9.1/9.2 Applications. Maximum and Minimum Problems \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Begin by sketching a picture of the parabola. Then use it and the given information to answer each.**

1. A punter kicked the football into the air with an upward velocity of 62 ft./s. Its height h in feet after t seconds is given by the function h = –16t2 + 62t + 2. What is the maximum height the ball reaches? How long will it take the football to reach the maximum height?
2. A disc is thrown into the air with an upward velocity of 20 ft./s. Its height h in feet after t seconds is given by the function h = –16t2 + 20t + 6. What is the maximum height the disc reaches? How long will it take the disc to reach the maximum height?
3. A local nursery sells a large number of ornamental trees every year. The owners have determined the cost per tree *C* for buying and caring for each tree before it is sold is

*C* = 0.001*n*2 − 0.3*n +* 50. In this function, *C* is the cost per tree in dollars and *n* is the number of trees in stock.How many trees will minimize the cost per tree? What will the minimum cost per tree be?

1. A small independent motion picture company determines the profit *P* for producing *n* DVD copies of a recent release is *P =* −0.02*n*2 + 3.40*n −* 16. *P* is the profit in thousands of dollars and *n* is in thousands of units.How many DVDs should the company produce to maximize the profit?What will the maximize profit be?
2. The amount of cloth used to make four curtains is given by the function *A =* −4*x*2 + 40*x*, where *x* is the width of one curtain in feet and *A* is the total area in square feet. Find the width that maximizes the area of the curtains. What is the maximum area?
3. The expression *P*(*x*) = 2500*x* − 2*x*2 describes the profit of a company that customizes bulldozers

when it customizes *x* bulldozers in a month.How many bulldozers per month must the company customize to make the maximum possible profit? What is the maximum profit?