

WRITING AN EQUATION When you decide that a set of ordered pairs represents a linear, an exponential, or a quadratic function, you can write an equation for the function. In this lesson, when you write an equation for a quadratic function, the equation will have the form $y = ax^2$.

EXAMPLE 3 Write an equation for a function

Tell whether the table of values represents a *linear function*, an *exponential function*, or a *quadratic function*. Then write an equation for the function.

x	-2	-1	0	1	2
y	2	0.5	0	0.5	2

Solution

STEP 1 Determine which type of function the table of values represents.

x	-2	-1	0	1	2
y	2	0.5	0	0.5	2

First differences: -1.5 -0.5 0.5 1.5

Second differences: 1 1 1

The table of values represents a quadratic function because the second differences are equal.

STEP 2 Write an equation for the quadratic function. The equation has the form $y = ax^2$. Find the value of a by using the coordinates of a point that lies on the graph, such as (1, 0.5).

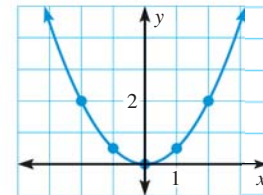
$y = ax^2$ Write equation for quadratic function.

$0.5 = a(1)^2$ Substitute 1 for x and 0.5 for y .

$0.5 = a$ Solve for a .

▶ The equation is $y = 0.5x^2$.

CHECK Plot the ordered pairs from the table. Then graph $y = 0.5x^2$ to see that the graph passes through the plotted points.



AVOID ERRORS

In Example 3, do not use (0, 0) to find the value of a , even though (0, 0) lies on the graph of $y = ax^2$. If you do, you will obtain an undefined value for a .

GUIDED PRACTICE for Example 3

Tell whether the table of values represents a *linear function*, an *exponential function*, or a *quadratic function*. Then write an equation for the function.

3.

x	-3	-2	-1	0	1
y	-7	-5	-3	-1	1

4.

x	-2	-1	0	1	2
y	8	2	0	2	8