

**LESSON**  
**9.2**

# Graphing Calculator Activity: Finding a Minimum or Maximum Value

For use before the lesson "Graph  $y = ax^2 + bx + c$ "

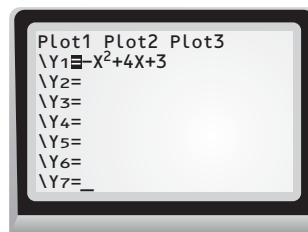
**QUESTION** How can you use a graphing calculator to graph a quadratic function and tell whether the function has a minimum value or a maximum value?

Recall from Section 10.1 that a quadratic function can be written in the standard form  $y = ax^2 + bx + c$  where  $a \neq 0$ . You know that every quadratic function has a U-shaped graph called a parabola that opens up if  $a > 0$  and opens down if  $a < 0$ .

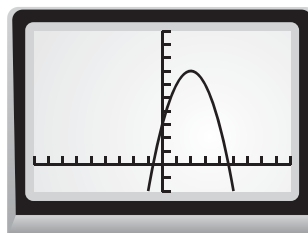
**EXAMPLE** Find a minimum value or maximum value of a quadratic function

Use a graphing calculator to graph  $f(x) = -x^2 + 4x + 3$ . Tell whether the function has a *minimum value* or a *maximum value*. Then find the minimum or maximum value.

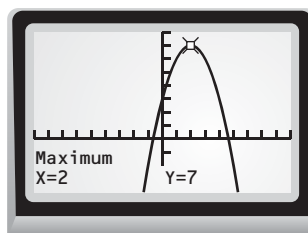
**STEP 1** Press  $\boxed{Y=}$ . Let  $y_1$  equal the quadratic function.



**STEP 2** Graph the quadratic function using a friendly viewing window. From the graph, it appears that the function has a maximum value.



**STEP 3** Use the *maximum* feature to find the maximum value of the function. When  $x = 2$ , the maximum value of the function is  $f(2) = 7$ .



**PRACTICE** Use a graphing calculator to graph the quadratic function. Tell whether the function has a *minimum value* or a *maximum value*. Then find the minimum or maximum value to the nearest tenth. (Use either the graphing calculator's *minimum* feature or *maximum* feature.)

1.  $f(x) = -2x^2 + 10x - 3$
2.  $f(x) = 2x^2 - x + 5$
3.  $f(x) = 5x^2 - 9x - 3$
4.  $f(x) = 4x^2 + 13x + 7$
5.  $f(x) = -3x^2 + 10x + 5$
6.  $f(x) = -x^2 + 9x - 14$
7. Complete the following: For  $y = ax^2 + bx + c$ , the  $y$ -coordinate of the vertex is the   ?   value of the function if  $a > 0$  and the   ?   value of the function if  $a < 0$ .

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# Graphing Calculator Activity: Finding a Minimum or Maximum Value

*continued*
*For use before the lesson "Graph  $y = ax^2 + bx + c$ "*
**TI-83 Plus**

$Y=$  (-) X,T,θ,n  $x^2$  + 4 X,T,θ,n  
 + 3 ZOOM 6 2nd [CALC] 4  
 0 ENTER 5 ENTER 2 ENTER

**Casio CFX-9850GC Plus**

From the main menu, choose GRAPH.

(-) X,θ,T  $x^2$  + 4 X,θ,T + 3 EXE  
 SHIFT F3 F3 EXIT F6 SHIFT F5 F2