

## Lesson 13-6

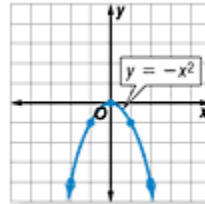
### Example 1 Graph Quadratic Equations

Graph each function.

a.  $y = -x^2$

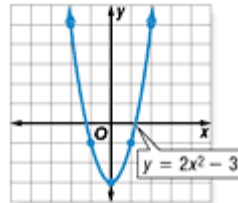
Make a table of values, plot the ordered pairs, and connect the points with a curve.

$x$	$y = -x^2$	$(x, y)$
-2	$-(-2)^2 = -4$	$(-2, -4)$
-1	$-(-1)^2 = -1$	$(-1, -1)$
0	$-(0)^2 = 0$	$(0, 0)$
1	$-(1)^2 = -1$	$(1, -1)$
2	$-(2)^2 = -4$	$(2, -4)$



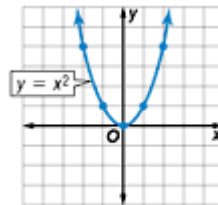
b.  $y = 2x^2 - 3$

$x$	$y = 2x^2 - 3$	$(x, y)$
-2	$2(-2)^2 - 3 = 5$	$(-2, 5)$
-1	$2(-1)^2 - 3 = -1$	$(-1, -1)$
0	$2(0)^2 - 3 = -3$	$(0, -3)$
1	$2(1)^2 - 3 = -1$	$(1, -1)$
2	$2(2)^2 - 3 = 5$	$(2, 5)$



c.  $y = x^2$

$x$	$y = x^2$	$(x, y)$
-2	$(-2)^2 = 4$	$(-2, 4)$
-1	$(-1)^2 = 1$	$(-1, 1)$
0	$(0)^2 = 0$	$(0, 0)$
1	$(1)^2 = 1$	$(1, 1)$
2	$(2)^2 = 4$	$(2, 4)$



**Example 2 Use a Function to Solve a Problem**

**NATURE** The height of a tree is equal to 0.5 times the number of years since planting squared. Graph this function and determine how tall the tree will be after 3.5 years.

**Words** Height is equal to 0.5 times the years squared.

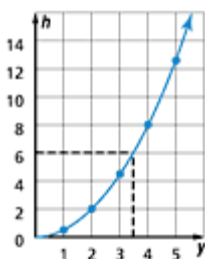
**Variables** Let  $h$  = height in feet and  $y$  = years since planting.

**Equation**

Height	is equal		0.5	times	the number of
{	to	{	}	}	years squared.
$h$	=	$0.5$	.	$y^2$	

The equation is  $h = 0.5y^2$ . Since the variable  $y$  has an exponent of 2, this function is nonlinear. Now graph  $h = 0.5y^2$ . Since the number of years since planting cannot be negative, use only positive values of  $y$ .

$y$	$h = 0.5y^2$	$(y, h)$
1	$0.5(1)^2 = 0.5$	(1, 0.5)
2	$0.5(2)^2 = 2$	(2, 2)
3	$0.5(3)^2 = 4.5$	(3, 4.5)
4	$0.5(4)^2 = 8$	(4, 8)
5	$0.5(5)^2 = 12.5$	(5, 12.5)

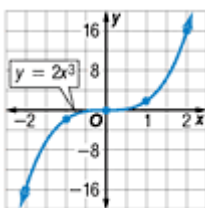


By looking at the graph, we find that after 3.5 years, the tree will be approximately 6 feet tall.

**Example 3 Graph a Cubic Function**

a.  $y = 2x^3$

$x$	$y = 2x^3$	$(x, y)$
-2	$2(-2)^3 = -16$	(-2, -16)
-1	$2(-1)^3 = -2$	(-1, -2)
0	$2(0)^3 = 0$	(0, 0)
1	$2(1)^3 = 2$	(1, 2)
2	$2(2)^3 = 16$	(2, 16)



b.  $y = x^3 - 3$

$x$	$y = x^3 - 3$	$(x, y)$
-2	$(-2)^3 - 3 = -11$	$(-2, -11)$
-1	$(-1)^3 - 3 = -4$	$(-1, -4)$
0	$(0)^3 - 3 = -3$	$(0, -3)$
1	$(1)^3 - 3 = -2$	$(1, -2)$
2	$(2)^3 - 3 = 5$	$(2, 5)$

