Name_____ Date _____

# Performance Task (continued)

## Secret of the Hanging Baskets

A carnival game uses two baskets hanging from springs at different heights. Next to the higher basket is a pile of baseballs. Next to the lower basket is a pile of golf balls. The object of the game is to add the same number of balls to each basket so that the baskets have the same height. But there is a catch—you only get one chance. What is the secret to winning the game?

### Part 1: The Model

Initially, the empty baseball basket hangs so that the bottom of the basket is at the 54-inch mark, whereas the bottom of the empty golf ball basket hangs at the 45-inch mark.

1. On a separate sheet of paper, sketch the baskets as they look at the beginning of a turn. One contestant puts 10 balls in each basket. This lowers the baseball basket to 40 inches and the golf ball basket to 37 inches. Because the baskets are not at equal height, the contestant does not win. On the same sketch, draw the baskets after this contestant's turn. The baskets are emptied and another contestant puts five balls in each basket. This lowers the baseball basket to 47 inches and the golf ball basket to 41 inches. This contestant does not win either.

2. Plot the data points for each basket in the coordinate plane. Use a straightedge to draw one line through the points plotted for the baseball basket, and one line through the points plotted for the golf ball basket. What is the independent variable? What is the dependent variable? How did you decide on the scale of each axis? Describe what you see in your graphs.

3. Do these lines ever cross? Why? What does the intersection of these two lines represent with respect to the carnival game?

4. Write an equation for each basket representing the height of the basket in terms of the number of balls in the basket.

5. Solve this system of equations. How many balls are needed in each basket to win? To what height will the baskets lower on the winning play?
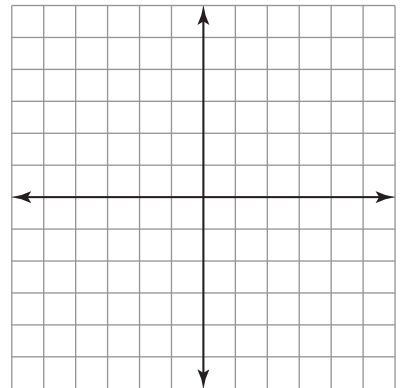
### Part 2: Using Your Results

6. How many baseballs do you need to place in the higher basket so that it touches the ground? How many golf balls do you need to place in the lower basket so that it touches the ground? What do these points represent on the graph?

7. Explain the mathematical differences between the solution to the system of equations in Question 5 and the solutions to the single equations in Question 6.