Math 115

Summer 2017

Lecture 7

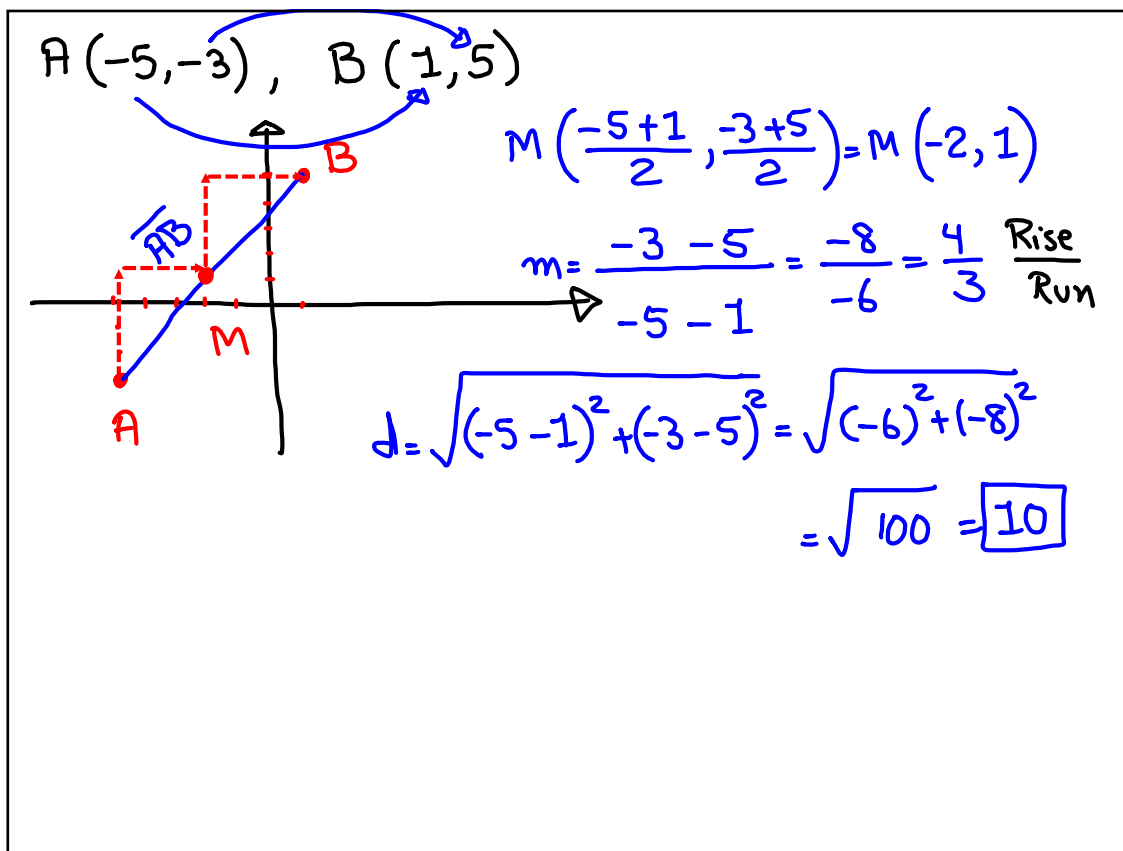$\sqrt{xy}$

$A(x_1, y_1)$ & $B(x_2, y_2)$

$\overline{AB}$

A ● B

A $\overleftrightarrow{AB}$ B
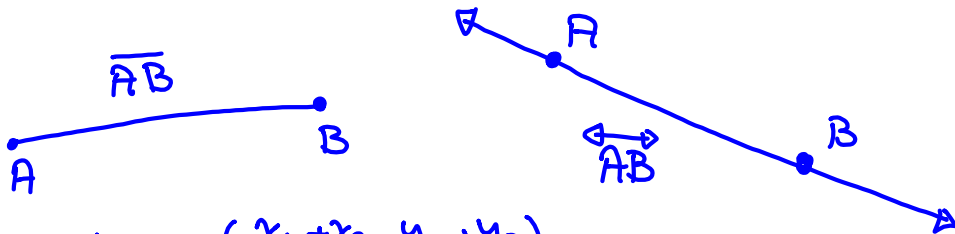
Midpoint $M\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$

Slope $\quad m = \dfrac{y_1 - y_2}{x_1 - x_2}$, distance

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

$A(-5,-3), \quad B(1,5)$

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

$m = \dfrac{-3-5}{-5-1} = \dfrac{-8}{-6} = \dfrac{4}{3} \quad \dfrac{\text{Rise}}{\text{Run}}$

$d = \sqrt{(-5-1)^2 + (-3-5)^2} = \sqrt{(-6)^2 + (-8)^2}$

$= \sqrt{100} = \boxed{10}$

B

$\overline{AB}$

M

A

Vertical line $\Longleftrightarrow x = a \Longleftrightarrow$ No slope

Horizontal line $\Longleftrightarrow y = b \Longrightarrow$ Zero slope

Graph $x = 6$ & $y = -4$, Identify slope for each line.

$x = 6$
No slope
or
undefined
slope

$y = -4$
Zero slope
$m = 0$

$(6, -4)$
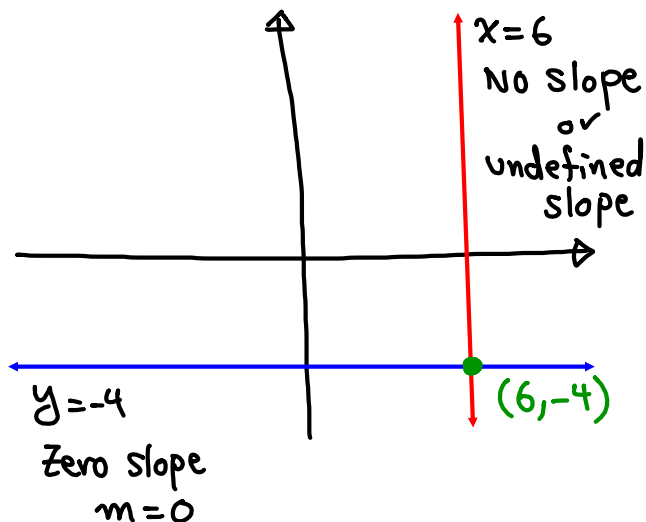
Slant line

1) Standard form $Ax + By = C$

use intercept method to graph

x	y
0	
	0

$5x - 3y = -15$

x	y
0	5
-3	0

This is the best method when C is divisible by both A and B.

$m = \dfrac{5}{3}$

3

(0,5)

5

(-3,0)
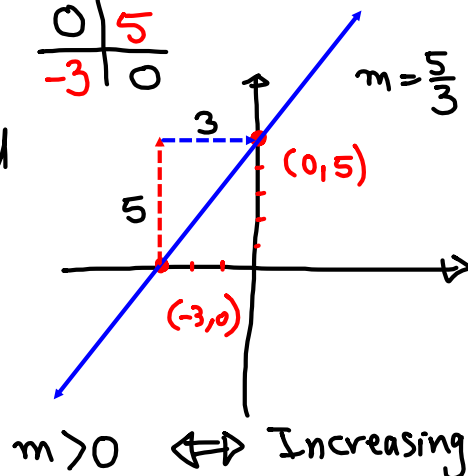
$m > 0 \iff$ Increasing

$4x + 3y = -12$

Graph using the intercept method find its slope, Show rise & run of slope on the graph.

x	y
0	-4
-3	0

Decreasing line
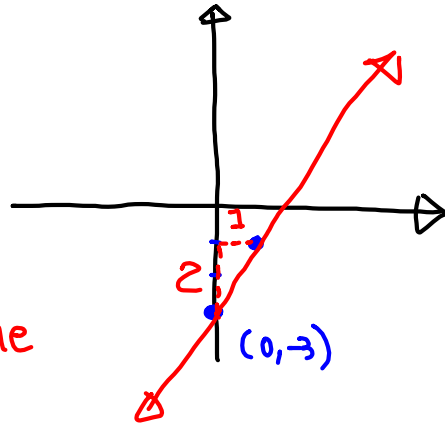
$m < 0$

(-3,0)

$m = \dfrac{-4}{3}$

Rise -4

(0,-4)

3

Run
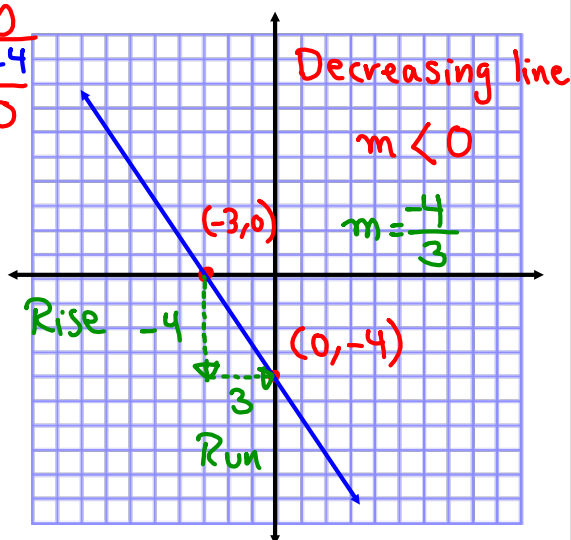
Slant line

Slope –Int. form $y = mx + b$

Y-Int $(0, b)$, Slope m

$y = 2x - 3$
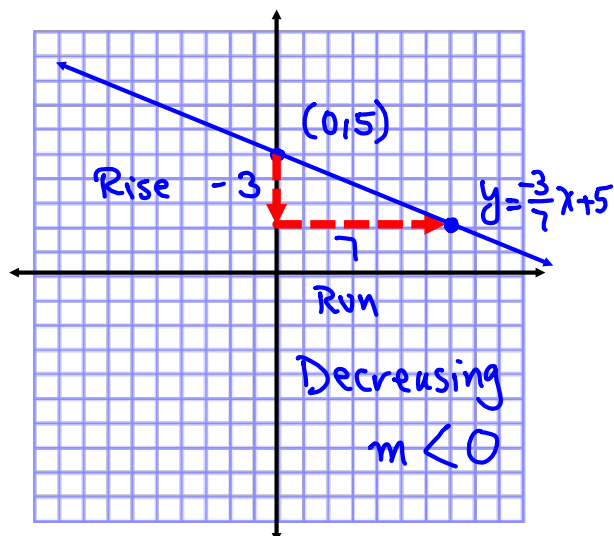
Y-Int $(0, -3)$, $m = 2 = \frac{2}{1}$

$m > 0 \iff$ Increasing line

(0,-3)

$y = \boxed{\frac{-3}{7}} x + 5$

1) Y-Int $(0, 5)$

2) Slope $m = \frac{-3}{7}$

3) Graph

4) Discuss Rise, Run, Increasing, decreasing

(0,5)

Rise -3

Run 7

$y = \frac{-3}{7} x + 5$

Decreasing

$m < 0$

$2x + 5y = -15$ $5y = -2x - 15$

1) write in slope-Int. Form $y = \frac{-2}{5}x - \frac{15}{5}$
           $y = mx + b$

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

2) Y-Int & slope
   $(0, -3)$ $m = \frac{-2}{5}$

3) Draw, Discuss rise & run,

        Discuss Increasing/Decreasing

   $m < 0$ Decreasing line

Rise -2

5

Run
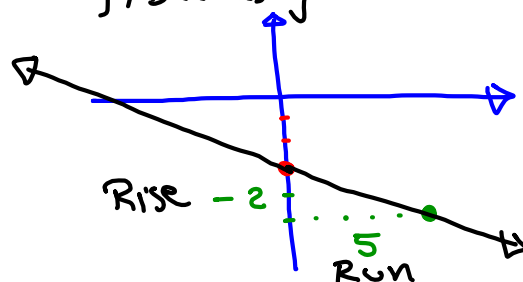
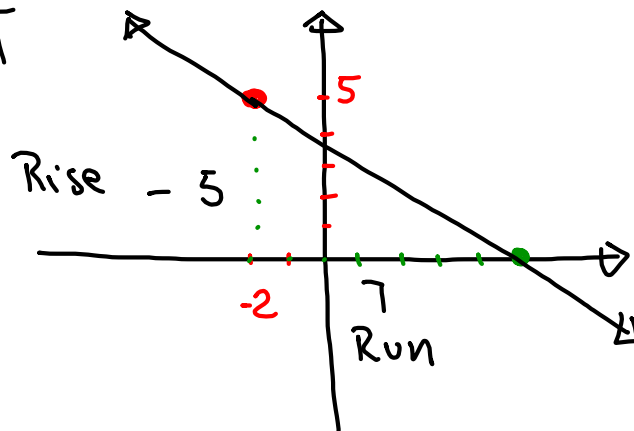Draw a line that contains $(-2, 5)$

with slope $\frac{2}{3}$

   Increasing

Run

3

Rise 2

5

-2
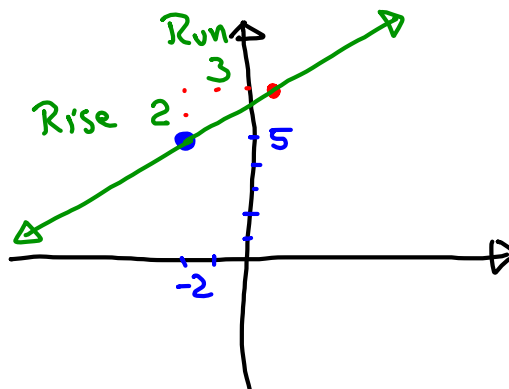
Draw a line that contains (-2,5)
with slope $\frac{-5}{7}$

m < 0

Decreasing

Rise - 5

-5

-2

7

Run

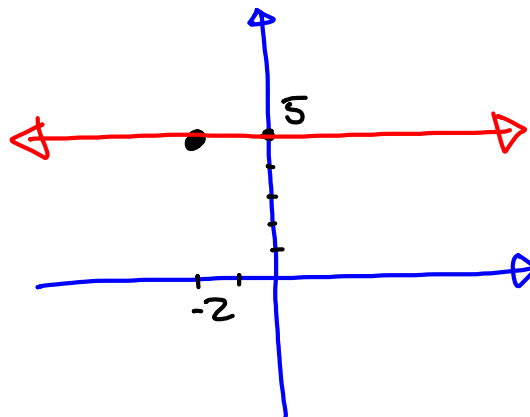
Draw a line that contains (-2,5)
with slope Zero.

m = 0

Horizontal
line

5

-2

Draw a line that contains (-2,5)

with   slope undefined

$\underbrace{}$

No slope

$\underbrace{}$

Vertical line

- 5

- 2
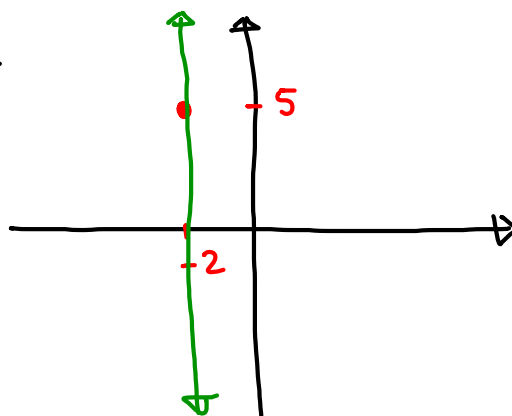
Draw $y=5$, $x=-8$, $2x+3y=6$, and

$y=\frac{2}{3}x-2$. Shade the region that is enclosed

by all 4 lines.
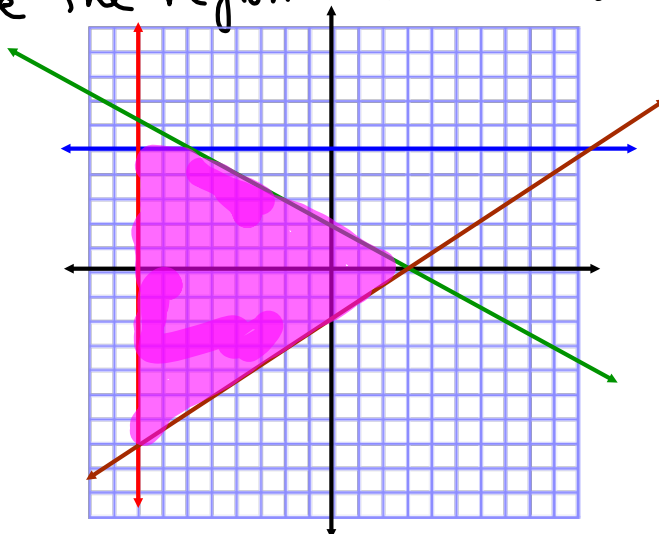
Graphing Point-slope form of a line

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

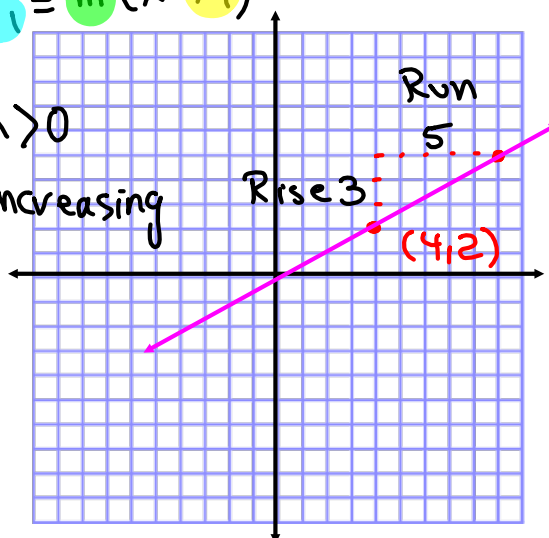$$y - 2 = \frac{3}{5}(x - 4)$$

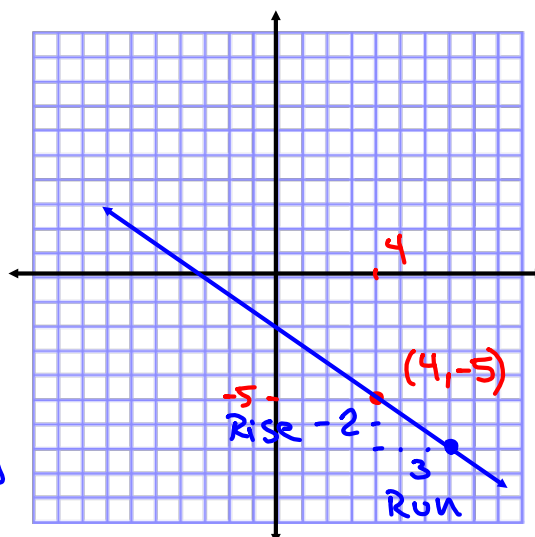Point $(4, 2)$

Slope $m = \frac{3}{5}$

$m > 0$

Increasing

Run 5

Rise 3

$(4, 2)$

$$y + 5 = \frac{-2}{3}(x - 4)$$

Point $(4, -5)$

$m = \frac{-2}{3}$

$m < 0$

Decreasing

4

$(4, -5)$

-5

Rise -2

3

Run

$$y - 2 = \frac{1}{4}(x + 5)$$

Point $(-5, 2)$

$m = \frac{1}{4}$

$m > 0$

Increasing

Run
4

Rise 1

.2

-5
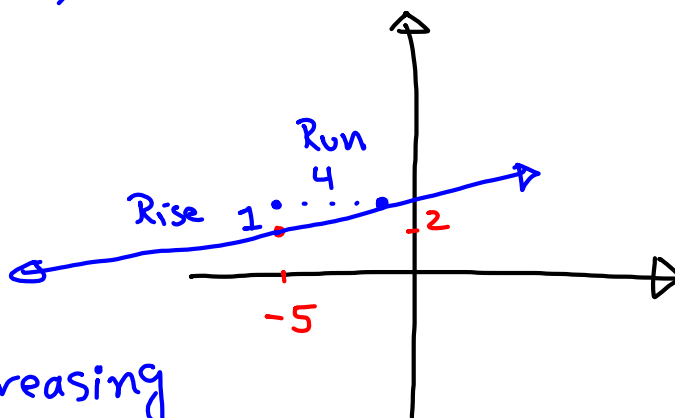
SG 8 is due tomorrow @ 6:00 AM.

Graphing linear inequalities

$x <$ left ⎫
            ⎬ Broken
$x >$ Right ⎭   ⎫ Vertical lines

$x \geq$ Right ⎫
              ⎬ Solid
$x \leq$ left ⎭

$y <$ below ⎫
            ⎬ Broken
$y >$ above ⎭   ⎫ Horizont -al

$y \geq$ above ⎫
               ⎬ Solid
$y \leq$ below ⎭

$y < mx + b$ Below $y \leq mx + b$

$y > mx + b$ Above $y \geq mx + b$

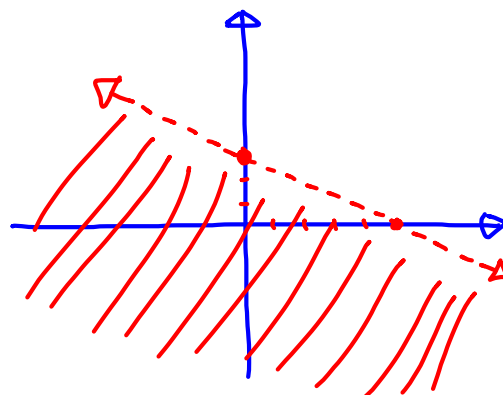Broken   Slant lines   Solid

Graph & Shade

$x < 3$

$y \geq -3$
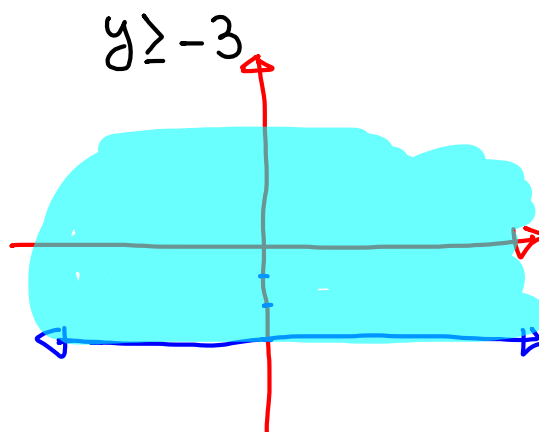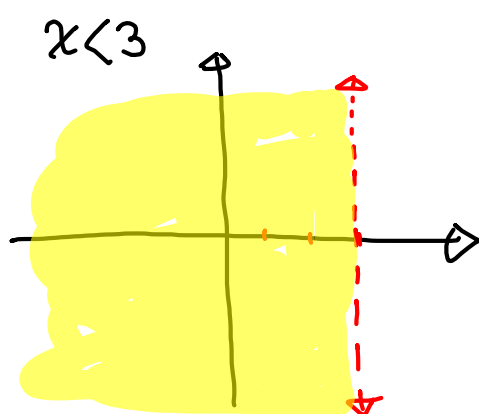
$y \geq \frac{2}{3}x - 4$
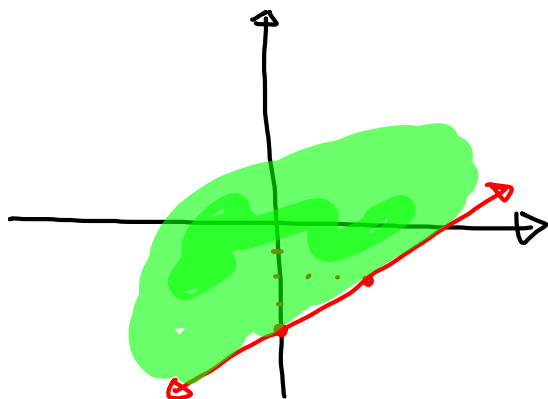
$y < \frac{-3}{5}x + 3$

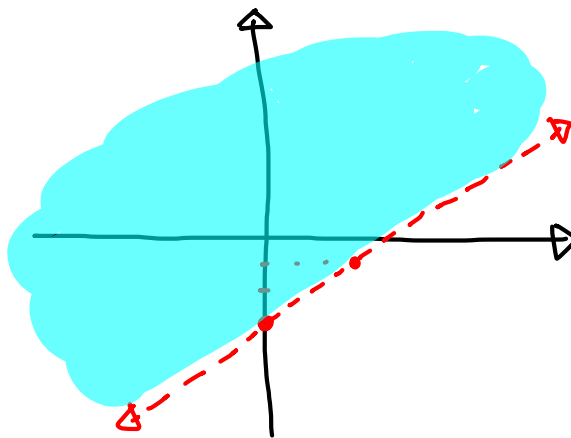Graph & Shade:

$2x - 3y < 9$

$-3y \boxed{<} -2x + 9$

Divide by -3
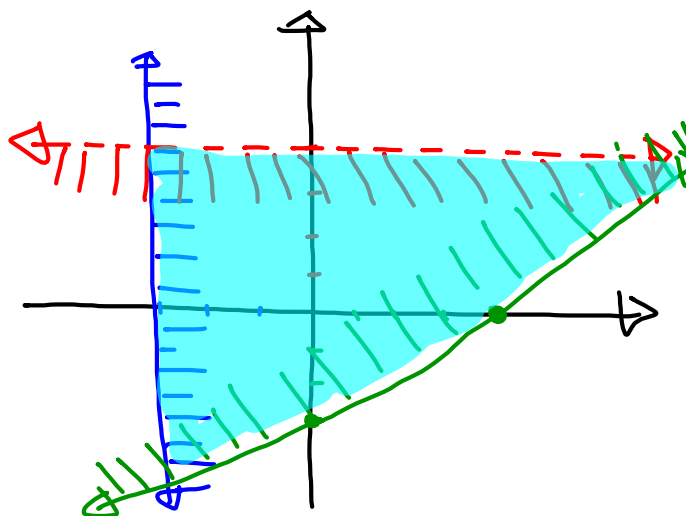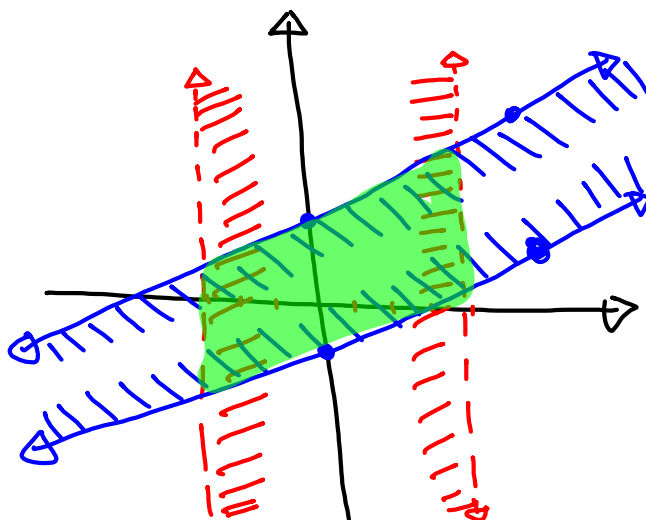
$y > \dfrac{-2}{-3}x + \dfrac{9}{-3}$

$y > \dfrac{2}{3}x - 3$

Hint: write in
Slope-Int. Form
"Isolate Y"

Graph & Shade

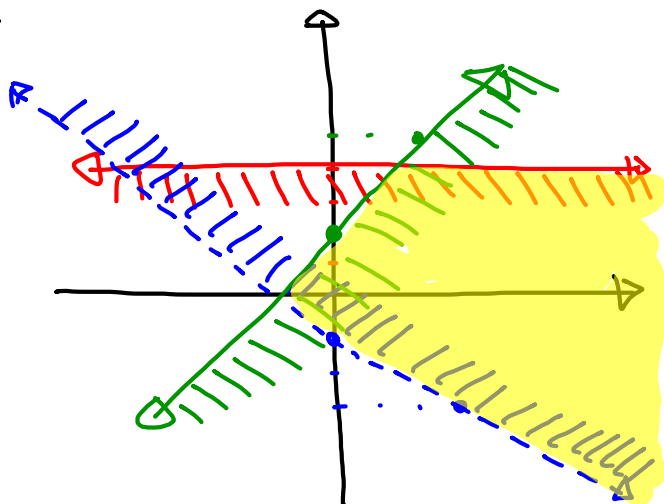$\begin{cases} x \geq -3 \\ y < 4 \\ y \geq \dfrac{3}{4}x - 3 \end{cases}$

$$\begin{cases} x < 4 \\ x > -3 \\ y \geq \frac{3}{5}x - 1 \\ y \leq \frac{3}{5}x + 3 \end{cases}$$

Graph & Shade

$$\begin{cases} y \leq 4 \\ y > \frac{-2}{3}x - 1 \\ y \leq \frac{3}{2}x + 2 \end{cases}$$

Due Tomorrow: SG 8

Work on last page of SG 9 & 10.

Find an angle such that the sum of four times the angle and 3 times its supplement is 565°.

Angle	Comp.	Suppl.
x	$90-x$	$180-x$

$4x + 3(180 - x) = 565$

$\vdots$

$x = 25$

$25°$

Find an angle such that the difference between 5 times its supplement and twice its complement is equal to 630°.

Angle	Comp.	Suppl.
x	$90-x$	$180-x$

$5 \cdot \text{Suppl.} - 2 \cdot \text{Comp.} = 630°$
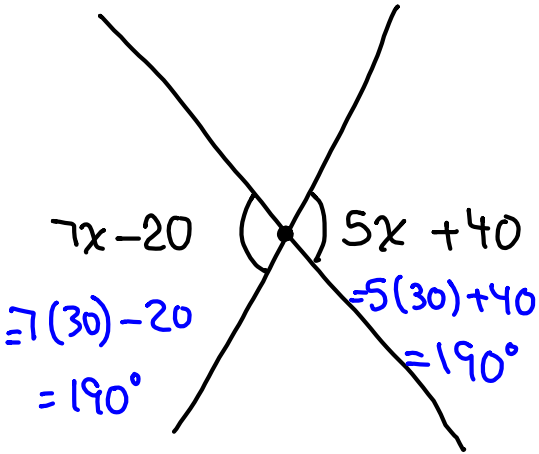
$5(180 - x) - 2(90 - x) = 630°$

$900 - 5x - 180 + 2x = 630$

$-3x + 720 = 630$

$-3x = 630 - 720$

$-3x = -90$

$x = 30$

$30°$

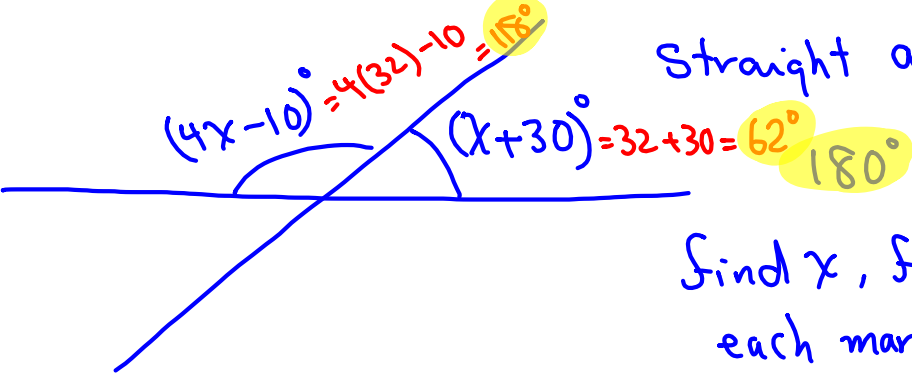Vertical Angles are equal

find x, and measure of each angle.

$7x - 20$

$= 7(30) - 20$

$= 190°$

$5x + 40$

$= 5(30) + 40$

$= 190°$

$7x - 20 = 5x + 40$

$\vdots$

$x = 30$

$(4x - 10)° = 4(32) - 10 = 118°$

$(x + 30)° = 32 + 30 = 62°$

Straight angle

$180°$

find x, find each marked angle.

$4x - 10 + x + 30 = 180$

$5x = 160$

$x = 32$

Due Tomorrow

SG 8

WP : Angles & Triangles