Math 245

Spring 2022

Lecture 4

as $x \to -\infty$
$f(x) \to \infty$

as $x \to \infty$
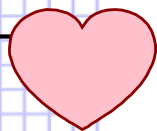$f(x) \to -\infty$
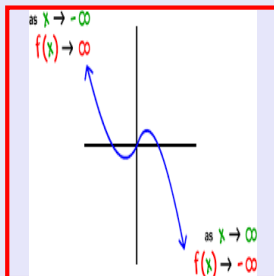
Consider the points $A(x_1, y_1)$ and $B(x_2, y_2)$

Run

Rise

B

M

A
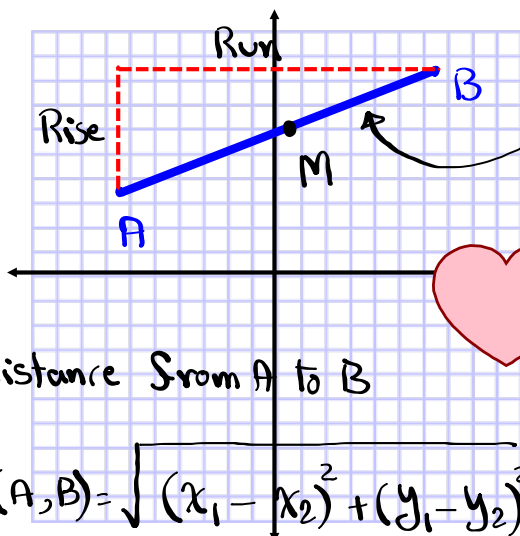
$\overline{AB} \Rightarrow$ line Segment AB

Midpoint

$M\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$

distance from A to B

$d(A,B) = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

Slope

$m = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{Rise}{Run}$

Consider $A(2,4)$ and $B(8,10)$

1) Draw $\overline{AB}$ ✓

2) Find its midpoint ✓

$M\left(\dfrac{2+8}{2}, \dfrac{4+10}{2}\right)$

$= M(5,7)$

3) Find its slope $\quad m = \dfrac{10-4}{8-2} = \dfrac{4-10}{2-8} = \dfrac{-6}{-6} = 1$ ✓

4) Find $d(A,B)$
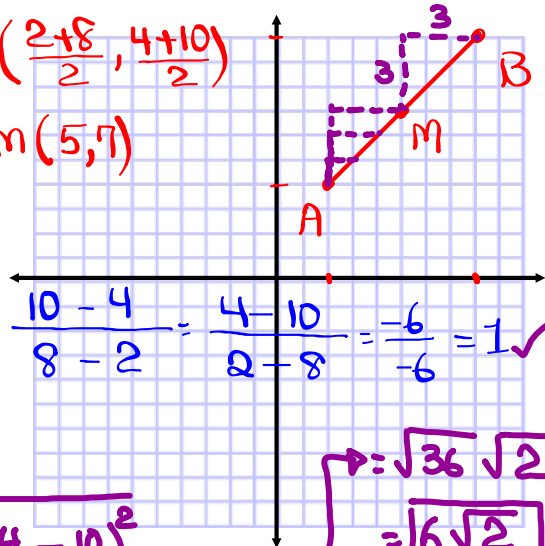
$d(A,B) = \sqrt{(2-8)^2 + (4-10)^2}$

$= \sqrt{(-6)^2 + (-6)^2} = \sqrt{36+36} = \sqrt{72}$

$= \sqrt{36}\sqrt{2}$

$= 6\sqrt{2}$

≈ 8.5

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

1) Draw $\overline{AB}$

$M\left(\dfrac{-6+0}{2}, \dfrac{0+8}{2}\right)$

$= M(-3,4)$

2) Find its midpoint and plot it.

3) Find its slope, show rise and run.

$m = \dfrac{0-8}{-6-0} = \dfrac{-8}{-6} = \dfrac{4}{3}$ ← Rise
                                          ← Run

4) Find $d(A,B) = \sqrt{(-6-0)^2 + (0-8)^2}$

$= \sqrt{(-6)^2 + (-8)^2} = \sqrt{36+64} = \sqrt{100} = 10$
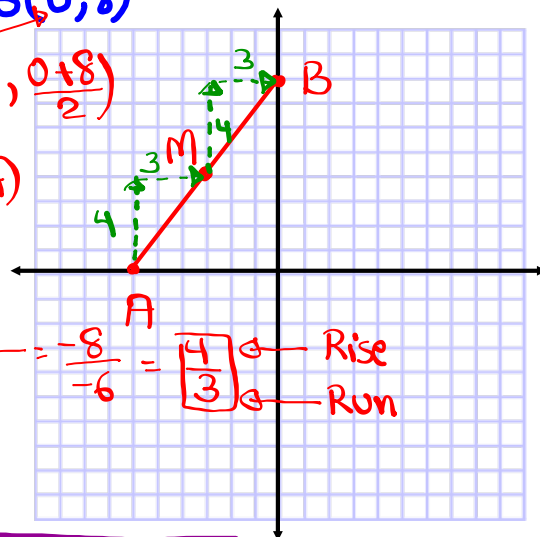
Equation of a line in standard form
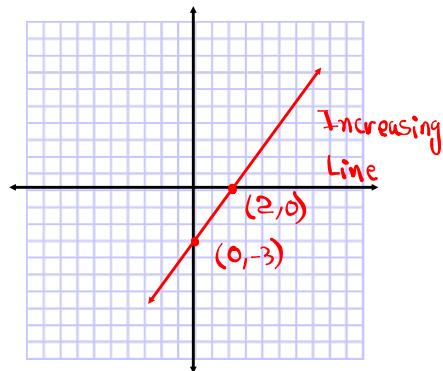$$Ax + By = C$$
$$3x - 2y = 6$$

Draw by intercept method:

x	y
0	-3
2	0

$3(0) - 2y = 6 \qquad -2y = 6 \qquad y = -3$

$3x - 2(0) = 6 \qquad 3x = 6 \qquad x = 2$

Increasing Line

(2,0)

(0,-3)

Draw $4x + 3y = -12$ by intercept method:

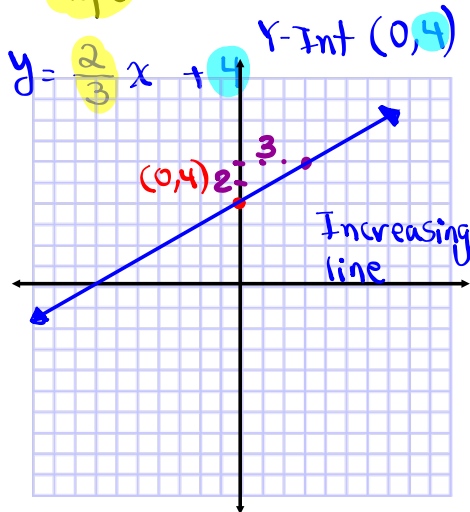| x	y
0	-4
-3	0

(-3,0)

(0,-4)

Decreasing line
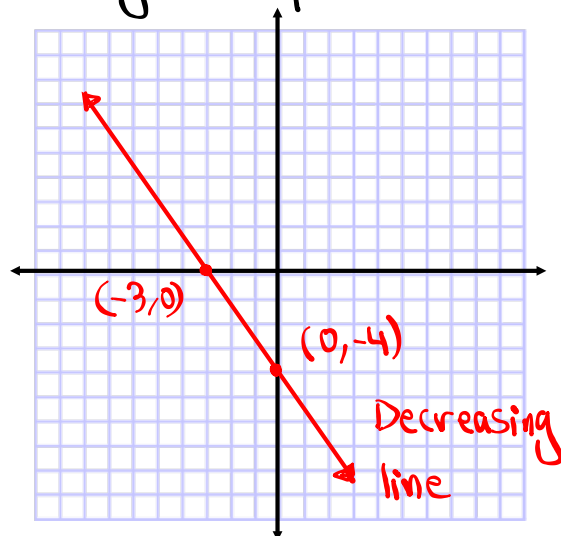
Drawing line in Slope-Int. Form:

$$y = mx + b$$

Slope

Y-Int (0, b)

$$y = \frac{2}{3}x + 4$$ Y-Int (0, 4)

1) Plot Y-Int.

2) Use slope to find a second point

3) Draw

(0,4)   Increasing line

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

1) Y-Int (0,3)

2) $m = \frac{-3}{4}$ ← Rise

(0,3)

Decreasing line
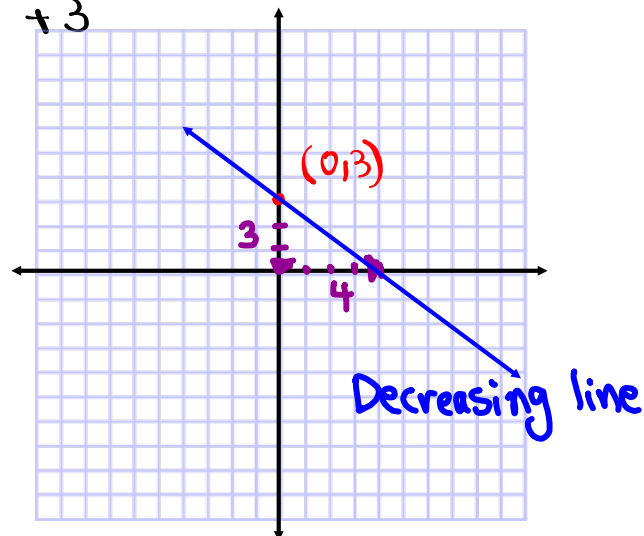
Class Qz 2

Solve and graph $2x + 10 \geq 5x - 5$

$2x - 5x \geq -5 - 10$

$-3x \geq -15$

$\dfrac{-3}{-3}x \leq \dfrac{-15}{-3}$

$\boxed{x \leq 5}$