Graphing Quadratic Functions – Basics

Objective 1: Graph of Quadratic Functions $y = ax^2 + bx + c$

The graph of $y = ax^2 + bx + c$ is a parabola.

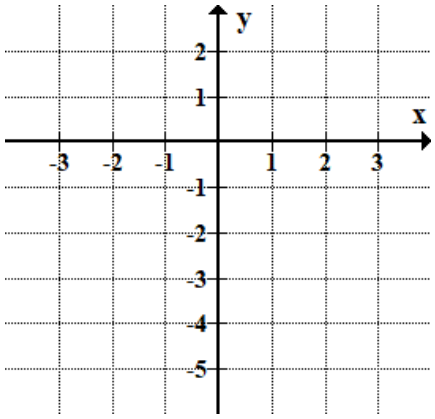
The parabola opens upward if $a > 0$.

The parabola opens downward if $a < 0$.

The x-coordinate of the vertex can be found using the formula $x = -\frac{b}{2a}$.

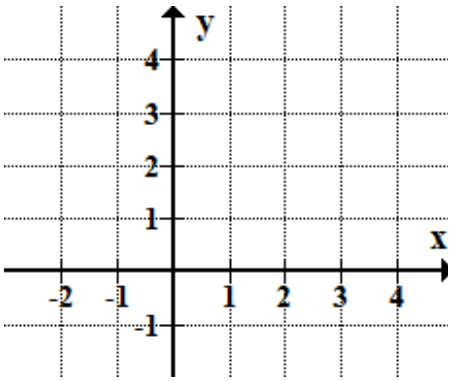
Example: Determine if the parabola opens up or down. Find the vertex, any intercepts and sketch the graph. Round intercepts to one decimal place if needed. $y = x^2 - 4$

x	y



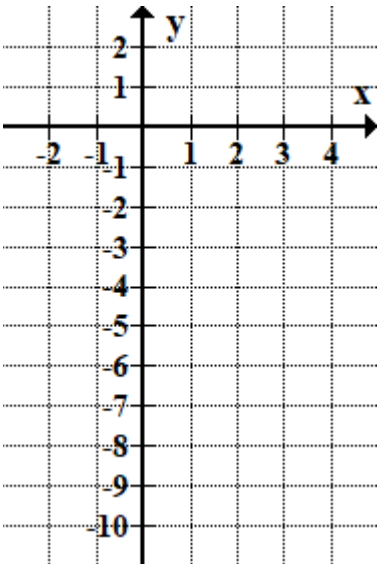
Example: Determine if the parabola opens up or down. Find the vertex, any intercepts and sketch the graph. Round intercepts to one decimal place if needed. $y = -x^2 + 2x + 3$

x	y



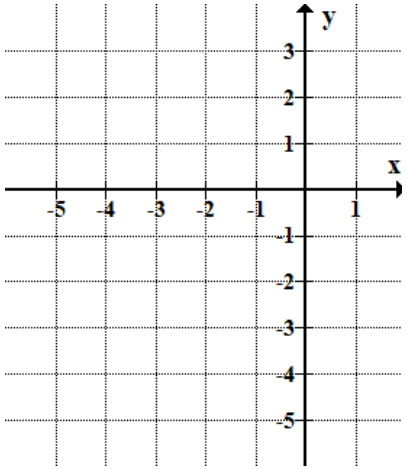
Example: Determine if the parabola opens up or down. Find the vertex, any intercepts and sketch the graph. Round intercepts to one decimal place if needed. $y = -3x^2 + 6x - 1$

x	y



Example: Determine if the parabola opens up or down. Find the vertex, any intercepts and sketch the graph. Round intercepts to one decimal place if needed. $y = 2x^2 + 8x + 3$

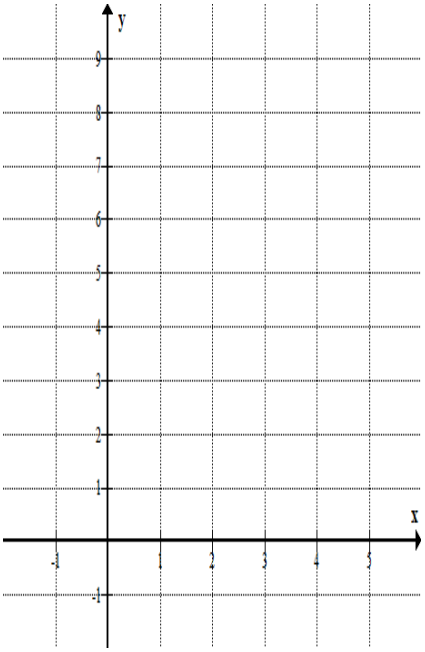
x	y



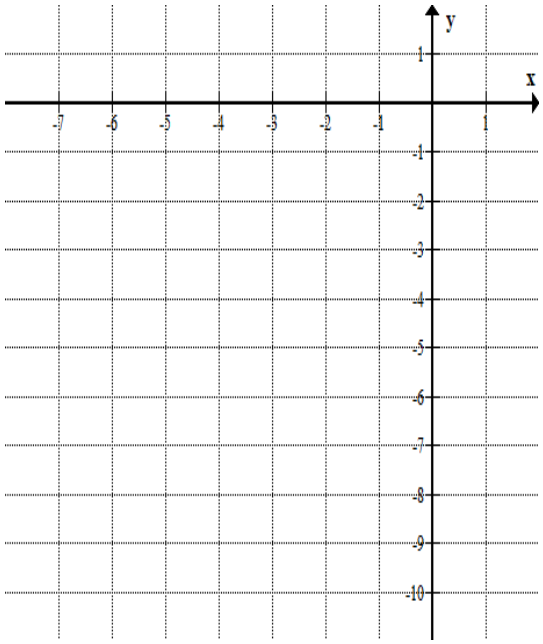
Pause the video to try this one on your own, then restart when you are ready to check your answer.

Extra Practice

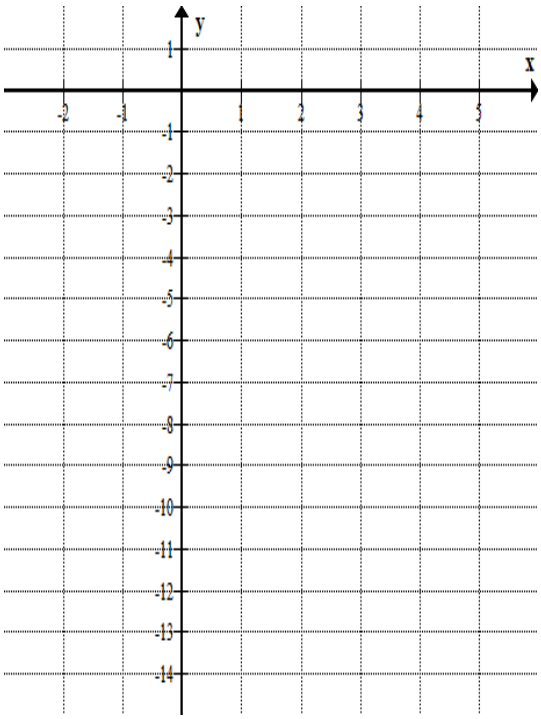
1. Determine if the parabola opens up or down. Find the vertex, any intercepts and sketch the graph. Round intercepts to one decimal place if needed. $y = -x^2 + 4x + 5$



2. Determine if the parabola opens up or down. Find the vertex, any intercepts and sketch the graph. Round intercepts to one decimal place if needed. $y = x^2 + 6x - 1$



3.Determine if the parabola opens up or down. Find the vertex, any intercepts and sketch the graph. Round intercepts to one decimal place if needed. $y = -2x^2 + 4x - 7$



Restart when you are ready to check your answers.

Objective 2: Applications of Quadratic Functions

Example: The cost C in dollars of manufacturing x keyboards is given by the function $C(x) = 3x^2 - 900x + 94,500$.

a) Does this function have a minimum or a maximum?

b) Find the number of keyboards that must be manufactured to minimize the cost.

c) Find the minimum cost.

Example: A company that produces lamps finds that if they manufacture x lamps per week, their costs will be $C(x) = 150x + 6000$ and their revenue will be $R(x) = -3x^2 + 510x$ (both in dollars).

a) Find the company's break-even points.

b) Find the number of lamps that will maximize the profit.

c) Find the maximum profit.

Example: A company that produces furniture finds that if they manufacture x desks per week, their costs will be $C(x) = 220x + 64000$ and their revenue will be $R(x) = -4x^2 + 1340x$ (both in dollars).

a) Find the company's break-even points.

b) Find the number of desks that will maximize the profit.

c) Find the maximum profit.

Pause the video to try this one on your own, then restart when you are ready to check your answer.

Extra Practice

1. The cost C in dollars of manufacturing x keyboards is given by the function $C(x) = 2x^2 - 416x + 32500$

   a) Does this function have a minimum or a maximum?

   b) Find the number of keyboards that must be manufactured to minimize the cost.

   c) Find the minimum cost.

2. A company that produces lamps finds that if they manufacturer x lamps per week, its costs will be $C(x) = 240x + 6000$ and its revenue will be $R(x) = -3x^2 + 600x$ (both in dollars).

   a) Find the company's break-even points.

   b) Find the number of lamps that will maximize profit.

   c) Find the maximum profit.

3. A company that produces manufacturers finds that if they produce x desks per week, its costs will be $C(x) = 160x + 22000$ and its revenue will be $R(x) = -4x^2 + 800x$ (both in dollars).

a) Find the company's break-even points.

b) Find the number of desks that will maximize profit.

c) Find the maximum profit.

Restart when you are ready to check your answers.