Anna is going to buy some candles. Small candles cost $3.50 and large candles cost $5 each. She wants to buy between 20 and 30 candles. Anna has only $80 to spend. She wants at least 12 large candles. Write a system of FIVE inequalities to model this situation.

L = # Lg candles

S = # Sm candles

$3.5S + 5L \leq 80$

$L \geq 12$

$20 \leq L + S \leq 30$

$S \geq 0$

$L \geq 0$

I'm going to the store to buy some CD's and/or some DVD's. DVD's cost $12 each and CD's cost $8 each. I can spend no more than $48 at the store.

Define variables and write three inequalities to represent all the constraints in this situation.

D = # DVD's

C = # CD's

$C \geq 0$ $D \geq 0$

$8C + 12D \leq 48$

Find at least 5 combinations of CD's and/or DVD's that meet all of these constraints.

Constraint: A restriction or limit placed on a variable.

(C, D)

(0, 0) (1, 1)

(2, 2) (6, 0)

(0, 4)

$8C + 12D \leq 48$

Find the TOTAL number of combinations of CD's and/or DVD's that would meet all the constraints.

(C, D)

(0,0) (0,1) (0,2) (0,3) (0,4)

(1,0) 1,1 (1,2) (1,3)

(2,0) 2,1 (2,2)

(3,0) 3,1 (3,2)

(4,0) (4,1)

(5,0)

(6,0)

19 possible combinations

C = # CD's

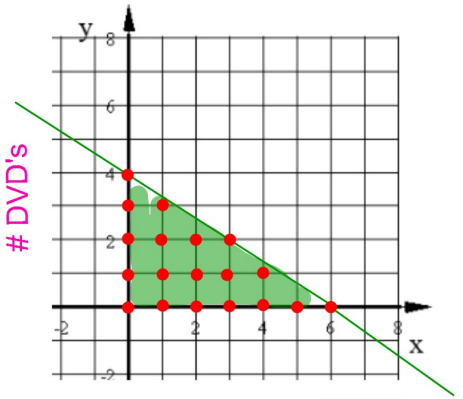
D = # DVD's

$C \geq 0$

$D \geq 0$

} These tell us to only use the 1st Quadrant

$8C + 12D \leq 48$




Each whole number ordered pair represents a combination of CD's and/or DVD's that meet all the constraints. There are 19 of these points in the solutions region (identified by the red dots).

Suppose I can buy no more than 3 CD's. Now how many combinations of DVD's and/or CD's will meet all of these constraints?

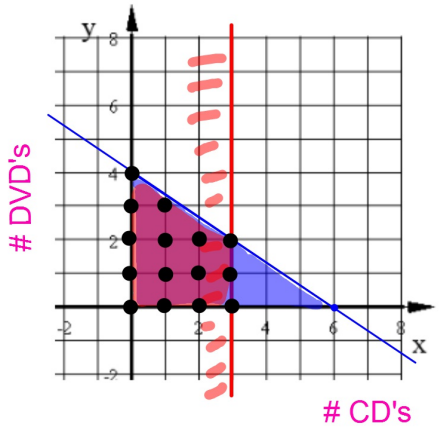
$C \leq 3$

$C \geq 0 \quad D \geq 0$

$8C + 12D \leq 48$

$C \leq 3$ Graph this on top of the original graph.

the points indicated by black dots are the combinations of CD's and/or DVD's that meet all 4 contraints. There are 15 of these oredered pairs.




Without solving, state the number of solutions to each system of equations.

a)

$y = 2x + 7$

$2x + 4y = -28$

b)

$y = -5x$

$10x + 2y = 6$

c)

$y - 3 = -\frac{3}{2}(x + 8)$

$6x + 4y = -36$

a)

$y = 2x + 7$ $m = 2$

$2x + 4y = -28$

$y = \frac{-28 - 2x}{4} = -7 - \frac{1}{2}x$ $m = -\frac{1}{2}$

ONE SOL diff slopes

b)

$y = -5x$ → $m=-5$, $b=0$

$10x + 2y = 6$ → $y = \frac{6-10x}{2} = 3-5x$ → $m=-5$, $b=3$

NO SOL → parallel lines

c)

$y - 3 = -\frac{3}{2}(x+8)$ → $y-3 = -\frac{3}{2}x - 12$ → $y = -\frac{3}{2}x - 9$

$6x + 4y = -36$ → $y = \frac{-36-6x}{4} = -9 - \frac{3}{2}x$

Many Sol's → same lines

Solve each of these systems of equations. You must use each method at least once: Elimination & Sustitution. State the method you used and write your answer as an ordered pair.

a)

$3x - 2y = 23$

$7x + 10y = -5$

Elimination

b)

$2d + 6e = -42$

$9d + 8e = -56$

Substitution

c)

$74x + 36y = 438.8$

$81x - 45y = 41.4$

Elimination

a)

$5(3x - 2y = 23)$ → $15x - 10y = 115$

$7x + 10y = -5$ → $+\ 7x + 10y = -5$

$\frac{22x}{22} = \frac{110}{22}$

$x = 5$ → $7(5) + 10y = -5$

$35 + 10y = -5$

$-35 \quad -35$

$\frac{10y}{10} = \frac{-40}{10}$

$y = -4$

Sol: $(5, -4)$

b)

$2d + 6e = -42 \rightarrow d = \frac{-42-6e}{2} = -21-3e$

$9d + 8e = -56$

$9(-21-3e) + 8e = -56$

$-189 - 27e + 8e = -56$

$-189 - 19e = -56$

$+189 \quad +189$

$\frac{-19e}{-19} = \frac{133}{-19}$

$e = -7$

$d = -21 - 3e$

$= -21 - 3(-7)$

$= -21 + 21 = 0$

Sol: $(0, -7)$

c)

$5(74x + 36y = 438.8)$

$4(81x - 45y = 41.4)$

$370x + 180y = 2194$

$+ \; 324x - 180y = 165.6$

$\frac{694x}{694} = \frac{2359.6}{694}$

$x = 3.4$

$74(3.4) + 36y = 438.8$

$251.6 + 36y = 438.8$

$-251.6 \quad -251.6$

$\frac{36y}{36} = \frac{187.2}{36}$

$y = 5.2$

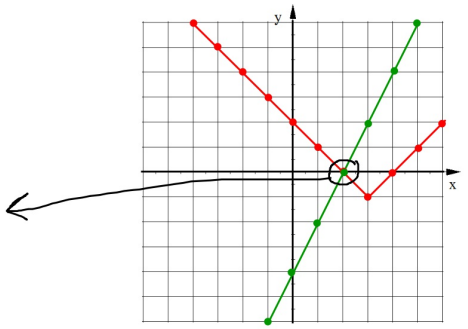
Sol: $(3.4, 5.2)$

Solve this system of equations. State your answers as ordered pairs.

Using a Graph:

$y = |x - 3| - 1$

$y = 2x - 4$




Sol: (2,0)

Solve this system of equations. State your answers as ordered pairs.

Solve using Algebra:

$y = |x - 3| - 1$

$y = 2x - 4$

use substitution

$2x - 4 = |x-3| - 1$

$+1 \quad +1$

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

$x - 3 = -(2x-3)$

$x - 3 = -2x + 3$

$+2x \quad +2x$

$3x - 3 = 3$

$+3 \quad +3$

$\frac{3x}{3} = \frac{6}{3}$

$x = 2$

$(2,0)$

Both eq's give $y=0$ when $x=2$

$x - 3 = 2x - 3$

$-x \quad -x$

$-3 = x - 3$

$+3 \quad +3$

$x = 0$

THIS is an extraneous Solution because You get different Values for y when $x=0$