**20-1 Quadratic Function Problems**

1) A rectangular pool has a tile border around the entire edge. The perimeter of the tile border is 44 metres.

a) Determine a quadratic function that could be used to determine the maximum area of the pool.

Express the function equation in the form .

b) Use the method of completing the square to determine the coordinates of the vertex.

c) What is the maximum area of the pool?

d) What are the dimensions of the pool that would maximize the area?

e) State the domain of this situation in set builder notation.

f) State the range of this situation in interval notation.

2) A farmer’s rectangular field is surrounded by 1000 metres of fence on three sides. The fourth side is open.

a) Determine a quadratic function that could be used to determine the maximum area of the field.

Express the function equation in the form .

b) Use the method of completing the square to determine the coordinates of the vertex.

c) What is the maximum area of the field?

d) What are the dimensions of the field that would maximize the area?

e) State the domain of this situation in set builder notation.

f) State the range of this situation in interval notation.

3) A sports team wants to raise money selling replicas of their jerseys. Last year the price was $20 per jersey and they were able to sell 180 jerseys. Their research on sales determined that for every $5 price increase, they will sell 10 fewer jerseys.

Let R 

Let n 

a) Write a quadratic function to model this situation.

b) Use technology to graph the quadratic function.

Edit the window settings or axis end values to display the vertex and intercepts.

Sketch the graph in the window to the right and record axis labels, axes end values, and the vertex coordinates.

c) Determine the maximum revenue that the team can hope to make.

d) How many price increases would be needed to achieve the maximum revenue?

e) Calculate the price per jersey the team would have to charge to make this maximum revenue.

4) A store is selling the newest cellphone for $200. At this price, 700 phones were sold in one day. If the store reduces the

 price by $10, they could sell 50 more phones in a day.

Let R 

Let n 

a) Write a quadratic function that could be used to determine the maximum revenue.

b) Determine the maximum revenue that the store can hope to make.

c) How many price increases would be needed to maximize the revenue?

d) Calculate the price the store would have to charge per phone to make this maximum revenue.

5) If the x-intercepts of a quadratic function were located at -6 and 2, what would the equation of the axis of symmetry be?