \frac{-10}{-8} = \frac{5}{4}$$

2) Slope

$$d = \sqrt{(-3 - 5)^2 + (-2 - 8)^2}$$

4) distance

$$= \sqrt{(-8)^2 + (-10)^2} = \sqrt{164} \approx \boxed{12.806}$$



3) Midpoint

$$M\left(\frac{-3+5}{2}, \frac{-2+8}{2}\right) = M(1, 3)$$

Graph

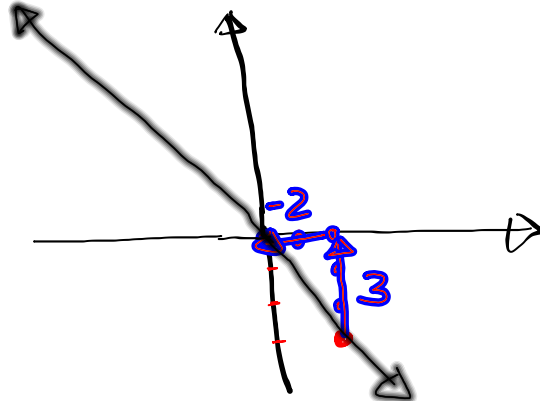
Point-Slope Form

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

Point (2, -3)

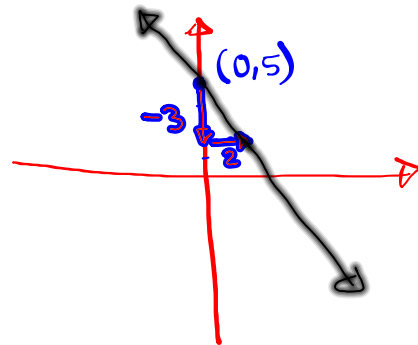
$$\text{slope } \frac{-3}{2} = \frac{3}{-2}$$

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



Class QZ 5

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



2) Solve & Graph.

$$2x - 8 < 4x + 6$$

$$2x - 4x < 6 + 8$$

$$-2x < 14$$

$$\frac{-2x}{-2} > \frac{14}{-2}$$

$$\boxed{x > -7}$$

