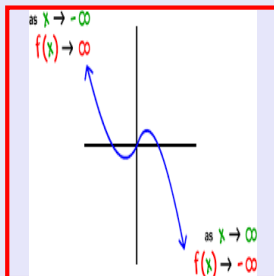


Math 245
Spring 2022
Lecture 10



Graph inequalities in two variables in rectangular coordinate system:

$y < mx + b$	$y > mx + b$
$y \leq mx + b$	$y \geq mx + b$

Slope-Int Form
 Dotted lines
 Solid lines

Shade below Shade above

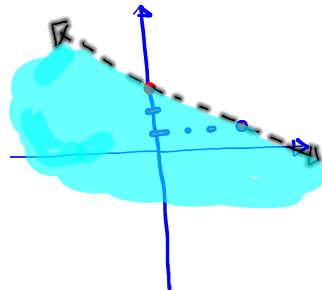
Graph and shade

$$2x + 3y < 9$$

$$3y < -2x + 9$$

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

$y < -\frac{2}{3}x + 3$
 dotted line, shade below
 Y-Int (0,3)
 $m = -\frac{2}{3}$



Graph and shade

$$4x - 3y \leq 15$$

write in slope-Int form

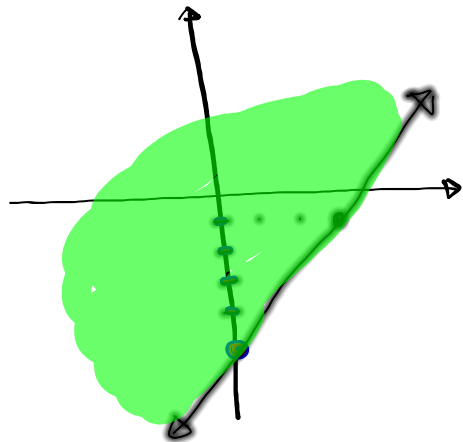
$$-3y \leq -4x + 15$$

$$\frac{-3}{-3} y \geq \frac{-4}{-3} x + \frac{15}{-3}$$

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

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

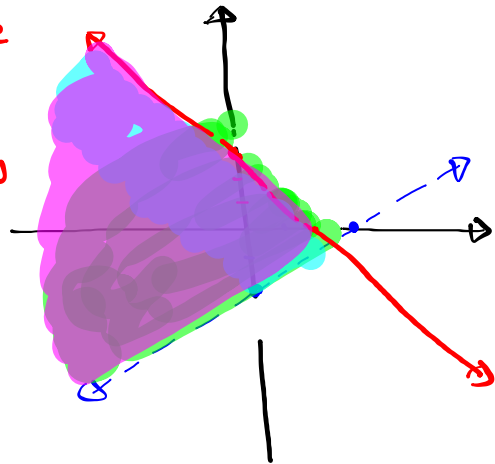
Solid line, shade above

Y-Int (0, -5), $m = \frac{4}{3}$ 

Graph and shade:

$$\left\{ \begin{array}{l} y > \frac{2}{3} x - 2 \text{ Dotted, above} \\ y \leq \frac{-3}{2} x + 3 \text{ Solid, below} \end{array} \right.$$

$$\left\{ \begin{array}{l} y > \frac{2}{3} x - 2 \text{ Dotted, above} \\ y \leq \frac{-3}{2} x + 3 \text{ Solid, below} \end{array} \right.$$

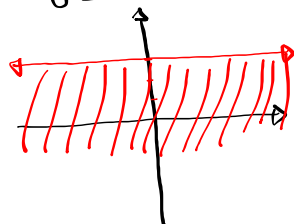


what about vertical lines and Horizontal lines?

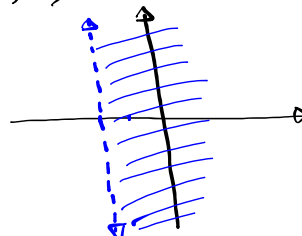
$x < a$	$x \leq a$	shade left
$x > a$	$x \geq a$	shade right
Dotted	Solid	
$y < b$	$y \leq b$	Shade below
$y > b$	$y \geq b$	Shade above

Graph and Shade

1) $y \leq 3$

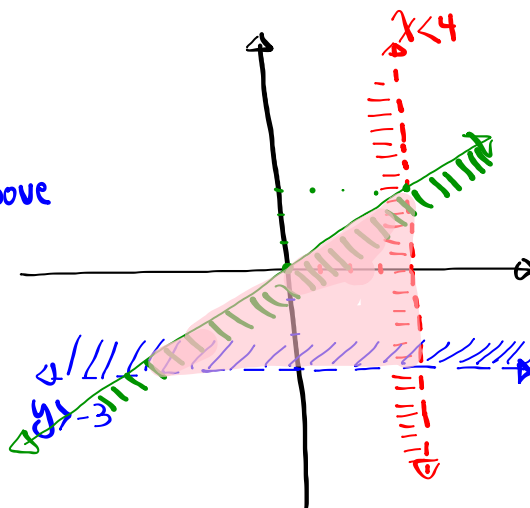


2) $x > -2$

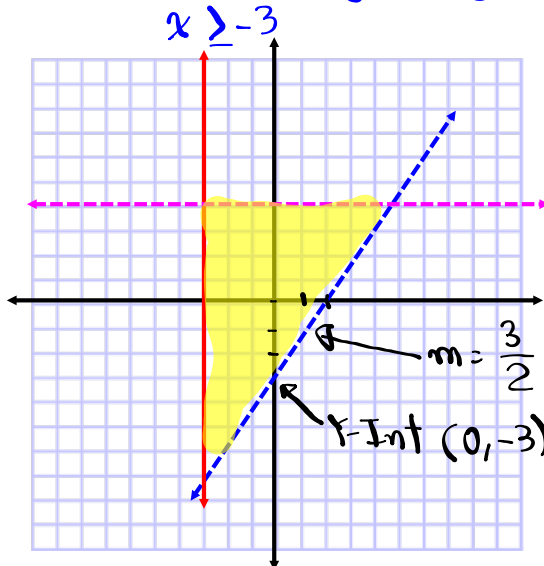


Graph and Shade

$$\left\{ \begin{array}{l} x < 4 \\ y > -3 \\ y \leq \frac{3}{4}x \end{array} \right. \begin{array}{l} \text{V.L., Dotted, left} \\ \text{H.L., Dotted, above} \\ \text{Slant line,} \\ \text{Y-Int (0,0)} \\ m = \frac{3}{4} \\ \text{Solid, below} \end{array}$$



Consider the region given below:



$$\begin{cases} y < 4 \\ x \geq -3 \\ y > \frac{3}{2}x - 3 \end{cases}$$

$$\Rightarrow y > \frac{3}{2}x - 3$$

Solving inequalities with polynomials:

Solve $x^2 - x - 12 < 0$

$(x-4)(x+3) < 0$ → - Sign

$x-4=0$ $x+3=0$

$x=4$ $x=-3$

Sign chart

x	$-\infty$	-3	4	∞
$x+3$	-	o	+	+
$x-4$	-	-	o	+
Problem	+	-	+	+



$-3 < x < 4$

I.N. $(-3, 4)$

S.B.N.

$\{x \mid -3 < x < 4\}$

Please work on SG 4 & Submit
 " " " SG 5 as well.

Class QZ 4

Given $(x-3)^2 + y^2 = 9$

1) Center $(3,0)$

2) Radius 3

3) Draw $[0,6]$ $[-3,3]$

4) Domain \in Range in interval notation.

