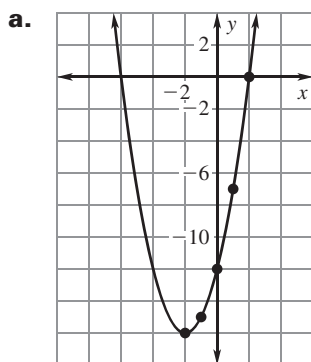


LESSON
9.8**Study Guide**

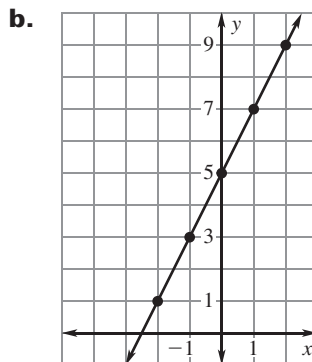
For use with the lesson "Compare Linear, Exponential, and Quadratic Models"

GOAL Compare linear, exponential, and quadratic models.**EXAMPLE 1** Choose functions using sets of ordered pairsUse a graph to tell whether the ordered pairs represent a **linear function**, an **exponential function**, or a **quadratic function**.

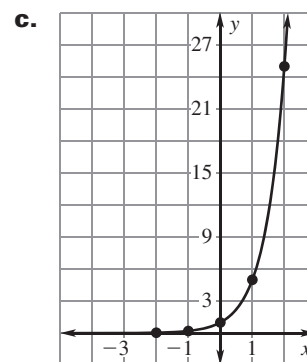
- a. $(-2, -16), (-1, -15), (0, -12), (1, -7), (2, 0)$
 b. $(-2, 1), (-1, 3), (0, 5), (1, 7), (2, 9)$
 c. $(-2, \frac{1}{25}), (-1, \frac{1}{5}), (0, 1), (1, 5), (2, 25)$

Solution

Quadratic function



Linear function



Exponential function

EXAMPLE 2 Identify functions using differences or ratiosUse differences or ratios to tell whether the table of values represents a **linear function**, an **exponential function**, or a **quadratic function**.**Solution**

x	-1	0	1	2
y	1	3	9	2

7

Ratios: $\frac{3}{1} = 3$ 3 3

The table represents an exponential function.

LESSON
9.8
Study Guide
continued
For use with the lesson "Compare Linear, Exponential, and Quadratic Models"
Exercises for Examples 1 and 2

- Tell whether the ordered pairs represent a *linear function*, a *quadratic function*, or an *exponential function*: $(-1, -6)$, $(0, -4)$, $(1, 0)$, $(2, 6)$.
- Tell whether the table represents a *linear function*, a *quadratic function*, or an *exponential function*.

x	0	1	2	3
y	-6	3	12	21

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.

STEP 1 Determine which type of function the values in the table represent.

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

First differences: -2 -2 -2 -2

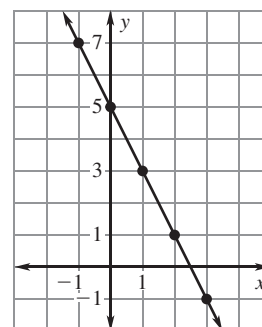
The table of values represents a linear function because the first differences are equal.

STEP 2 Write an equation for the linear function. The equation has the form $y = mx + b$. When $x = 0$, $y = 5$, so $b = 5$. Find m by substituting any two points into the slope formula.

$$m = \frac{5 - 7}{0 - (-1)} = \frac{-2}{1} = -2$$

The equation is $y = -2x + 5$.

CHECK Plot the ordered pairs from the table. Then graph $y = -2x + 5$ to see that the graph passes through the plotted points.


Exercises 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	-1	0	1	2
y	1	2	6	2

4.

x	-2	-1	0	1	2
y	0.0625	0.125	0.25	0.5	1