Practice test 2 2016.doc

1 (a) $4x-7y=6$
$2x+y=12$

① $4x-7y=6$
②×7 $14x+7y=84$
①+② $18x=90$
$x=5$

sub $x=5$
$4(5)-7y=6$
$20-7y=6$
$-7y=-14$
$y=2$

$(5,2)$

(b) ① $6x-5y=-3$
② $5x+3y=19$

①×3 $18x-15y=-9$
②×5 $25x+15y=95$
①+② $43x=86$
$x=2$

sub $x=2$
$6(2)-5y=-3$
$12-5y=-3$
$-5y=-15$
$y=3$

$(2,3)$

(c) $3(x+4)-4(y+1)=7$
$3x+12-4y-4=7$
$3x-4y+8=7$
$3x-4y=-1$

① $3x-4y=-1$
② $x-y=9$

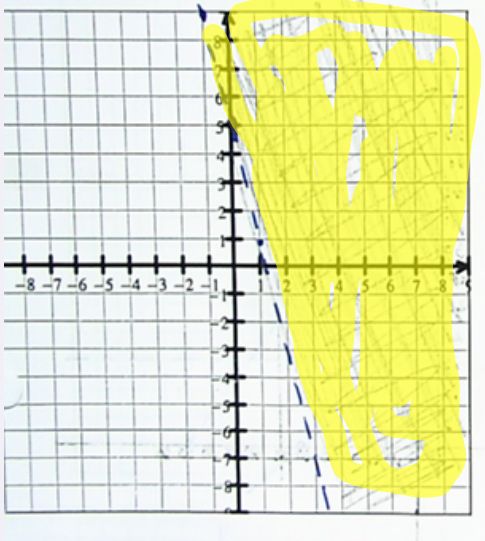
① $3x-4y=-1$
②×3 $3x-3y=27$
①−② $-y=-28$
$y=28$

sub $y=28$ $x-28=9$
$x=37$

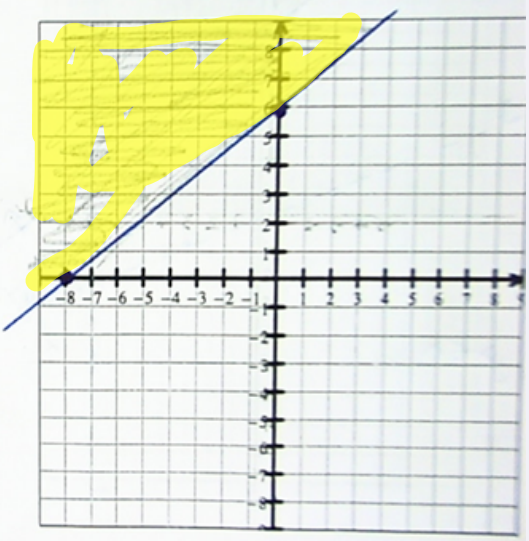
$(37,28)$

$x-9=y$
$x-y=9$

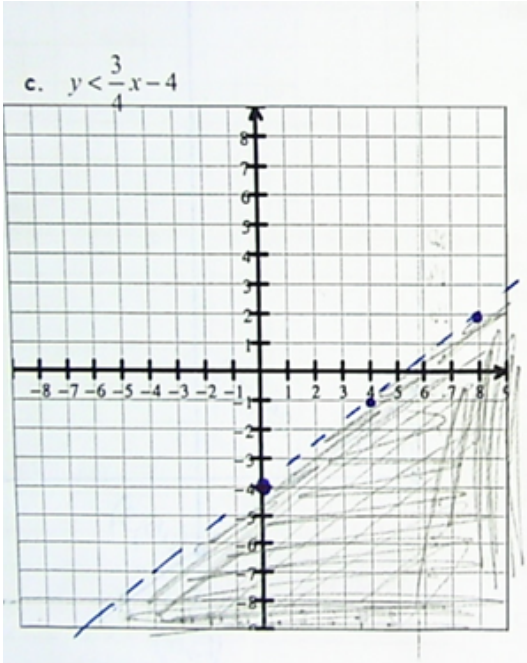
2. a. $y>-4x+5$



b. $3x-4y\leq -24$

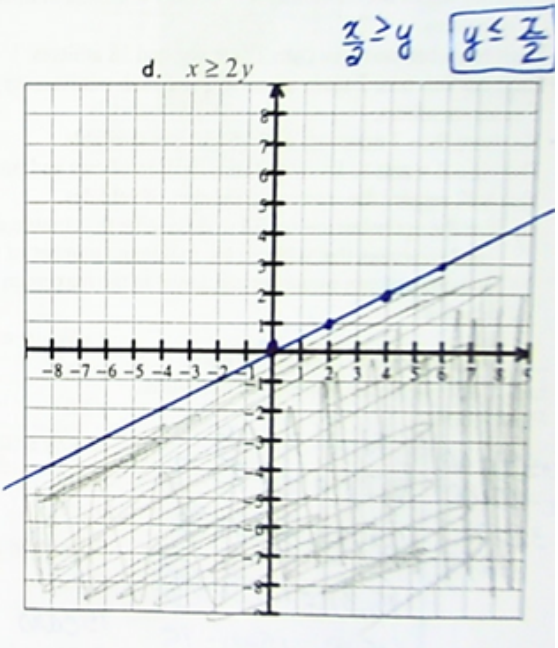


c. $y < \frac{3}{4}x - 4$



d. $x \geq 2y$

$\frac{x}{2} \geq y$ $\quad y \leq \frac{x}{2}$



3. Given the following constraints, graph each:

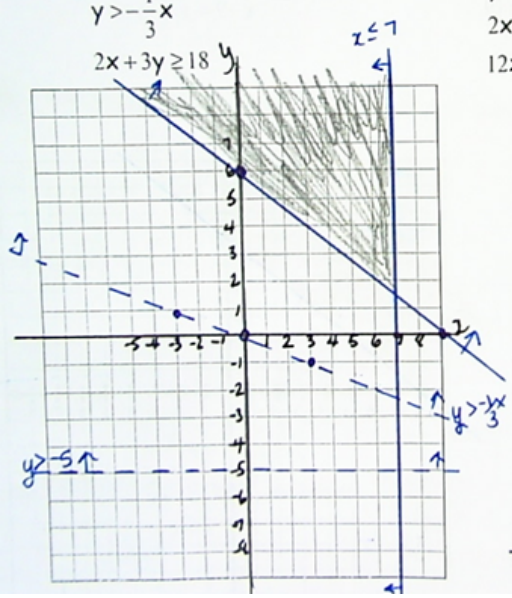
a. $x \in R$, $y \in R$

$x \leq 7$

$y > -5$

$y > -\frac{1}{3}x$

$2x + 3y \geq 18$



b. $x \geq 0$

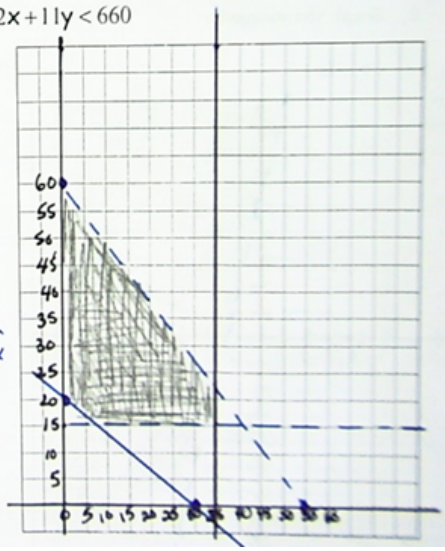
$y \geq 0$

$x \leq 35$

$y > 15$

$2x + 3y \geq 60$

$12x + 11y < 660$



4. Three teams are travelling to a hockey tournament in cars and minivans.

- Each team has no more than 2 coaches and 18 athletes.
- Each car can take 3 team members, and each minivan can take 5 team members.
- No more than 7 minivans and 15 cars are available.

The school wants to know the combination of cars and minivans that will require the maximum number of vehicles.

a) Use the optimization model to determine the combination of cars and minivans that will use the maximum number of vehicles.

b) How many team members can travel in the maximum number of vehicles?

Let x represent the number of cars.
Let y represent the number of minivans.
Restrictions:

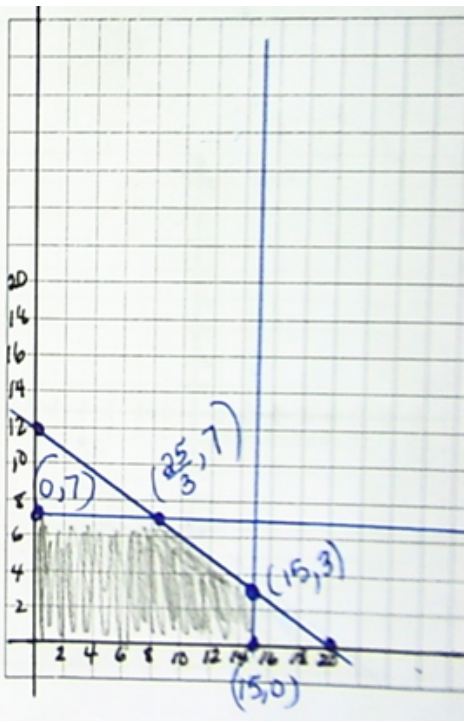
$x \in W \quad y \in W$
$x \geq 0$
$y \geq 0$
$3x + 5y \leq 60$
$x \leq 15$
$y \leq 7$

Objective Function
$N = x + y$

$3x+5(7)=60$
$3x+35=60$
$3x=25$
$x=25/3$

$N = x + y$
$(0,7) = 0+7 = 7$
$(\frac{25}{3},7) = \frac{25}{3}+7 = \frac{46}{3}$
$(15,3) = 15+3 = 18$
$(15,0) = 15+0 = 15$

15 cars
3 minivans



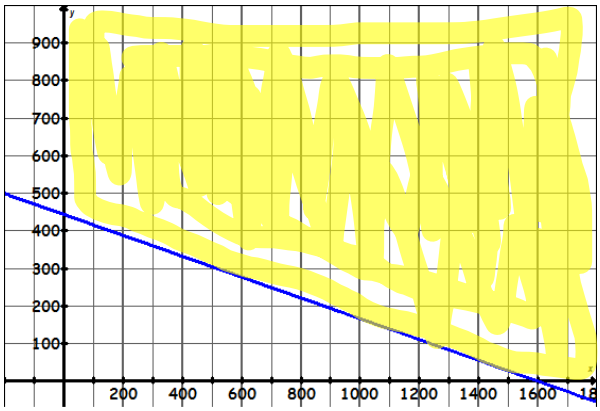
Ans: 15 cars, 3 minivans

this point is not justified because you cannot have 25/3 cars....

5. x = school friends
y = karate friends
$x + y \leq 460$
$x \geq 2y$

6. x = # salami
y = # cheese
$x + y \leq 820$
$3x \geq 2y$

7. x = # bouquets
y = # tickets
$5x + 18y \geq 8000$



8. x = # hotdogs
y = # hamburgers

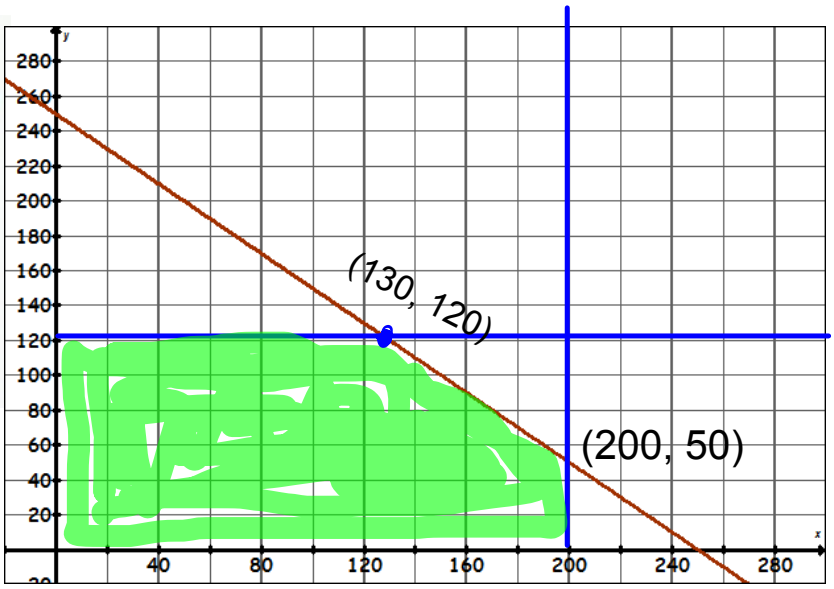
$x + y \leq 250$

$x \leq 200$

$y \leq 120$

$P = 3x + 5y$

(0,0)	$P = 0$
(0, 120)	$P = 600$
(130, 120)	$P = 990$ max
(200, 50)	$P = 850$
(200, 0)	$P = 600$



9. A fast-food concession stand sells vegetarian hot dogs and Polish sausages.
- Daily sales can be as high as 450 hot dogs and sausages combined.
- The stand always sells at least twice as many Polish as vegetarian hotdog sold.
- Vegetarian hot dogs are sold for $2.50, and Polish sausages are sold for $3.50.

Create a model that could be used to determine the combination of hot dogs and sausages that will result in maximum sales.

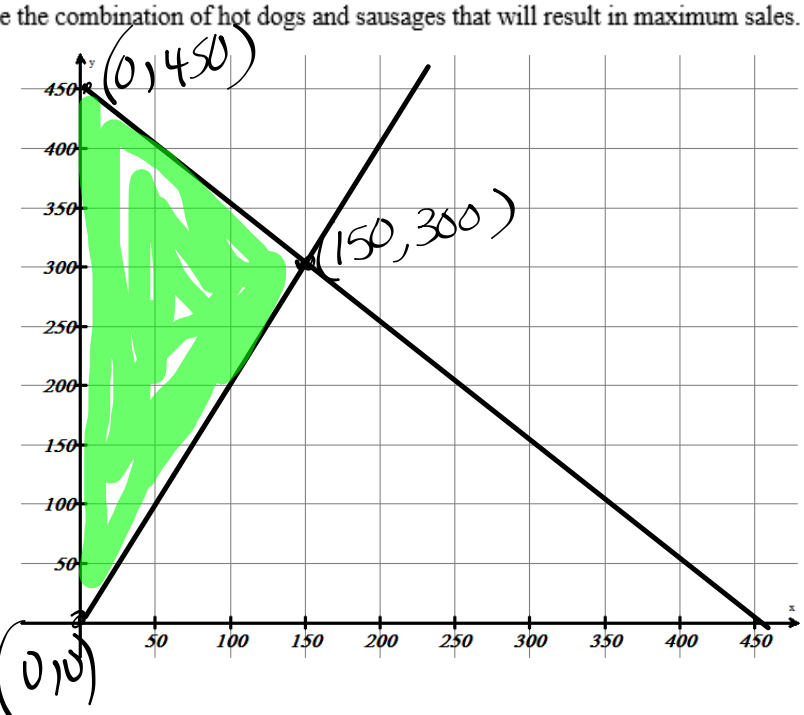
x = # hotdogs

y = # sausages

$x + y \leq 450$

$y \geq 2x$

$P = 2.50x + 3.50y$



(0, 0) P = 0

(150, 300) P= $1425

(0, 450) P=$1575

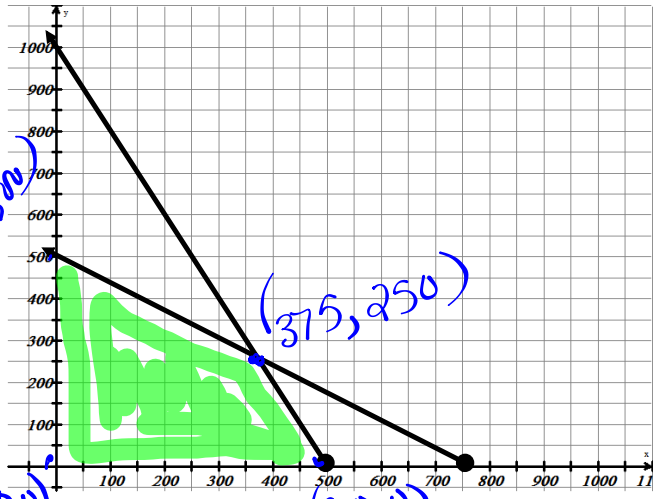
Max occurs at 450 hamburgers

10. A store has requested a manufacturer to produce pants and sports jackets. For materials, the manufacturer has 750 m^2 of cotton textile and 1,000 m^2 of polyester. Every pair of pants needs 1 m^2 of cotton and 2 m^2 of polyester. Every jacket needs 1.5 m^2 of cotton and 1 m^2 of polyester. The price of the pants is fixed at \$50 and the jacket, \$40.
What is the number of pants and jackets that the manufacturer must give to the stores so that these items obtain a maximum sale?

Let x = #pants
y = #jackets

	pants x	jackets y	
cotton	1	1.5	≤ 750
polyester	2	1	≤ 1000

$x + 1.5y \leq 750$
$2x + y \leq 1000$



$P = 50x + 40y$
(500,0) $P = 25000$
(0,500) $P = 20000$
(375,250) $P = 28750$ max profit

Attachments

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