Warm-Up

Graph the quadratic function using the equation of the axis of symmetry.

Label the vertex, axis of symmetry, y-intercept, x-intercept, including their location (hint: a #).

$$f(x) = x^2 + 4x - 5$$

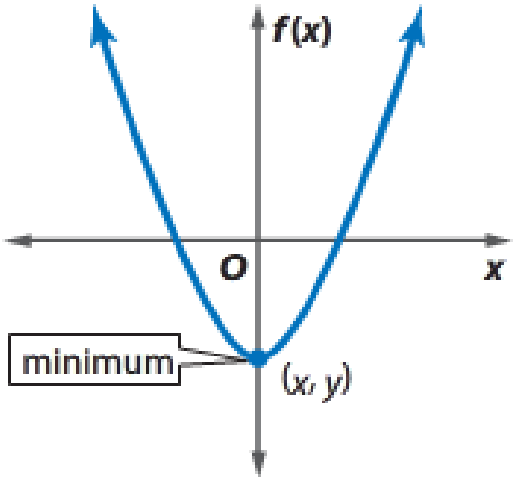
KeyConcept Maximum and Minimum Value

Words The graph of $f(x) = ax^2 + bx + c$, where $a \neq 0$,

- opens up and has a minimum value when $a > 0$, and
- opens down and has a maximum value when $a < 0$.

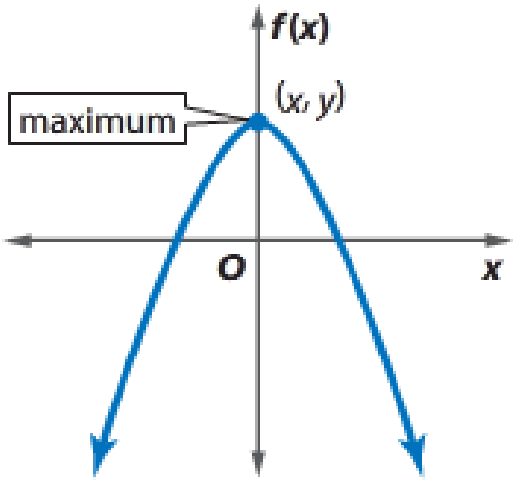
Model

a is positive.



The y-coordinate is the minimum value.

a is negative.



The y-coordinate is the maximum value.

LT 3.3
Graphing Quadratic Functions
Maximum and Minimum

Learning Objective

I will be able to . . .

* Find and interpret the maximum and minimum values of a quadratic function.

Ex1:

a. Determine whether the functions has a maximum or minimum value.

$$f(x) = -4x^2 + 12x + 18$$

a = -4, so the graph open down and the function has a maximum value

b. State the maximum or minimum value

$$f(x) = -4x^2 + 12x + 18$$

The maximum value of the function is the y-coordinate of the vertex.

The x-coordinate of the vertex is

The y-coordinate of the vertex is

Ex2: $f(x) = 4x^2 - 24x + 11.$

A. Determine whether the function has a maximum or minimum value.

b. State the maximum or minimum value

$$f(x) = 4x^2 - 24x + 11.$$

The maximum value of the function is the y-coordinate of the vertex.

The x-coordinate of the vertex is

The y-coordinate of the vertex is

Homework

- Use HW #1 and 2 to complete the following:

1) Determine whether the function has a maximum or minimum value.

2) State the maximum or minimum value