

## PROBLEM SOLVING

### EXAMPLE 7

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for Exs. 62–65

- 62. DRUM MAJOR** While marching, a drum major tosses a baton into the air and catches it. The height  $h$  (in feet) of the baton after  $t$  seconds can be modeled by  $h = -16t^2 + 32t + 6$ . Find the maximum height of the baton.

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- 63. VOLLEYBALL** The height  $h$  (in feet) of a volleyball  $t$  seconds after it is hit can be modeled by  $h = -16t^2 + 48t + 4$ . Find the volleyball's maximum height.

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- 64. SKATEBOARD REVENUE** A skateboard shop sells about 50 skateboards per week for the price advertised. For each \$1 decrease in price, about 1 more skateboard per week is sold. The shop's revenue can be modeled by  $y = (70 - x)(50 + x)$ . Use vertex form to find how the shop can maximize weekly revenue.



- 65. VIDEO GAME REVENUE** A store sells about 40 video game systems each month when it charges \$200 per system. For each \$10 increase in price, about 1 less system per month is sold. The store's revenue can be modeled by  $y = (200 + 10x)(40 - x)$ . Use vertex form to find how the store can maximize monthly revenue.

- 66. MULTIPLE REPRESENTATIONS** The path of a ball thrown by a softball player can be modeled by the function

$$y = -0.0110x^2 + 1.23x + 5.50$$

where  $x$  is the softball's horizontal position (in feet) and  $y$  is the corresponding height (in feet).

- Rewriting a Function** Write the given function in vertex form.
  - Making a Table** Make a table of values for the function. Include values of  $x$  from 0 to 120 in increments of 10.
  - Drawing a Graph** Use your table to graph the function. What is the maximum height of the softball? How far does it travel?
- 67. TAKS REASONING** Your school is adding a rectangular outdoor eating section along part of a 70 foot side of the school. The eating section will be enclosed by a fence along its three open sides. The school has 120 feet of fencing and plans to use 1500 square feet of land for the eating section.
- Write an equation for the area of the eating section.
  - Solve the equation. *Explain* why you must reject one of the solutions.
  - What are the dimensions of the eating section?

