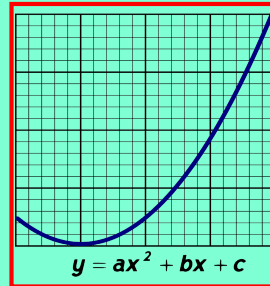


Math 125  
Fall 2021  
Lecture 21



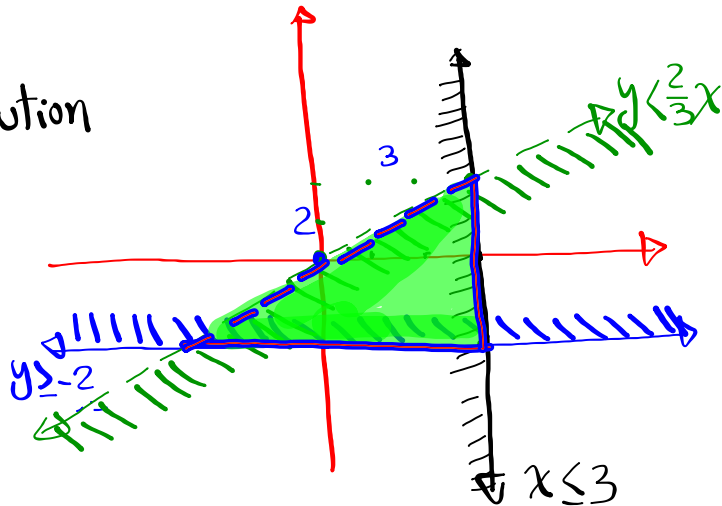
Class QZ 16

shade the solution

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

Y-Int (0,0)

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



Solve

$$\frac{x}{3} - \frac{3}{4} - 1 > \frac{x}{2}$$

Hint: Use LCD  
to clear fractions

LCD = 12

$$\overset{4}{12} \cdot \frac{x}{\cancel{3}} - \overset{3}{12} \cdot \frac{3}{\cancel{4}} - 12 \cdot 1 > \overset{6}{12} \cdot \frac{x}{\cancel{2}}$$

$$4x - 9 - 12 > 6x$$

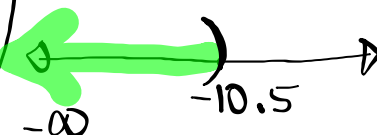
$$4x - 6x > 9 + 12$$

$$-2x > 21$$

Divide by -2

$$\frac{-2}{-2}x < \frac{21}{-2}$$

$$x < -10.5$$

I.N.  $(-\infty, -10.5)$ S.B.N.  $\{x \mid x < -10.5\}$ 

Solve

$$-2 \leq -4x + 2 < 10$$

Subtract 2

$$-2 - 2 \leq -4x + 2 - 2 < 10 - 2$$

$$-4 \leq -4x < 8$$

Divide by -4

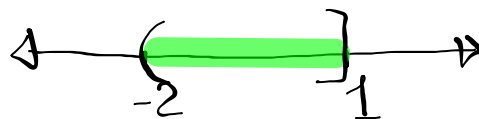
$$\frac{-4}{-4} \geq \frac{-4}{-4}x > \frac{8}{-4}$$

$$1 \geq x > -2$$

Hint: Isolate  
 $x$  in the  
middle

$$\langle x \rangle$$

$$-2 < x \leq 1$$

I.N.  $(-2, 1]$ S.B.N.  $\{x \mid -2 < x \leq 1\}$

Graph & shade

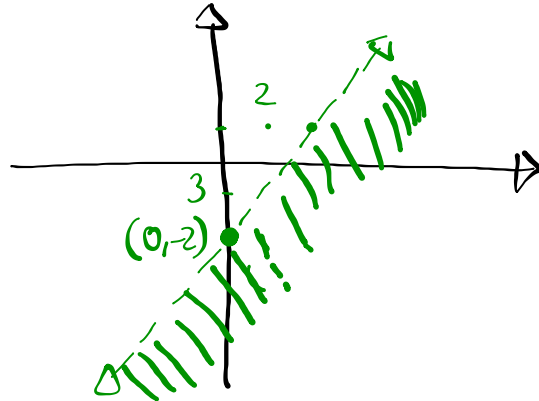
$$3x - 2y > 4$$

$$-2y > -3x + 4$$

Divide by -2

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

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



Hint: Write  
in Slope-Int.  
form  
 $y = mx + b$

$$A = \{a, b, c\}$$

$$B = \{a, c, d, e\}$$

$$C = \{a, d, f, g\}$$

Find

$$1) A \cup B = \{a, b, c, d, e\}$$

$$2) A \cap C = \{a\}$$

Solve

$$-2x < -12 \quad \text{AND} \quad x-3 \leq 1$$

$$\frac{-2}{-2}x > \frac{-12}{-2}$$

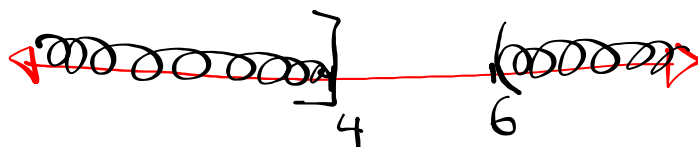
$$x \leq 1+3$$

$$x > 6$$

AND

$$x \leq 4$$

Overlap



No overlap

 $\emptyset$ 

Solve

$$5x-2 \leq -22 \quad \text{OR} \quad 3x-4 > -40$$

$$5x \leq -22+2$$

$$3x > -40+4$$

$$5x \leq -20$$

$$3x > -36$$

$$x \leq \frac{-20}{5}$$

$$x > \frac{-36}{3}$$

$$x \leq -4$$

OR

$$x > -12$$

Take whatever  
Shaded $(-\infty, \infty)$  All Reals  
 $\mathbb{R}$

Solve

$$|3x+2| + 5 = 0$$

$$|3x+2| = -5$$

$$\emptyset$$

$$|4x-3| = |7x+9|$$

$$4x-3 = 7x+9 \quad \text{OR} \quad 4x-3 = -(7x+9)$$

$$4x-7x = 9+3$$

$$-3x = 12$$

$$\boxed{x = -4}$$

$$\left\{-4, \frac{-6}{11}\right\}$$

Solve

$$2|x-3| - 6 = 10$$

$$2|x-3| = 16$$

$$|x-3| = 8$$

$$x-3 = 8$$

$$\boxed{x = 11}$$

$$x-3 = -8$$

$$\boxed{x = -5}$$

$$\{-5, 11\}$$

Solve  $|2x+3| \leq 15$ Solve  $|2x+3| = 15$ 

$$2x+3 = 15$$

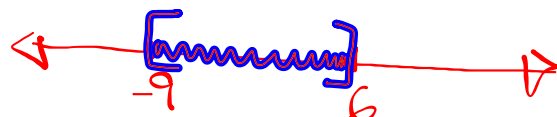
$$2x = 12$$

$$x = 6$$

$$2x+3 = -15$$

$$2x = -18$$

$$x = -9$$

I.N.  $[-9, 6]$ SBN  $\{x \mid -9 \leq x \leq 6\}$

Solve

$$-4|x-2| + 5 < -7$$

$$-4|x-2| < -7-5$$

$$-4|x-2| < -12$$

$$\frac{-4}{-4}|x-2| > \frac{-12}{-4}$$

$$|x-2| > 3$$

Shade outside

Solve  $|x-2|=3$

$$x-2=3 \quad x-2=-3$$

$$x=5 \quad x=-1$$

I.N.  $(-\infty, -1) \cup (5, \infty)$  S.B.N.  $\{x \mid x < -1 \text{ OR } x > 5\}$

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Solve  $|2x-3| + 4 \geq -6$

$$|2x-3| \geq -10$$

All Real numbers  
 $\mathbb{R}$   
 $(-\infty, \infty)$

Factor completely:

$$1) 4x^2 - 8x = 4x(x-2)$$

$$2) 3x(2x+5) - 4(2x+5) = (2x+5)(3x-4)$$

$$3) x^2 - 11x + 24 = (x-3)(x-8)$$

$$4) 49x^2 - 100 = (7x)^2 - (10)^2 = (7x+10)(7x-10)$$

$$A^2 - B^2 = (A+B)(A-B)$$

$$5) \quad 27x^3 + 1000 = (3x)^3 + (10)^3 = (3x+10)(9x^2 - 30x + 100)$$

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

$$6) \quad 64x^3 - 125y^3 = (4x)^3 - (5y)^3 = (4x-5y)(16x^2 + 20xy + 25y^2)$$

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

Simplify

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

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

$$= \boxed{\frac{x+28}{(x-4)(x+4)}}$$

Simplify

$$\frac{y^2+y}{y^2-4} \div \frac{y^3-y}{y^2+5y+6} = \frac{y^2+y}{y^2-4} \cdot \frac{y^2+5y+6}{y^3-y}$$

$$= \frac{\cancel{y(y+1)}}{(y-2)\cancel{(y+2)}} \cdot \frac{(y+3)\cancel{(y+2)}}{\cancel{y(y+1)}(y-1)} = \boxed{\frac{y+3}{(y-2)(y-1)}}$$

Class QZ 17

$$1) f(x) = 2x - 3 \quad g(x) = 4x^2 + 6x + 9$$

Exam II  
Next  
Thursday

$$\text{Find } (f \cdot g)(x) = (2x-3)(4x^2+6x+9)$$

$$= 8x^3 + 12x^2 + 18x - 12x^2 - 18x - 27$$

$$2) \text{Simplify } \frac{x^2 - 12x + 36}{x^2 - 36} = \boxed{8x^3 - 27}$$

$$= \frac{(x-6)\cancel{(x-6)}}{(x+6)\cancel{(x-6)}} = \boxed{\frac{x-6}{x+6}}$$