1) In order to prepare for a fundraiser, you go to the supermarket to buy hamburgers and chicken patties. All the other items for your fundraiser have been donated. Hamburgers cost $4.00 per pound and chicken costs $2.00 per pound. You must spend no more than $400. You will be selling hamburgers for $5.00 each and chicken sandwiches for $4.00. Your goal is to raise at least $600. You need to have at least 50 hamburgers available for sale and 80 chicken sandwiches available for sale.

   a. What does your x-value represent?

      The x-value represents the number of hamburgers.

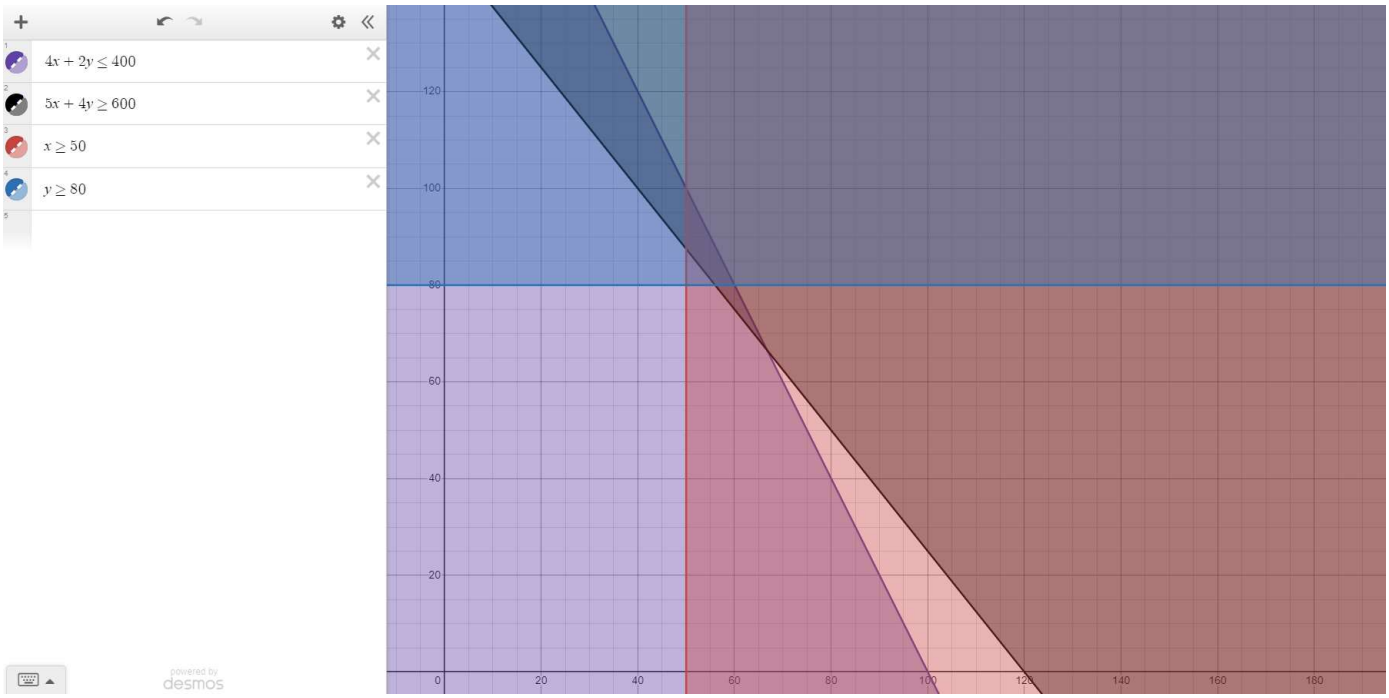
   b. What does your y-value represent?

      The y-value represents the number of chicken sandwich patties.

   c. Write the inequalities that represent the conditions listed in the problem.

      $4x + 2y \leq 400$ $\quad\quad$ $5x + 4y \geq 600$

      $x \geq 50$ $\quad\quad$ $y \geq 80$



   d. List three possible numbers of hamburgers and chicken sandwiches that could be made available to meet the conditions.

      Answers will vary. Any three sets of values within the shaded region for all four inequalities will work.

   e. Can you sell 60 hamburgers and 80 chicken sandwiches? Why or why not?

      You can sell 60 hamburgers and 80 chicken sandwiches. This meets the conditions of more than 50 hamburgers and at least 80 chicken sandwiches. The cost to you of purchasing that many hamburgers and chicken patties is $400 (right at the maximum), and you will sell those items for $620 (more than $600).

f. Can you sell 60 hamburgers and 90 chicken sandwiches? Why or why not?

You cannot sell 60 hamburgers and 90 chicken sandwiches. This would meet the condition of more than 50 hamburgers and at least 80 chicken sandwiches. The amount of money brought in would be $660 (more than $600). However, the cost to purchase those items would be $420 which exceeds your budget of $400.

2) You are making two different items available for sale at the craft fair in two weeks. You have no more than 40 hours to spend making your items in the next two weeks. Item 1 takes 30 minutes to make per item, costs $.45 in materials, and can be sold for $4.50. Item two takes 2 hours to make, costs $2.25 in materials, and can be sold for $18.00. You need to have at least 8 of each item available for sale on the day of the craft fair. Your goal is to spend less than $40 in materials and make $350.

a. What does your x-value represent?

The x-value represents the number of item 1 you will make.

b. What does your y-value represent?

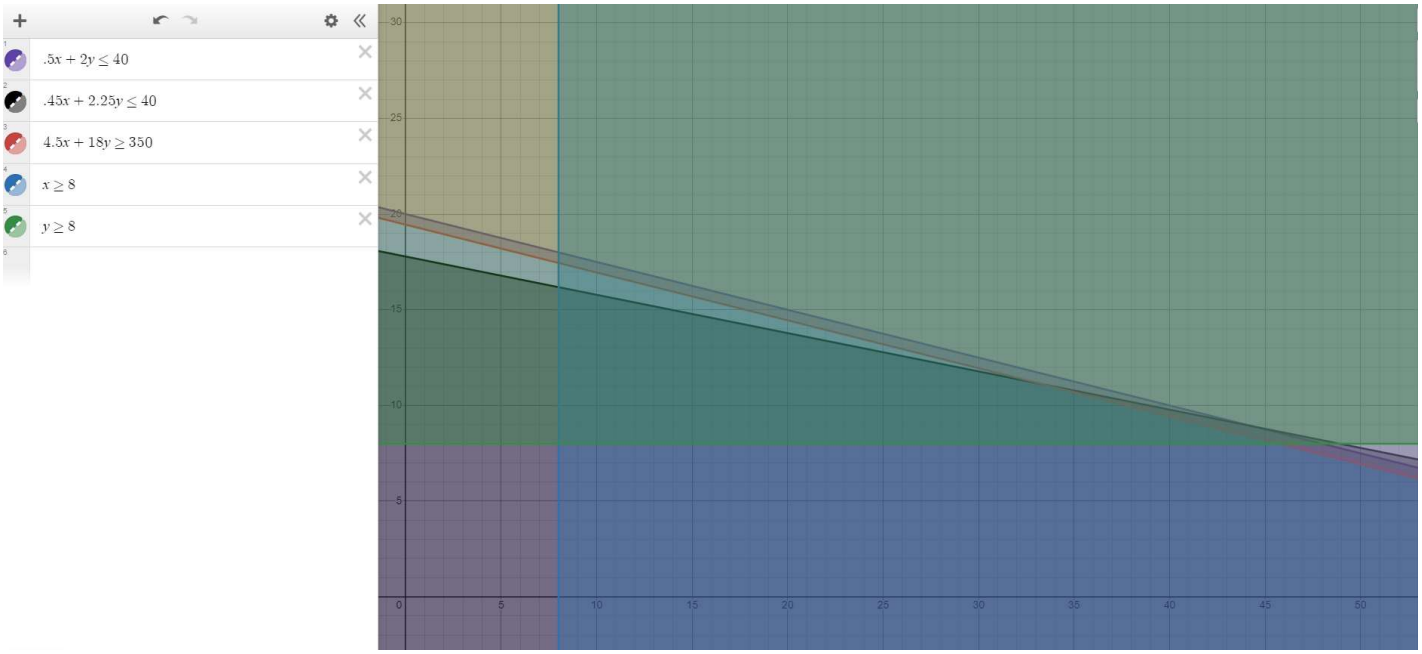
The y-value represents the number of item 2 you will make.

c. Write the inequalities that represent the conditions listed in the problem.

$.5x + 2y \leq 40$ $.45x + 2.25y \leq 40$

$4.5x + 18y \geq 300$ $x \geq 8$

$y \geq 8$



d. List three possible numbers of items available for sale.

Answers will vary. Any three sets of values within the shaded region for all five inequalities will work.

e. Can you make 46 of item 1 and 8 of item 2? Why or why not?

You can make 46 of item 1 and 8 of item 2. This meets the requirement that you make at least 8 of each item. This will require 39 hours of time. The materials will cost you $38.70 (less than $40). You will be able to sell the items for #351 (more than $350).

f. Can you make 32 of item 1 and 12 of item 2? Why or why not?

You cannot make 32 of item 1 and 12 of item 2. This meets the requirements that you make at least 8 of each item. It will take you exactly 40 hours to make and you would earn $360 which is more than $350. However, the materials to make this number of items would cost $41.40 which is more than the $40 limit.

3) You have two part-time jobs. Both jobs require that you spend a minimum of 6 hours per week. You have a maximum of 30 hours to spend at each of the jobs. Your first job pays $11 per hour and your second job pays $12.75 per hour. You are hoping to earn at least $345 this week.

a. What does your x-value represent?

The x-value represents the number of hours spent at Job 1.

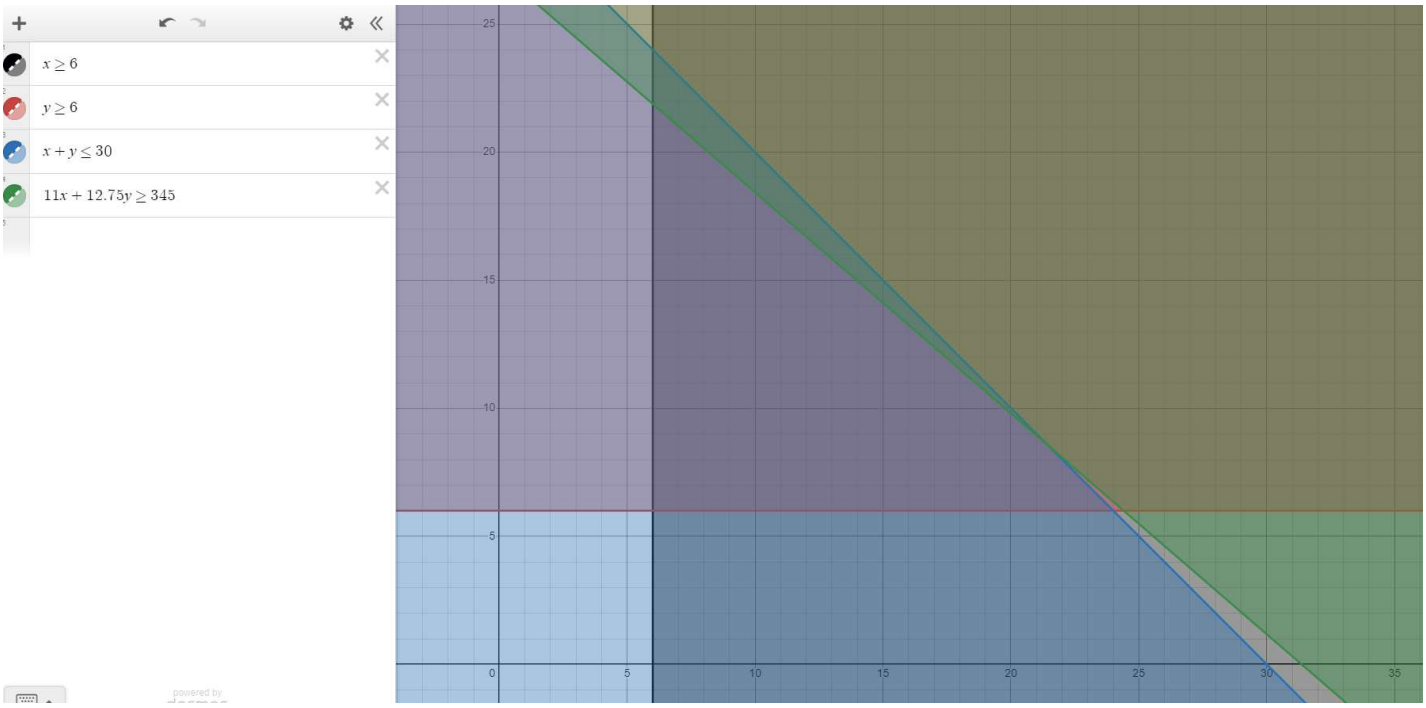
b. What does your y-value represent?

The y-value represents the number of hours spent at Job 2.

c. Write the inequalities that represent the conditions listed in the problem.

$x \geq 6$ $\quad$ $y \geq 6$

$x + y \leq 30$ $\quad$ $11x + 12.75y \geq 345$



d. List three possible values for the number of hours you could work at each job to meet the conditions.

Answers will vary. Any three sets of values within the shaded region for all four inequalities will work.

e. Can you work 24 hours at the first job and 6 hours at the second job? Why or why not?

You cannot work 24 hours at the first job and 6 hours at the second job. This does meet the conditions that you work no more than 30 hours total and more than 6 hours at each job. However, this would only have you earning $340.50 which is below the $345 goal.

f. Can you work 15 hours at each job? Why or why not?

You can work 15 hours at each job. This meets the conditions that you work no more than 30 hours total and more than 6 hours at each job. You will earn $356.25 which is more than the $345 goal.

4) Katie is buying plants and soil for her garden. The soil costs $4 per bag, and the plants cost $10 each. She wants to buy at least 5 plants. She cannot spend more than $100. If each bag of soil contains 5 cubic feet of soil, and each rectangular planting box with dimensions 2 feet x 3 feet x 2 feet deep needs 3 plants.

a. What does your x-value represent?

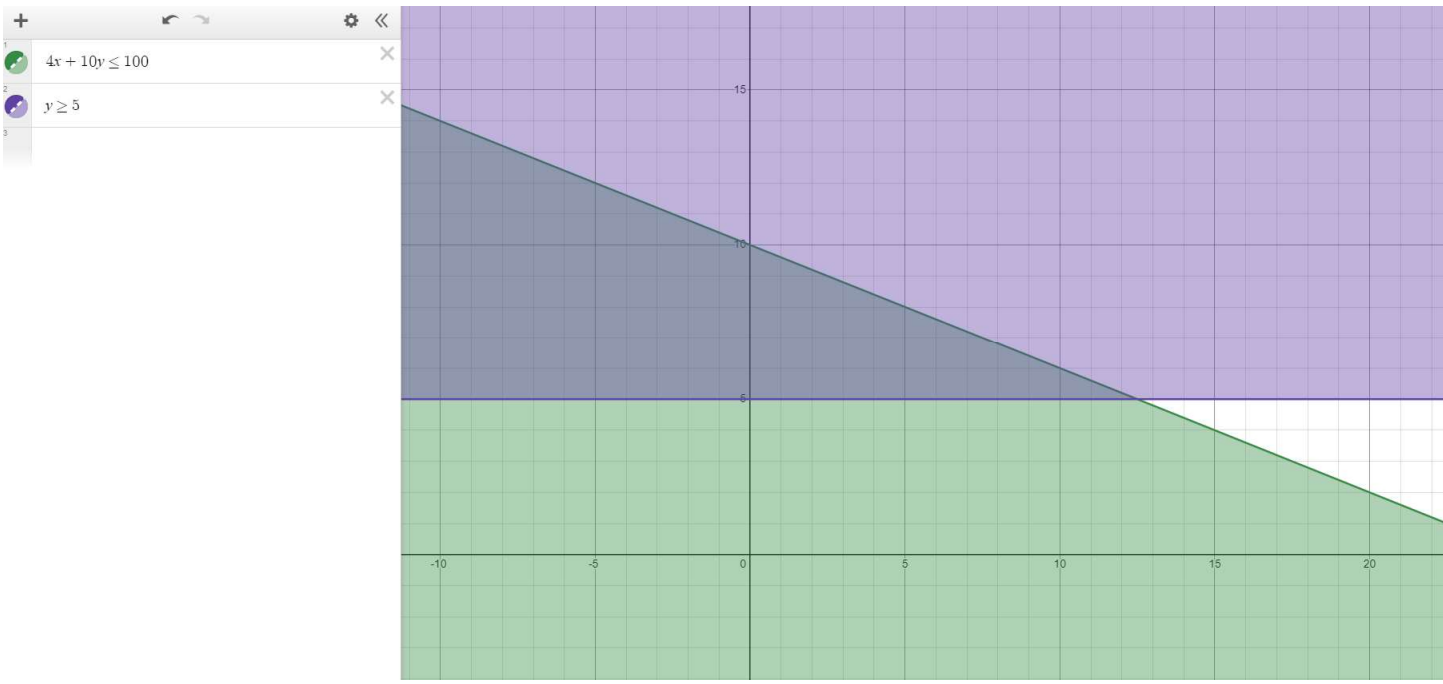
The x-value represents the number of bags of soil.

b. What does your y-value represent?

The y-value represents the number of plants.

c. Write the inequalities that represent the conditions listed in the problem.

$4x + 10y \leq 100$ $y \geq 5$



d. Can she fill three planting boxes?

Each planting box has a volume of 12 cubic feet. Three planting boxes would require 36 cubic feet of soil. This would require Katie to buy 8 bags of soil. To fully fill three planting boxes, Katie would need to buy 9 plants. Since the point $x = 8$ and $y = 9$ is outside the area shaded by both inequalities, Katie cannot fill three planting boxes.

5) During summer vacation, Ben decides to sell hot dogs and pretzels on a food cart. It costs Ben \$0.50 for each hot dog and \$0.40 for each pretzel. He has only \$100 to spend each day on hot dogs and pretzels. He wants to sell at least 200 items each day. He will sell hot dogs for \$3.00 each and pretzels for \$2.00 each. He is hoping to make at least \$500 each day.

a. What does your x-value represent?

The x-value represents the number of hotdogs.

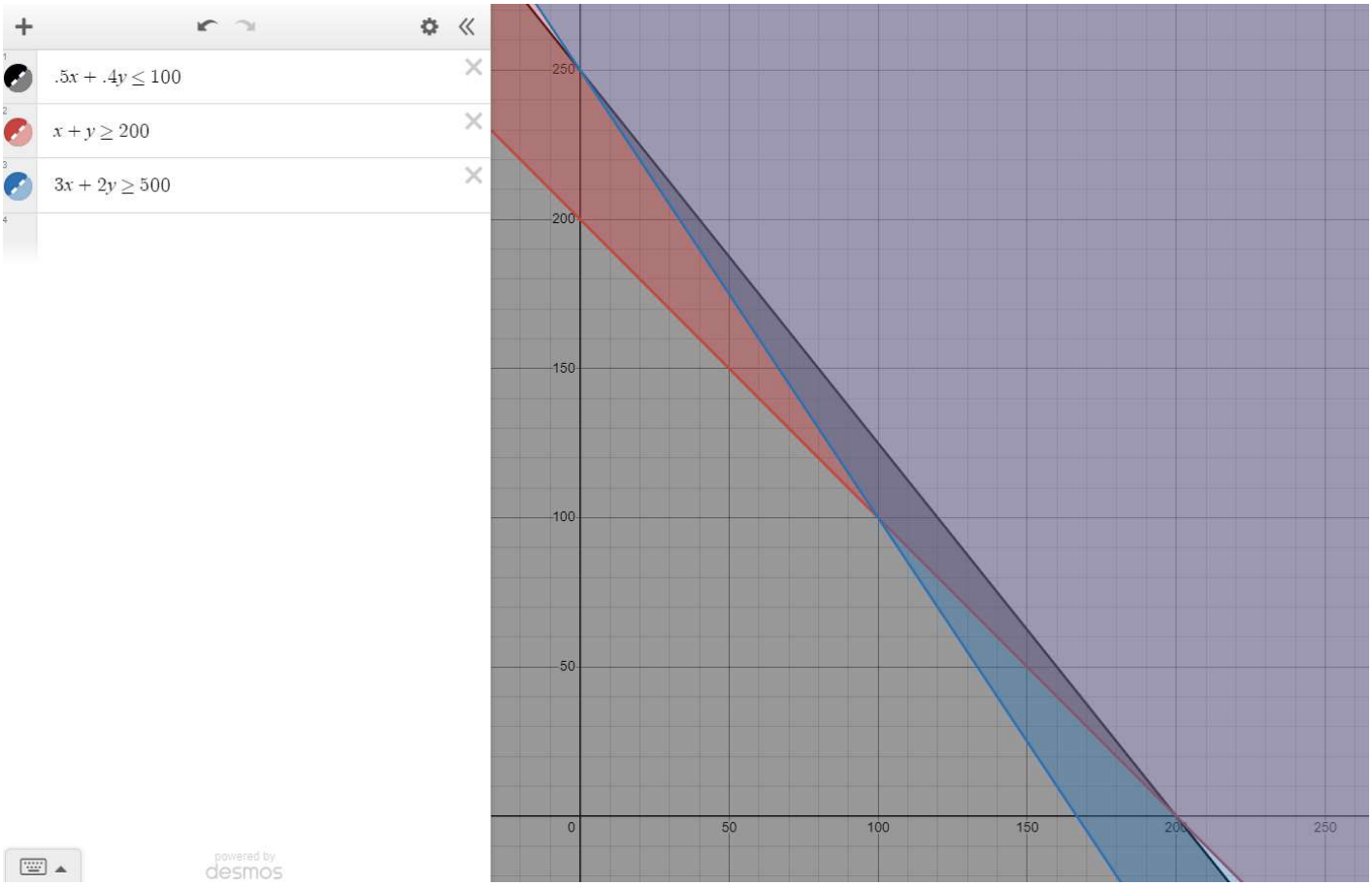
b. What does your y-value represent?

The y-value represents the number of pretzels.

c. Write the inequalities that represent the conditions listed in the problem.

$.5x + .4y \leq 100$ $x + y \geq 200$

$3x + 2y \geq 500$



d. List three possible combinations of hot dogs and pretzels that could be sold to meet the conditions.

Answers will vary. Any three sets of values within the shaded region for all three inequalities will work.

e. Can Ben sell 120 hot dogs and 100 pretzels? Why or why not?

Ben can sell 120 hot dogs and 100 pretzels. He will be selling more than 200 items, he will spend exactly $100 purchasing the items, and he will make $560.

f. Can Ben sell 50 hot dogs and 160 pretzels? Why or why not?

Ben cannot sell 50 hot dogs and 160 pretzels. While this does have him selling more than 200 items and $89 (which is less than $100), Ben will only make $470, which does not exceed the $500 goal.