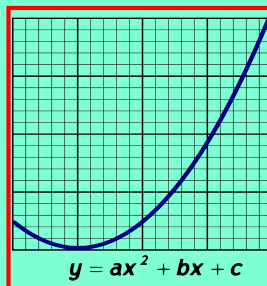


Math 125
Fall 2021
Lecture 23



Class QZ 18

$$1) f(x) = 2x + 5 \quad g(x) = 2x - 5$$

Find $(f + g)(x) = 2x + 5 + 2x - 5 = \boxed{4x} \checkmark$

$$(f - g)(x) = 2x + 5 - (2x - 5) = 2x + 5 - 2x + 5 = \boxed{10} \checkmark$$

$$2) \text{ Simplify: } \frac{x^2 - 100}{x^2 - 20x + 100} = \frac{(x+10)\cancel{(x-10)}}{(x-10)\cancel{(x+10)}} = \boxed{\frac{x+10}{x-10}}$$

Is $(-3, -4)$ a solution of

$$\begin{cases} y = 3x + 5 \\ 5x - 2y = -7 \end{cases} ?$$

$$\begin{array}{l|l} y = 3x + 5 & 5x - 2y = -7 \\ -4 = 3(-3) + 5 & 5(-3) - 2(-4) = -7 \\ -4 = -9 + 5 & -15 + 8 = -7 \\ -4 = -4 \checkmark & -7 = -7 \checkmark \end{array}$$

Yes, $(-3, -4)$ is a solution.

Solve $\begin{cases} 4x - y = 9 \\ x - 3y = 16 \end{cases}$ by subs. method.

$$4(3y + 16) - y = 9$$

$$12y + 64 - y = 9$$

$$11y = 9 - 64$$

$$11y = -55 \quad \boxed{y = -5}$$

$$x = 3(-5) + 16$$

$$\boxed{x = 1}$$

Final Ans: $(1, -5)$

$$\begin{cases} 4x - y = 9 \\ x - 3y = 16 \end{cases}$$

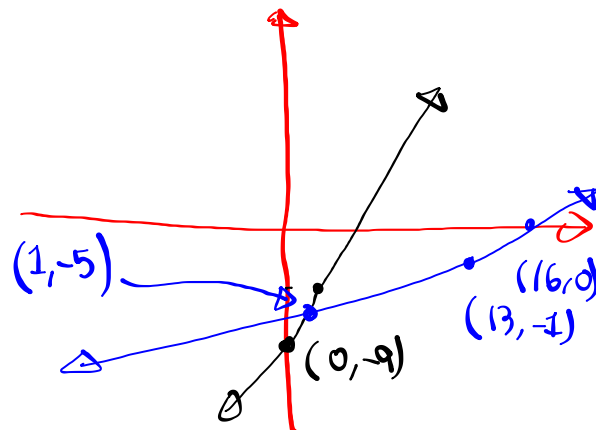
$$\rightarrow y = 4x - 9$$

Y-Int $(0, -9)$

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

$$x = 3y + 16$$

x	y
16	0
13	-1



Solve by addition Method:

$$\begin{cases} \frac{1}{4}x - \frac{1}{9}y = \frac{2}{3} & \ominus \text{LCD}=36 \\ \frac{1}{2}x - \frac{1}{3}y = 1 & \ominus \text{LCD}=6 \end{cases} \quad \text{Hint: Use LCD to clear Fractions}$$

$$36 \begin{cases} \frac{1}{4}x - \frac{1}{9}y = \frac{2}{3} \\ \frac{1}{2}x - \frac{1}{3}y = 1 \end{cases} \rightarrow \begin{cases} 9x - 4y = 24 \\ 3x - 2y = 6 \end{cases}$$

$$\begin{cases} 9x - 4y = 24 \\ -6x + 4y = -12 \end{cases} \rightarrow \begin{cases} 3x = 12 \\ x = 4 \end{cases}$$

$$\begin{aligned} 3(4) - 2y &= 6 \\ 12 - 2y &= 6 \\ -2y &= 6 - 12 \\ -2y &= -6 \\ y &= 3 \end{aligned}$$

Sinal
Ans

$$\rightarrow (4, 3)$$

$$\boxed{y=3}$$

The sum of two numbers is 100.

one of them is 3 times the other one.

Find both numbers.

25 & 75

$$\begin{cases} x + y = 100 \\ x = 3y \end{cases} \quad \text{USE Subs. method}$$

$$\begin{aligned} 3y + y &= 100 \\ 4y &= 100 \end{aligned}$$

$$x = 3(25)$$

$$\boxed{x=75}$$

$$\boxed{y=25}$$

Two angles are complementary.

$x \text{ \& } y$

twice one of them plus three times the other one is 230° .

$$\begin{cases} x + y = 90 \\ 2x + 3y = 230 \end{cases}$$

Find both angles.

$$\begin{cases} -2x - 2y = -180 \\ 2x + 3y = 230 \end{cases}$$

$$y = 50$$

$$x + 50 = 90$$

$$x = 40$$

$40^\circ \text{ \& } 50^\circ$

Two angles are supplementary.

one of them is 30° more than twice the other one.

Find both angles.

$$\begin{cases} x + y = 180 \\ x = 2y + 30 \end{cases}$$

$$2y + 30 + y = 180$$

$$3y = 150$$

$$y = 50$$

$$x = 2(50) + 30$$

$$x = 130$$

$50^\circ \text{ \& } 130^\circ$

I need 50 liters of 25% alcohol solution.
 I have unlimited supply of 10% & 40%
 of alcohol solutions. How many liters of each
 should I mix to obtain what I need?



$$\begin{cases} x + y = 50 \\ 10x + 40y = 25(50) \end{cases} \Rightarrow \begin{cases} x + y = 50 \\ x + 4y = 25(5) \end{cases}$$

$$\begin{cases} -x - y = -50 \\ x + 4y = 125 \end{cases} \Rightarrow \begin{cases} x + 25 = 50 \\ x = 25 \end{cases}$$

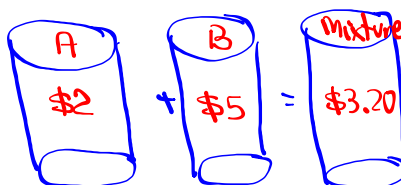
$$\begin{aligned} 3y &= 75 \\ y &= 25 \end{aligned}$$

25 liters of each

Two brands of coffee:

Type A: \$2/lb.

Type B: \$5/lb.



I need 200 lb. at
 \$3.20/lb.

How many pounds of each?

$$\begin{cases} A + B = 200 \\ 2A + 5B = 3.20(200) \end{cases} \Rightarrow \begin{cases} -2A - 2B = -400 \\ 2A + 5B = 640 \end{cases} \Rightarrow \begin{cases} 3B = 240 \\ B = 80 \end{cases}$$

$$\begin{aligned} A + 80 &= 200 \\ A &= 120 \end{aligned}$$

120 lb of type A
 80 lb of type B

3 HB and 4 FF → \$14.40

5 HB and 3 FF → \$18.50

How much is one HB? HB? eliminate FF

$$\begin{cases} -3 \{ 3H + 4F = 14.40 \\ 4 \{ 5H + 3F = 18.50 \end{cases} \Rightarrow \begin{cases} -9H - 12F = -43.20 \\ 20H + 12F = 74 \end{cases}$$

One HB
\$2.80

$$11H = 30.8$$

$$H = 2.8$$

Solve: $x - 3 < 5$ AND $x + 4 \leq 14 - x$

$$x < 5 + 3$$

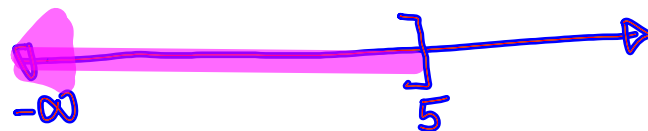
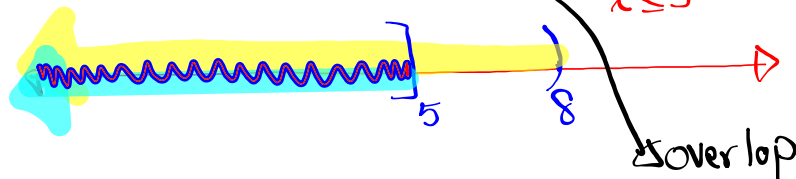
$$x < 8$$

$$x + x \leq 14 - 4$$

$$2x \leq 10$$

$$x \leq 5$$

AND



S.B.N. $\{x \mid x \leq 5\}$

I.N. $(-\infty, 5]$

Solve $x - 5 \leq 13 - 2x$ OR $2 > -5x - 3$

$$x + 2x \leq 13 + 5$$

$$3x \leq 18$$

$$x \leq 6$$

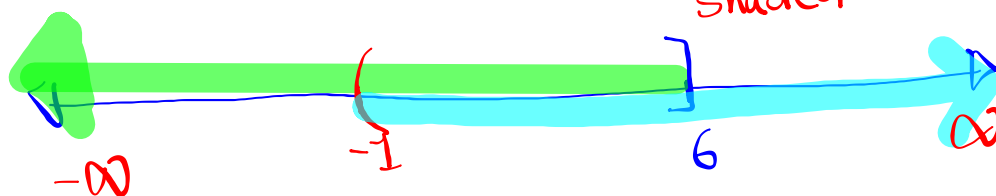
$$5x > -3 - 2$$

$$5x > -5$$

$$x > -1$$

OR

whatever shaded



S.B.N. $\{x \mid x \text{ is a real \#}\}$ I.N. $(-\infty, \infty)$

$$f(x) = 5x + 3$$

$$1) |f(x)| = -3 \quad |5x + 3| = -3 \quad \boxed{\emptyset}$$

$$2) |f(x)| = 3 \quad |5x + 3| = 3$$

$$5x + 3 = 3 \quad 5x + 3 = -3$$

$$5x = 0 \quad 5x = -6$$

$$3) |f(x)| \geq 3$$

$$\boxed{x = 0}$$

$$\boxed{x = -\frac{6}{5}}$$



$$\left\{-\frac{6}{5}, 0\right\}$$

$$(-\infty, -\frac{6}{5}] \cup [0, \infty)$$

SBN $\{x \mid x \leq -\frac{6}{5} \text{ OR } x \geq 0\}$

class QZ 19:

Solve by graphing:

$$\begin{cases} 2x - 3y = 6 \\ y = \frac{2}{3}x + 4 \end{cases}$$

Y-Int (0,4)

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

$$\begin{array}{r|l} x & y \\ \hline 0 & -2 \\ 3 & 0 \end{array}$$

