

HW 3/19

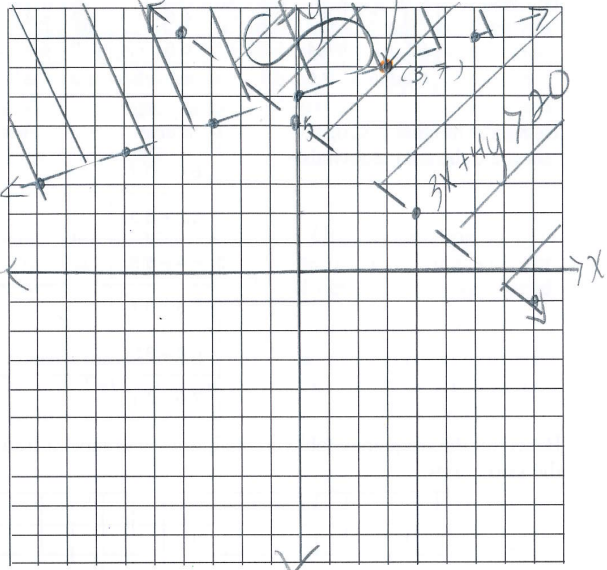
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not in the solution set because it is on the dotted line meaning it does not include the point.

35. Solve the following system of inequalities graphically on the grid below and label the solution S.

$$\begin{aligned} 3x + 4y &> 20 \\ x &< 3y - 18 \end{aligned}$$

Is the point (3, 7) in the solution set?
Explain your answer.



$$\begin{aligned} 3x + 4y &> 20 \\ -3x & \quad -3x \\ \hline 4y &> -3x + 20 \\ \frac{4y}{4} &> \frac{-3x + 20}{4} \\ y &> -\frac{3}{4}x + 5 \end{aligned}$$

$$\begin{aligned} x &< 3y - 18 \\ +18 & \quad +18 \\ \hline x + 18 &< 3y \\ \frac{x + 18}{3} &< \frac{3y}{3} \\ \frac{x}{3} + 6 &< y \\ y &> \frac{1}{3}x + 6 \end{aligned}$$

36. An Air Force pilot is flying at a **cruising altitude of 9000 feet** and is forced to eject from her aircraft. The function $h(t) = -16t^2 + 128t + 9000$ models the height, in feet, of the pilot above the ground, where t is the time, in seconds, after she is ejected from the aircraft.

$$x = -\frac{b}{2a} = \frac{-128}{2(-16)} \quad h(4) = -16(4)^2 + 128(4) + 9000$$

$$x = 4 \quad h(4) = 9256$$

Determine and state the vertex of $h(t)$. Explain what the second coordinate of the vertex represents in the context of the problem.

vertex = (4, 9256)
↓
represents the pilot's height from ground after being ejected.

After the pilot was ejected, what is the maximum number of feet she was above the aircraft's **cruising altitude**? Justify your answer.

$\frac{9256}{-9000}$
 $\frac{256}{256}$
256 feet b/c the pilot was ejected at 9000 ft but the vertex implies that the plane ejected the pilot 256 ft above the plane.

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Part IV

Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided to determine your answer. Note that diagrams are not necessarily drawn to scale. A correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [6]

37. Zeke and six of his friends are going to a baseball game. Their combined money totals \$28.50. At the game, hot dogs cost \$1.25 each, hamburgers cost \$2.50 each, and sodas cost \$0.50 each. Each person buys one soda. They spend all \$28.50 on food and soda.

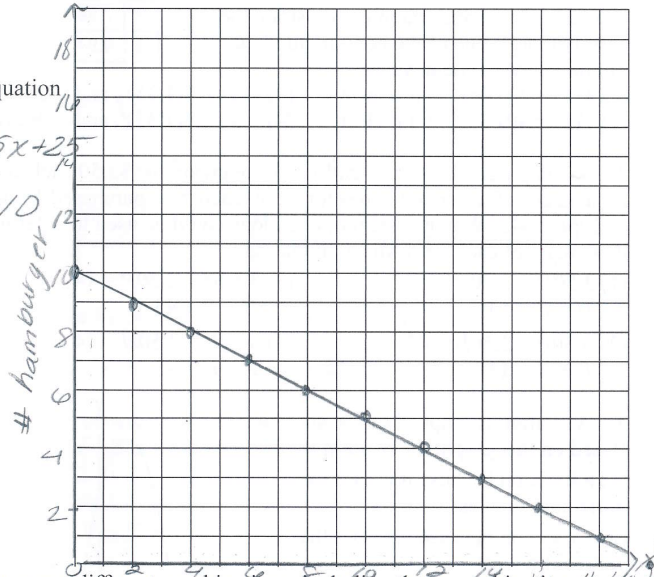
$$1.25x + 2.50y + 3.50 = 28.50$$

Write an equation that can determine the number of hot dogs, x , and hamburgers, y , Zeke and his friends can buy.

Graph your equation on the grid.

$$2.5y = -1.25x + 25$$

$$y = -\frac{1}{2}x + 10$$



Determine how many different combinations, including those combinations containing zero, of hot dogs and hamburgers Zeke and his friends can buy, spending all \$28.50. Explain your answer.

- (0, 10) (10, 5) (20, 0) 11 combinations each dot on the graph.
- (2, 9) (4, 8) (6, 7) (8, 6) (10, 5) (12, 4) (14, 3) (16, 2) (18, 1)