Mini-Lecture 3.4
Build Quadratic Models from Verbal Descriptions and Data

Learning Objectives:

1. Build quadratic models from verbal descriptions
2. Build quadratic models from data

Examples:

1. An object is propelled straight upward from a height of 6 feet with an initial velocity of 32 feet per second. The height at any time *t* is given by $s(t) = -16t^2 + 32t + 6$ where $s(t)$ is measured in feet and *t* in seconds. Find the maximum height attained by the object.

2. A rancher has 200 feet of fencing to enclose two adjacent rectangular corrals. What dimensions will produce a maximum enclosed area?

3. The revenue function for a new plasma television is given by $R(p) = 900p - 0.1p^2$. What price, *p*, should be charged to maximize revenue? What is the maximum revenue?

Teaching Notes:

- Students do not like application problems. You need to make the examples relevant.
- Emphasize the need to study problems of different types and to see a pattern in the way they are set up.
- Show the students that the equations are not difficult to solve, once the model is established.

Answers:

1. 22 feet

2. $50\,\text{ft} \times 33\frac{1}{3}\,\text{ft}$

3. \$4500; \$2,025,000