***Pre-Calculus 11***

***Unit 4: Analyzing Quadratic Functions***

***Worksheet 4.7—Modelling and Solving Problems with Quadratic Functions***

1. Find two numbers whose difference is 10 and whose product is a minimum.

2. Find two numbers whose sum is 34 and whose product is a maximum.

3. Two numbers have a sum of 34. Find the numbers if the sum of their squares is a minimum.

4. A rectangular field is to be enclosed by 400m of fence.

 a) What dimensions will give a maximum area?

 b) What is the maximum area?

5. An ostrich farmer wants to build a rectangular fenced enclosure divided into five rectangular

 pens, as show in the diagram.

 A total length of 120m of fencing material is available. Find the overall dimensions of the

 enclosure that will make the total area a maximum.

6. An amusement park charges $8 admission and averages 2000 visitors per day. A survey

 shows that, for each $1 increase in the admission cost, 100 fewer people would visit the park.

1. Write the equation to express the revenue, $R(x)$ dollars, in terms of a price increase

of *x* dollars.

 b) Find the coordinates of the maximum point of this function.

 c) What admission cost gives the maximum revenue?

 d) How many visitors give the maximum revenue?

7. A farmer wants to make a rectangular emu corral along the side of a large barn and has enough materials for 60m of fencing. Only three sides must be fenced, since the barn wall will form the fourth side. What width of rectangle should the farmer use so that the maximum area is enclosed?

8. The Soccer club sells hoodies as a fund-raiser. They sell 1200 shirts a year at $20 each.

 They are planning to increase the price. A survey indicates that, for every $2 increase in

 price, there will be a drop of 60 sales a year. What should the selling price be in order to

 maximize the revenue?

9. Determine the maximum area of a triangle, in square centimetres, if the sum of its base and

 height is 10 cm.

***Solutions***

1. $5 and-5$ 2. $17 and 17$ 3. $17 and 17$

4. a) $100 m by 100 m$ b) $10 000 m^{2}$ 5. $10 m by 30 m$

6. a) $R\left(x\right)=(2000-100x)(8+x)$ b) $(6, 19 600)$ c) $14 d) 1400

7. $15m by 30m$ 8. $\$30$ 9. $12.5 cm^{2}$