Math 115

Fall 2017

Lecture 14

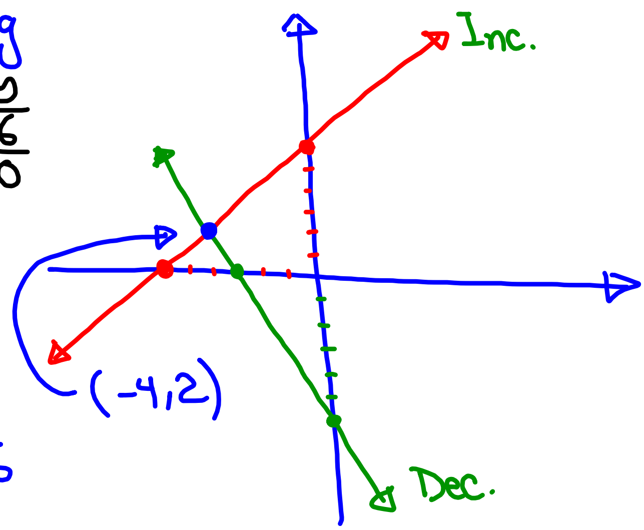
$\sqrt{xy}$

Solve by graphing

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

x	y
0	6
-6	0

x	y
0	-6
-3	0



check $2-(-4)=6$

$2+4=6$

$6=6$ ✓

$2+2(-4)=-6$

$2-8=-6$

$-6=-6$ ✓

$\boxed{\text{Soln } (-4,2)}$

Solve by Substitution method:

Isolate one Variable

$$\begin{cases} 3x - 2y = -14 \\ x + 3y = -1 \end{cases}$$

$x = -1 - 3y$

Now make the Subs.

$3(-1-3y) - 2y = -14$

$-3 - 9y - 2y = -14$

$-3 - 11y = -14$

$-11y = -14 + 3$

$-11y = -11$

$\boxed{y = 1}$

$x = -1 - 3(1)$

$\boxed{x = -4}$

$\boxed{(-4, 1)}$

Solve by addition/Elimination method:

$$\begin{array}{r} 3 \\ 5 \end{array}\begin{cases} 3x + 5y = 2 \\ 2x - 3y = 14 \end{cases}$$

$LCM(5,3) = 15$

$$\begin{cases} 9x + 15y = 6 \\ 10x - 15y = 70 \end{cases}$$

$19x = 76$

$x = \frac{76}{19}$ $\boxed{x = 4}$

$\boxed{(4, -2)}$

Let's eliminate x

$$\begin{array}{r} 2 \\ -3 \end{array}\begin{cases} 3x + 5y = 2 \\ 2x - 3y = 14 \end{cases}$$

$LCM(2,3) = 6$

$$\begin{cases} 6x + 10y = 4 \\ -6x + 9y = -42 \end{cases}$$

$19y = -38$

$\boxed{y = -2}$

The sum of two numbers is 10.

Their difference is 4.

Use system of linear equation to find both numbers.

$$\begin{cases} x + y = 10 \\ x - y = 4 \end{cases}$$

$$2x = 14$$

$$\boxed{x=7}$$

$$7 + y = 10$$

$$\boxed{y=3}$$

Numbers are 7 & 3.

The sum of twice some number and 3 times another number is 19.

Their difference is 2.

Use system of linear eqns to find both numbers.

$$\begin{cases} 2x + 3y = 19 \\ x - y = 2 \end{cases} \Rightarrow x = 2 + y$$

$$2(2+y) + 3y = 19$$

$$4 + 2y + 3y = 19$$

$$5y = 15$$

$$\boxed{y=3}$$

$$x = 2 + 3$$

$$\boxed{x=5}$$

Numbers are 5 & 3.

16 Tickets were purchased.
Adults & Kids only.
Adult's tkt → $10
Kid's tkt → $5
Total cost → $100
How many of each?

$4 + K = 16 \rightarrow \boxed{K=12}$

$$-5\begin{cases} A + K = 16 \\ 10A + 5K = 100 \end{cases}$$

$$\begin{cases} -5A - 5K = -80 \\ 10A + 5K = 100 \end{cases}$$

$5A = 20$

$\boxed{A=4}$

4 Adults & 12 Kids

Jose has 30 coins.
Dimes & Nickels only.
Total value $2.10
Use system of linear eqns to find how many of each he had.

$$-5\begin{cases} D + N = 30 \\ 10D + 5N = 210 \end{cases}$$

$$\begin{cases} -5D - 5N = -150 \\ 10D + 5N = 210 \end{cases}$$

$5D = 60$

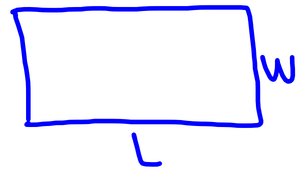
$\boxed{D=12}$

12 Dimes & 18 nickels

$12 + N = 30$

$N = 18$

The perimeter of a rectangular carpet is 44 ft.
The length is 1 ft longer than twice its width.
Use system of linear eqns to find its dimensions.



$P=44$

$$\begin{cases} 2\boxed{L} + 2W = 44 \\ L = \boxed{2W+1} \end{cases}$$

$2(2W+1)+2W=44$

$4W+2+2W=44$

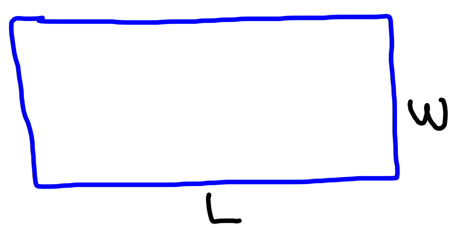
$6W+2=44$

$6W=42 \quad \boxed{W=7}$

$L=2(7)+1=\boxed{15}$

7 ft by 15 ft

Perimeter of a rectangular room is 68 m.
the length is 2 meters shorter than 3 times its width.
Use system of linear equations to find the length of this room.



$P=68$

$$\div 2 \begin{cases} 2L + 2W = 68 \\ L = 3W - 2 \end{cases}$$

$$\begin{cases} L + W = 34 \\ L = 3W - 2 \end{cases}$$

$3W-2+W=34$

$4W=34+2$

$4W=36 \rightarrow \boxed{W=9}$

$L=3(9)-2=25$

25 m.

Find an eqn of a line that contains $(2,-3)$ and is parallel to $y = \boxed{\frac{3}{4}}x - 1$.

Answer in Standard form.

$Ax + By = C$

"No fractions"

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

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

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

Point-Slope form.

Multiply by 4 to clear fraction.

$4y + 12 = 3(x-2)$

$4y + 12 = 3x - 6$

$\boxed{-3x + 4y = -18} \Rightarrow \boxed{3x - 4y = 18}$

Find eqn of a line that contains $(5,-3)$ and is perpendicular to $3x + 4y = 8$.

$Ax + By = C$

Stand. form

Isolate y

$4y = -3x + 8$

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

I need it to be in Slope-Int form.

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

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

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

$3y + 9 = 4(x-5)$

$3y + 9 = 4x - 20$

$3y - 4x = -20 - 9$

$\boxed{3y - 4x = -29}$ Stand. form.

$\boxed{-4x + 3y = -29}$ $\boxed{4x - 3y = 29}$

Graph & Shade

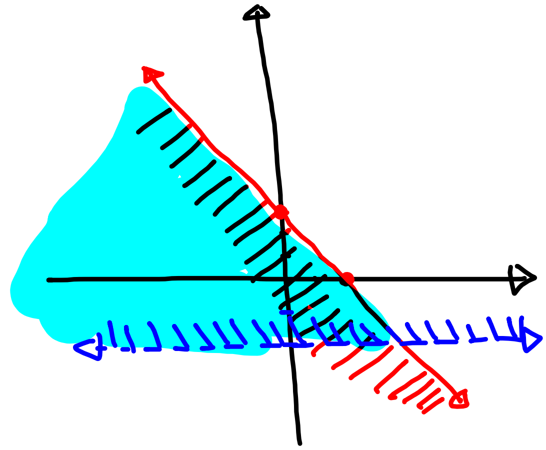
$$\begin{cases} 3x + 2y \le 6 \\ y > -2 \end{cases}$$

x	y
0	3
2	0

Isolate y

$2y \le -3x + 6$

$y \le \frac{-3}{2}x + 3$



Graph & Shade

$$\begin{cases} x \ge 0 \checkmark \\ y \ge 0 \checkmark \\ y > \frac{-3}{5}x + 3 \end{cases}$$

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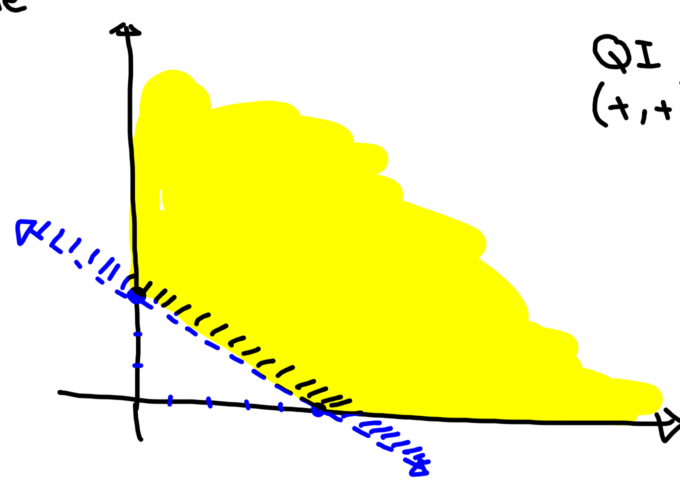

Graph & Shade

$$\begin{cases} x \geq 0 \checkmark \\ y \geq 0 \checkmark \\ y < -\frac{3}{4}x + 10 \\ y > -\frac{3}{4}x + 3 \end{cases}$$

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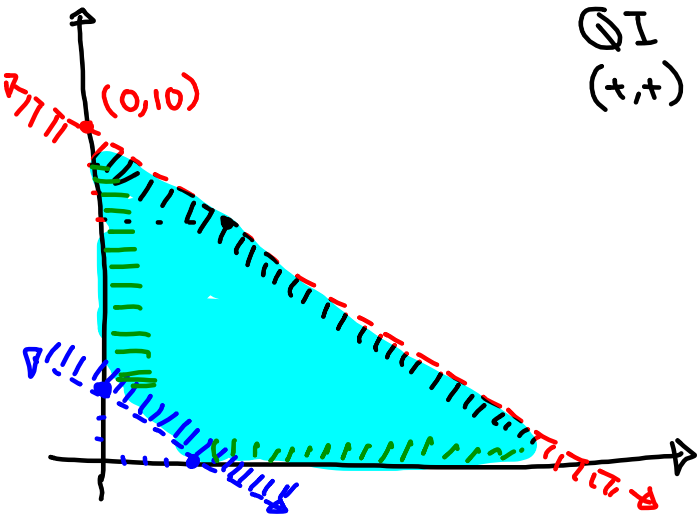

Two angles are complementary.

The sum of twice one of them and three times the other one is 245°.

Use system of linear equations to find them.

$$-2\begin{cases} x + y = 90 \\ 2x + 3y = 245 \end{cases}$$

$$\begin{cases} -2x - 2y = -180 \\ 2x + 3y = 245 \end{cases}$$

$$y = 65$$

65° & 25°

Two angles are supplementary.

when $\boxed{\text{3 times one of them}}$ is subtracted from $\underbrace{\text{4 times the other one}}$, the result is $-50°$.

Use system of linear eqns to find both angles.

$$3\begin{cases} x + y = 180 \\ 4x - 3y = -50 \end{cases}$$

$70°$ & $110°$

$$\begin{cases} 3x + 3y = 540 \\ 4x - 3y = -50 \end{cases} \Rightarrow 7x = 490$$

$\boxed{x = 70}$

Added to

Subtract from

more than

less than

Reverse the order

\$2.50/lb.	+	\$4.25/lb	=	\$2.85/lb.
80		20		100 lb.
A		B		
Candy A		Candy B		Mixture

$$\begin{cases} A + B = 100 \\ 2.50A + 4.25B = (2.85)100 \end{cases}$$

$$-2.5\begin{cases} A + B = 100 \\ 2.5A + 4.25B = 285 \end{cases}$$

$$\begin{cases} \cancel{-2.5A} - 2.5B = -250 \\ \cancel{2.5A} + 4.25B = 285 \end{cases} \Rightarrow 1.75B = 35$$

$$B = \frac{35}{1.75} \qquad \boxed{B = 20}$$

Mr. Castro ordered 4 HB & 3 FF for a total of \$7.65. $4H + 3F = 7.65$

Mrs. Chang ordered 6 HB & 2 FF for a total of \$9.60 $6H + 2F = 9.60$

Find the price of one order of FF.

$$3\left\{4H + 3F = 7.65\right.$$
$$-2\left\{6H + 2F = 9.60\right.$$

LCM(4,6) = 12

$$\begin{cases} 12H + 9F = 22.95 \\ -12H - 4F = 19.20 \end{cases}$$

$$5F = 3.75$$

$F = \frac{3.75}{5}$ $\boxed{\$.75}$

$\boxed{F = .75}$

Due Monday

1) Graphing Project

2) SG II

3) Exam II, come early if you want extra time.

Say Hi to George (Jorge)