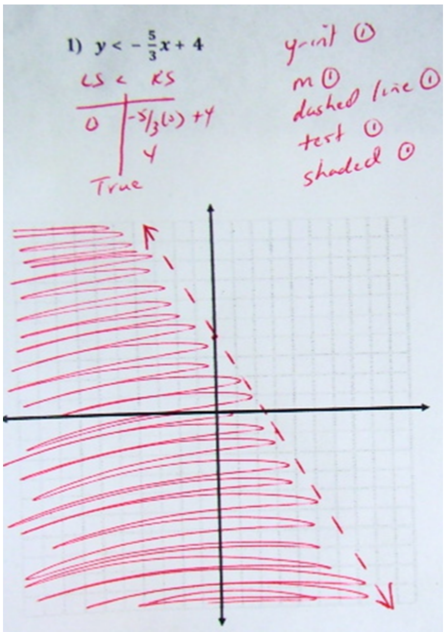
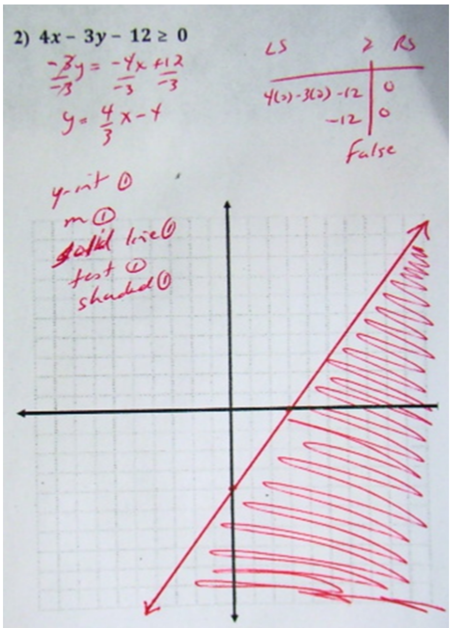
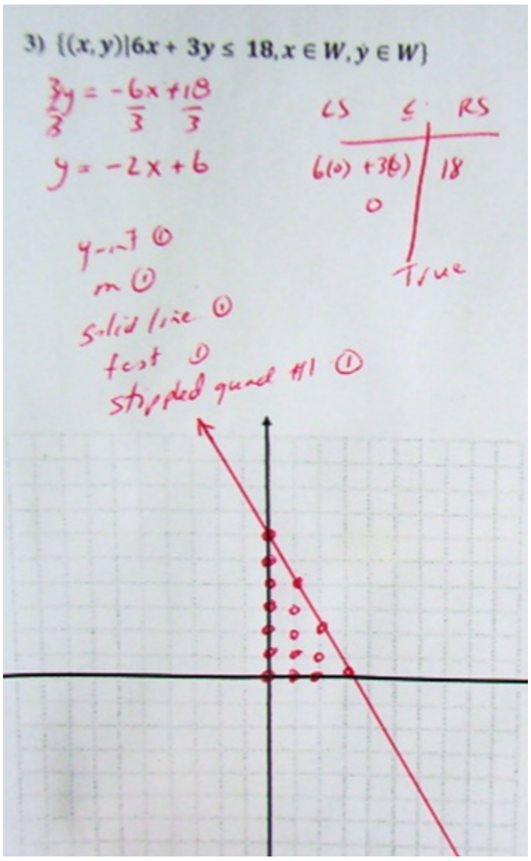
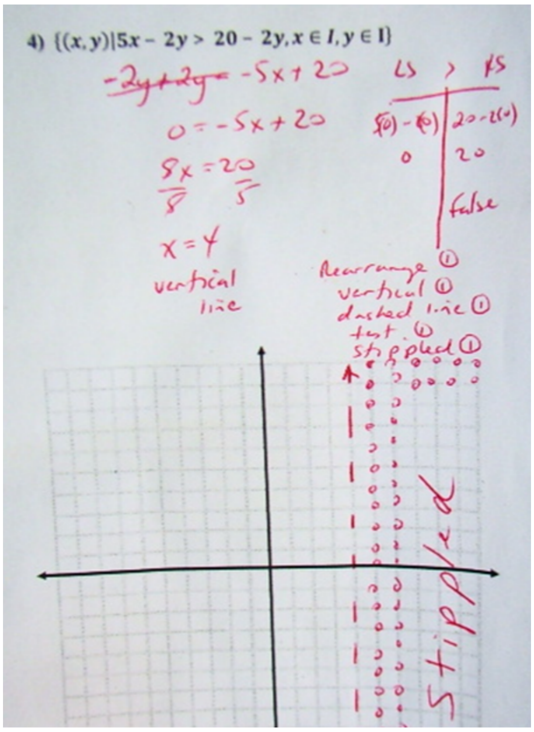
Quiz Solutions...









HOMEWORK???

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NOTE:

Create a model means graph the solution region

2. A fast-food concession stand sells hotdogs and hamburgers.
   - Daily sales can be as high as 300 hamburgers and hot dogs combined.
   - The stand has room to stock no more than 200 hot dogs and no more than 150 hamburgers.
   - Hot dogs are sold for \$3.25, and hamburgers are sold for \$4.75.

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

$M = 4.75x + 3.25y$

x → # of hamburgers sold   x ∈ W

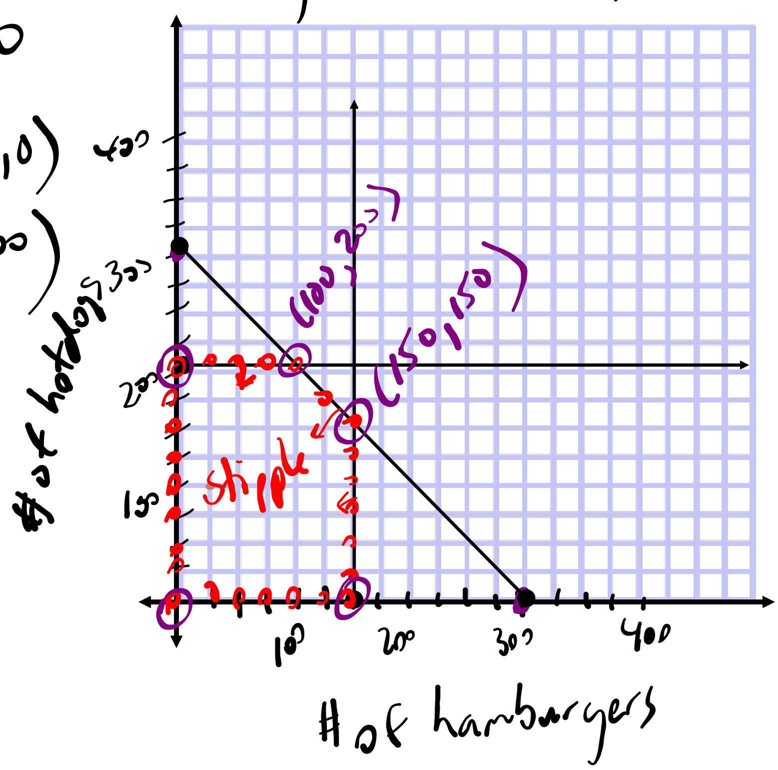
y → # of hotdogs sold   y ∈ W

$x + y \le 300$ $y \le 200$ $x \le 150$

$x + y = 300$ $y = 200$ $x = 150$

x int ⇒ (300, 0)

y int ⇒ (0, 300)



EXAMPLE #1...

The vertices of the feasible region (overlap) of a graph of a system of linear inequalities are (-4, -8); (5, 0) and (1, -6). Which point would result in the minimum value of the objective function C = 0.50x + 0.60y?

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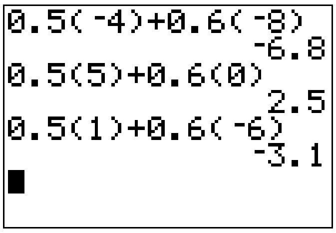
* To find Min/Max... sub vertices into objective

vertex	$C = 0.50x + 0.60y$
(-4, -8)	
(5, 0)	
(1, -6)	



← MIN (-4, -8)

EXAMPLE #2...

The following model represents an optimization problem. Determine the maximum solution.

Restrictions: $x \varepsilon R$ and $y \varepsilon R$

Constraints: $y \le 1$; $2y \ge -3x + 2$; $y \ge 3x - 8$

Objective Function: $D = -4x + 3y$

Test (0,0)
LS ≥ RS
0 | −3(0)+2 = 2 NO

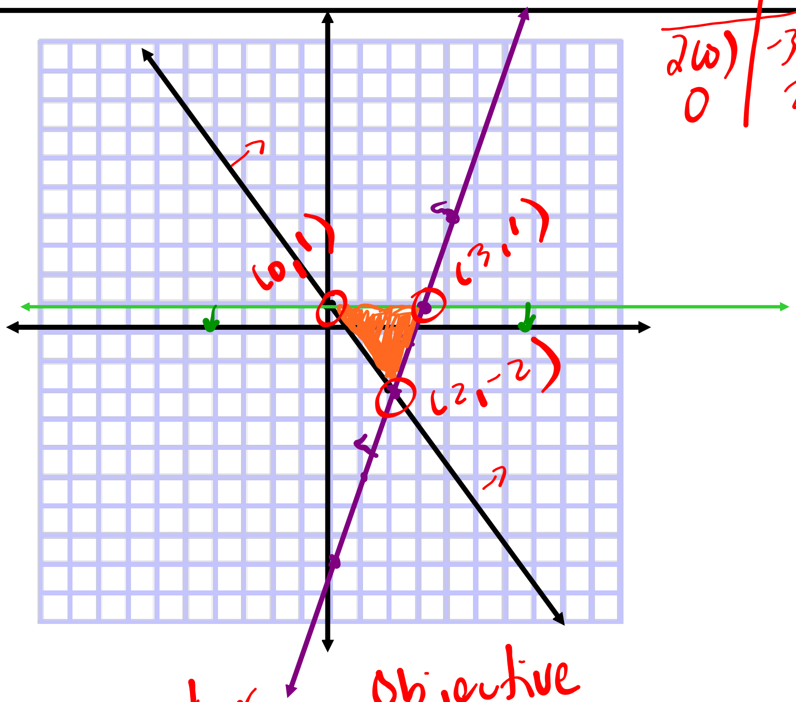
$\frac{2y}{2} = \frac{-3x}{2} + \frac{2}{2}$

$y = -\frac{3}{2}x + 1$

$y = 1$ (horizontal)

$y = 3x - 8$

LS ≥ RS
0 | 3(0) − 8 = −8 yes



Vertex	Objective $D = -4x + 3y$	
(0,1)	-4(0)+3(1)	3
(3,1)	-4(3)+3(1)	-9
(2,-2)	-4(2)+3(-2)	-14

Max is 3

EXAMPLE #3...

$4 \times 12 = 48$ total

Four MVHS teams are travelling to a basketball tournament in cars and minivans.

- Each team has no more than 2 coaches and 10 athletes
- Each car can take 4 team members. Each minivan can take 6 team members.
- No more than 6 cars are available, but more than 3 minivans are available.

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

Objective ⇒ $V = x + y$

a) Create an algebraic model to represent this situation.

$x \to$ # of cars $\quad x \in W$

$y \to$ # of minivans $\quad y \in W$

b) Graph the model.

$4x + 6y \leq 48 \quad x \leq 6 \quad y \geq 3$

$4x + 6y = 48$

x-int: $4x + 6(0) = 48$, $x = 12$, $(12, 0)$

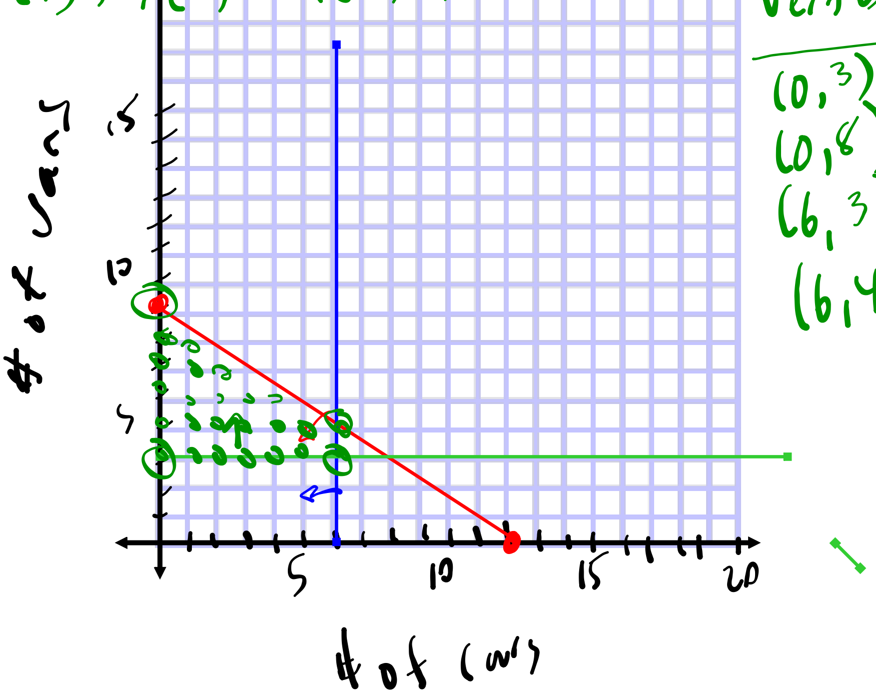
y-int: $4(0) + 6y = 48$, $y = 8$, $(0, 8)$

c) What combination of cars/minivans will result in the maximum number of vehicles?

6 cars & 4 minivans

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

$6(4) + 4(6) = 48$ total



Vertex	$V = x + y$
(0, 3)	0 + 3 = 3
(0, 8)	0 + 8 = 8
(6, 3)	6 + 3 = 9
(6, 4)	6 + 4 = 10 max

Practice Questions...

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