Practice 1.4.1: Representing Constraints

Determine whether each coordinate listed below is a solution to the given algebraic sentence.

1. Is the coordinate (–2, –4) a solution to the equation $y = 3x - 2$?

2. Is the coordinate (1, –3) a solution to the inequality $y \leq -4x + 6$?

Read each scenario and use it to complete the parts that follow.

3. Given the inequalities $y > 5x - 8$ and $y \geq 3x + 4$, find a point that
   a. satisfies both inequalities.

   b. satisfies neither inequality.

   c. satisfies one inequality, but not the other.

4. You pay \$12 to get into the fair, plus \$3 per ticket for x ride tickets.
   a. Write an equation to find the total cost of attending the fair.

   b. Now write an inequality and solve it to determine the maximum number of tickets you can buy if you have \$24 to spend.

   c. What is the minimum amount of money you will spend?

5. Charlie borrowed \$500 from his aunt. He has already paid back \$75. His aunt doesn't charge any interest and he is planning on making \$15 payments each Friday.
   a. Write an equation that represents the number of weeks it will take Charlie to repay his aunt if he pays \$15 each Friday.

   b. Is the solution to the equation the actual number of weeks it will take Charlie to repay his aunt? Explain your answer.

continued

Use the information in each scenario to complete problems 6–10.

6. The concession stand at the football game sells cans of soda for $0.75 and bottles of water for $1.25. You have $10.00. Write an inequality to represent this situation. What can you buy?

7. A stained glass artist has a fixed cost of $150. It costs the artist $15 to produce each piece, but each piece sells for $35. The equation $C = 150 + 15n$ represents the total cost, C, for producing n pieces. The total revenue for n pieces is determined by the equation $R = 35n$. What constraint is necessary to include when modeling this situation?

8. Your dad needs to rent a chain saw to cut down trees in your yard. The rental company charges $20 plus $6.50 per hour to rent the chain saw. Your dad wants to spend no more than $50. What constraints apply to this situation? What is the maximum number of hours your dad can rent the chain saw?

9. Jermaine has $10.00 to spend on ice cream. Three scoops cost $5.99, plus $0.75 for each topping. He always leaves a 20% tip for the cashier. Write an inequality and use it to determine if Jermaine can afford to buy a three-scoop ice cream with three toppings plus tip the cashier.

10. The local florist never has more than a combined total of 40 daisy and carnation bouquets and never more than 12 carnation bouquets. Write a system of inequalities that represents this situation. Be sure to include all constraints.