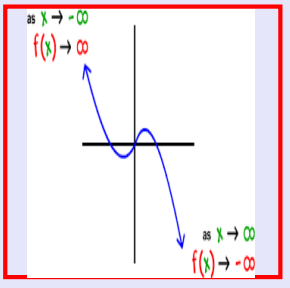
Math 245

Spring 2022

Lecture 11



Class QZ 4

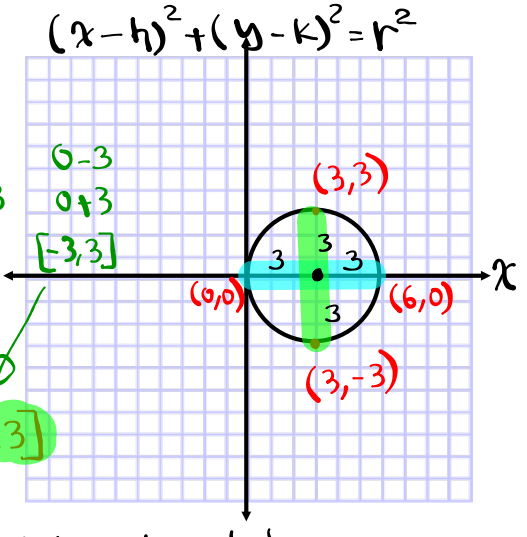
Given $(x-3)^2+y^2=9$

$(x-h)^2+(y-k)^2=r^2$

1) Center (3,0)

2) Radius 3

3) Draw



0-3, 0+3

[-3,3]

3-3, 3+3

[0,6]

4) Domain & Range in interval notation.

[0,6]

[-3,3]

Graph & shade

$2x - 5y > 15$

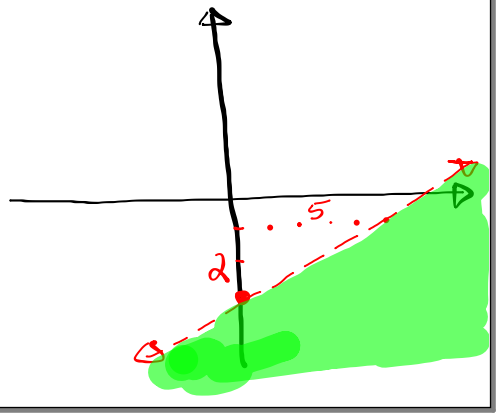
Write this in Slope-Int. Form

$-5y > -2x + 15$

$\frac{-5}{-5}y < \frac{-2}{-5}x + \frac{15}{-5}$

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

Slant line, dotted line, shade below

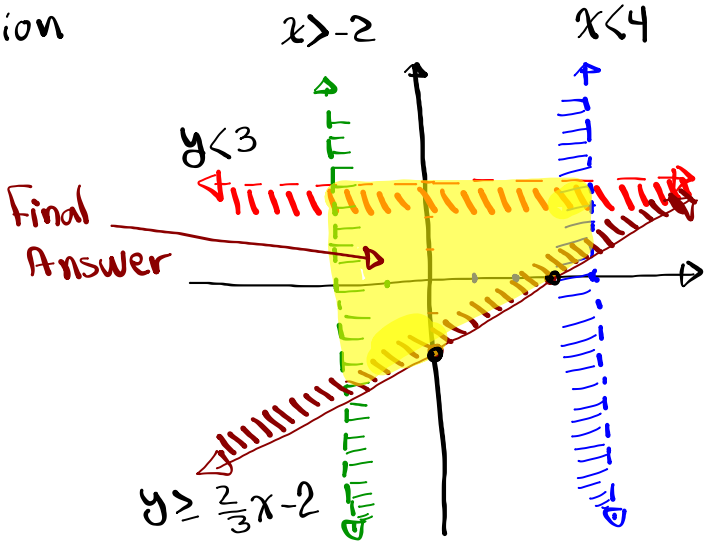


Y-Int $(0,-3)$

$m = \frac{2}{5}$

Shade the Solution

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



Solve $(x-3)(x+3)(x-6) \leq 0$ — $\leq$ Signs $\Rightarrow$ closed Circle.

Always make sure that one side is Zero, and other side is fully factored.

Set each factor $= 0$, and solve

$x-3=0$ $\quad x+3=0$ $\quad x-6=0$

$x=3$ $\quad x=-3$ $\quad x=6$

x	$-\infty$	-3	3	6	∞
$x+3$	$-$	0	$+$	$+$	$+$
$x-3$	$-$	$-$	0	$+$	$+$
$x-6$	$-$	$-$	$-$	0	$+$
Problem	$-$	$+$	$-$	$+$	

I.N. $(-\infty, -3] \cup [3, 6]$

Graph: -3, 3, 6

S.B.N. $\{x \mid x \leq -3 \text{ OR } 3 \leq x \leq 6\}$

Solve $\dfrac{x-5}{(x-2)(x+2)} > 0$ — $>$ Signs; Not equal $\Rightarrow$ open Circle

One side is Zero, other side is a Single Fraction in Factored Form.

Set each factor $= 0$, Solve

$x-5=0$ $\quad x-2=0$ $\quad x+2=0$

$x=5$ $\quad x=2$ $\quad x=-2$

x	$-\infty$	-2	2	5	∞
$x+2$	$-$	0	$+$	$+$	$+$
$x-2$	$-$	$-$	0	$+$	$+$
$x-5$	$-$	$-$	$-$	0	$+$
Problem	$-$	$+$	$-$	$+$	

I.N. $(-2, 2) \cup (5, \infty)$

Graph: -2, 2, 5

S.B.N. $\{x \mid -2 < x < 2 \text{ OR } x > 5\}$

Solve $x^2 - 12 > x$

1) Make RHS = 0 $\quad x^2 - 12 - x > 0$ — open Circles, + Signs

2) Factor LHS Completely $\quad x^2 - x - 12 > 0$

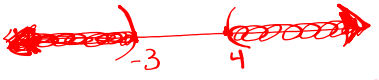
$(x-4)(x+3) > 0$

3) Set each Factor = 0, Solve $\quad x-4=0 \quad x=4 \qquad x+3=0 \quad x=-3$

4) Make Sign Chart

x	$-\infty$		-3		4		∞
$x+3$	$-$		0	$+$		$+$	
$x-4$	$-$			$-$	0	$+$	
Problem	$+$			$-$		$+$	

I.N. $(-\infty, -3) \cup (4, \infty)$

Graph 

S.B.N. $\{x \mid x < -3 \text{ OR } x > 4\}$

Review of Factoring:

1) $2x^2 + 5x - 7$

$= (x-1)(2x+7)$

2) $x^2(3x-5) - 25(3x-5)$

$= (3x-5)(x^2-25) = (3x-5)(x+5)(x-5)$

3) $x^3 - 1000 =$

$x^3 - 10^3 =$

$(x-10)(x^2+10x+100)$

4) $8x^3 + 1$

$= (2x)^3 + 1^3$

$= (2x+1)(4x^2-2x+1)$

$A^3 - B^3 = (A-B)(A^2+AB+B^2)$ $\quad A^3 + B^3 = (A+B)(A^2-AB+B^2)$