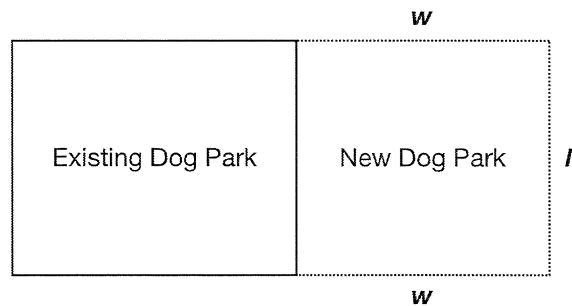


Name \_\_\_\_\_ Date \_\_\_\_\_

### Up and Down or Down and Up Exploring Quadratic Functions

1. The citizens of Herrington County are wild about their dogs. They have an existing dog park for dogs to play, but have decided to build another one so that one park will be for small dogs and the other will be for large dogs. The plan is to build a rectangular fenced in area that will be adjacent to the existing dog park. The sketch is shown below. The county has enough money in the budget to buy 1000 feet of fencing.

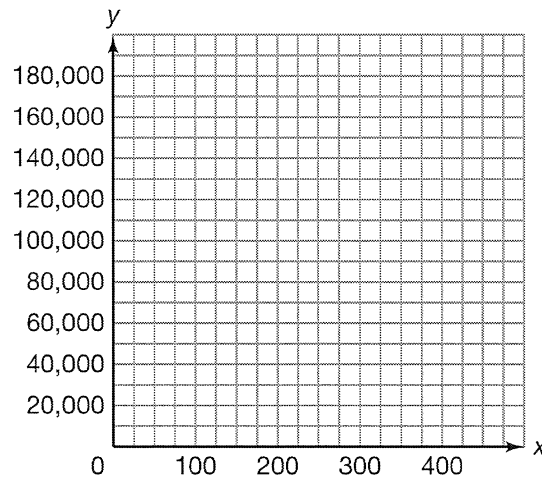
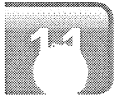


- a. Determine the length of the new dog park,  $l$ , in terms of the width,  $w$ .
- b. Write a function for the area of the new dog park,  $A(w)$ , in terms of the width,  $w$ . Write the function in standard quadratic form. Does this function have an absolute minimum or an absolute maximum? Explain your answer.

c. Determine the x-intercepts of the function. Explain what each means in terms of the problem situation.

d. What should the dimensions of the dog park be to maximize the area? What is the maximum area of the park?

e. Sketch the graph of the function. Label the axes, the absolute maximum or minimum, the x-intercepts, and the y-intercept.



f. Use the graph to determine the dimensions of the park if the area was restricted to 105,000 square feet.