

Name _____ Per _____

LO: I can write systems of inequalities to represent situations and solve the systems to answer questions about the situation.



emath 5.7

 DO NOW On the back of this packet (1) **Modeling with Systems of inequalities**

James makes spending money shoveling sidewalks and driveways in the winter months. It takes him an average of 30 minutes to shovel a sidewalk and 45 minutes to shovel a driveway. He charges \$10 for each sidewalk and \$18 for each driveway. James has no more than 6 hours available each weekend to shovel sidewalks and driveways. He wants at least 10 shoveling jobs each weekend.

(a) Write a system of inequalities that can be used to determine the combinations of sidewalk and driveway jobs he can take in a weekend.

(b) If he shovels 3 sidewalks, how many driveways can he shovel? Justify your answer with the inequalities.

(c) If he shovels 9 sidewalks on Saturday, is it still possible for James to earn over \$125 by the end of the weekend? Justify your answer.

(2) **Modeling with Systems of inequalities**

A high school drama club is putting on their annual theater production. There is a maximum of 800 tickets for the show. The costs of the tickets are \$6 before the day of the show and \$9 on the day of the show. To meet the expenses of the show, the club must sell at least \$5,000 worth of tickets.

a) Write a system of inequalities that represent this situation.

b) The club sells 440 tickets before the day of the show. Is it possible to sell enough additional tickets on the day of the show to at least meet the expenses of the show? Justify your answer.

 (3) **Systems and Situations**

A building developer is planning a new housing development. He plans to build two types of houses: townhouses and single-family homes. The developer bought a plot of land to build on which already has 20 townhouses and 10 single-family homes built on it. The plot of land has room for the developer to build up to 100 more homes. It takes the workers 2 months to build a townhouse and 3 months to build a single family home. The developer wants this development complete within 20 years. Define variables and write a system of inequalities to represent this situation.

 (3) **Modeling with Systems of inequalities**

A company, TVs4U, makes and sells two different television models: the HD Big View and the MegaTeleBox. The HD Big View takes 2 person-hours to make and the MegaTeleBox takes 3 person-hours to make. TVs4U has 24 employees, each working 8 hours a day, which is equivalent to 192 person-hours per day. TVs4U's total manufacturing capacity is 72 televisions per day.

 (5) **Exit Ticket**

ON THE LAST PAGE

 (6) **Homework**

(1) A store sells two models of laptop computers. Because of the demand, it is necessary to stock at least twice as many units of the Pro Series as units of the Deluxe Series. The costs to the store of the two models are \$800 and \$1200, respectively. The management does not want more than \$20,000 in laptop inventory at any one time, and it wants at least four Pro Series models and two Deluxe Series models in inventory at all times. Define variables and write a system of inequalities describing all possible inventory levels.

(2) You have two gifts to buy. You plan to spend no more than \$50 on the two gifts combined. You want to spend at least twice as much on the first gift as on the second gift. Define variables and write a system of inequalities describing all possible gift buying options.

(6) **Homework**
cont.

(3) For a hiking trip, you are making a mix of x ounces of peanuts and y ounces of dried fruit. You want the mix to have less than 60 grams of fiber and weigh less than 20 ounces. An ounce of peanuts has 14 grams of fiber, and an ounce of dried fruit has 2 grams of fiber. Define variables and write a system of inequalities that models the situation.

(4) A person's maximum heart rate (in beats per minute) is given by $220 - x$ where x is the person's age in years ($20 \leq x \leq 65$). When exercising, a person should aim for a heart rate that is at least 70% of the maximum heart rate and at most 85% of the maximum heart rate. Which of the following heart rates is not in the suggested target range for a 40-year-old person who is exercising? Write a system of inequalities to support your answer choice.

(A) 120 beats per minute

(B) 130 beats per minute

(C) 140 beats per minute

(D) 150 beats per minute

Exit Ticket **Name** _____ **Date** _____ **Per** _____ **4.5L**

(1) The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

Do the problem below:

A community center makes wreaths to sell during the holidays to raise money for various charities. It takes 2 hours to make a small wreath and 3 hours to make a large wreath. The center makes a profit of \$12 for each small wreath sold and \$24 for each large wreath sold. The volunteers at the center have no more than 60 work hours available to make the wreaths. They want to have at least 24 wreaths to sell. How many of each size wreath should be made to maximize the profit?

(1) Solving progress: Solve one of the two problems below.

(a) $\frac{635}{72} = -\frac{5}{2}\left(-\frac{11}{4} + x\right)$

(b) $3x = 2 + 6x - (5 - 2x)$

(2) Translation to algebra progress. Write an algebraic statement to represent this situation. Be sure to write a "Let" statement to define any variables.

A bakery makes three flavors of bagels - strawberry, cinnamon-raisin, and blueberry. This morning they made a total of 52 bagels. They made two more cinnamon-raisin than strawberry. The number of blueberry is 9 more than the number of cinnamon-raisin. How many of each flavor did they make?