Appendix F

Ticket Sales

Living in or near a metropolitan area has some advantages. Entertainment opportunities are almost endless in a major city. Events occur almost every night, from sporting events to the symphony. Tickets to these events are not available long and can often be modeled by quadratic equations.

Application Practice

Answer the following questions. Use Equation Editor to write mathematical expressions and equations. First, save this file to your hard drive by selecting **Save As** from the File menu. Click the white space below each question to maintain proper formatting.

1. Suppose you are an event coordinator for a large performance theater. One of the hottest new Broadway musicals has started to tour and your city is the first stop on the tour. You need to supply information about projected ticket sales to the box office manager. The box office manager uses this information to anticipate staffing needs until the tickets sell out. You provide the manager with a quadratic equation that models the expected number of ticket sales for each day *x*. ($x = 1$ is the day tickets go on sale).

$$Tickets = \text{-}0.2\text{x}^2 + 12\text{x} + 11$$

    a. Does the graph of this equation open up or down? How did you determine this?

    b. Describe what happens to the tickets sales as time passes.

    c. Use the quadratic equation to determine the last day that tickets will be sold.

      Note. Write your answer in terms of the number of days after ticket sales begin.

    d. Will tickets peak or be at a low during the middle of the sale? How do you know?

    e. After how many days will the peak or low occur?

    f. How many tickets will be sold on the day when the peak or low occurs?

    g. What is the point of the vertex? How does this number relate to your answers in parts e. and f?

    h. How many solutions are there to the equation $-0.2x^2 + 12x + 11 = 0$? How do you know?

    i. What do the solutions represent? Is there a solution that does not make sense? If so, in what ways does the solution not make sense?