

Applications of quadratic functions

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MA 158 Lesson 11

Example 1. A rectangular field is to be fenced off, and then divided in two by a fence running parallel to one of the sides. If 816 meters of fencing can be used, find the dimensions of the field that will maximize the total area, and then find the maximum area.

Example 2. At a price of \$100 per ticket, an airline can sell 300 tickets per day. It is determined that for every \$5 increase in ticket price, the airline will sell 10 fewer tickets. At what price should the airline sell the tickets to maximize their revenue?

Example 3. The height of a Samsung Galaxy Note 7 thrown from the top of the Purdue MathSci Building can be modeled by the equation

$$h(t) = -16t^2 + 21t + 331,$$

where h is the height in meters and t is time in seconds. Find the following:

- (a) The height of the building;
- (b) The time that it takes for the ball to reach its maximum height;
- (c) The maximum height of the ball;
- (d) The time it takes for the ball to reach the ground.

Example 4. A car rental company has 486 cars on their lot. They rent all 486 cars at a rate of \$38 per day. They determine that for every \$1 increase in the rental cost, they will rent 3 fewer cars. Find the car rental rate that will maximize revenue for the company.

Example 5. A company can produce a toy bear at a cost of \$5 per bear. When the company sells the bears at a price of \$34, they can sell 280 bears each week. It is estimated that for every \$0.50 decrease in the price, they can sell 20 more bears. Find the price that will maximize the profit for the company.