4-1 Study Guide and Intervention

Graphing Equations in Slope-Intercept Form

Lesson 4-1

Slope-Intercept Form

Slope-Intercept Form	$y = mx + b$, where m is the slope and b is the y-intercept

Example 1 Write an equation in slope-intercept form for the line with a slope of -4 and a y-intercept of 3.

$y = mx + b$ Slope-intercept form

$y = -4x + 3$ Replace m with -4 and b with 3.

Example 2 Graph $3x - 4y = 8$.

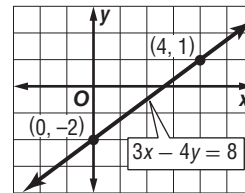$3x - 4y = 8$ Original equation

$-4y = -3x + 8$ Subtract $3x$ from each side.

$\dfrac{-4y}{-4} = \dfrac{-3x + 8}{-4}$ Divide each side by -4.
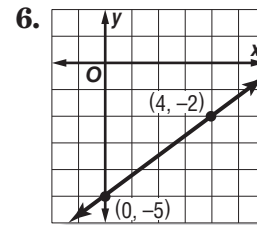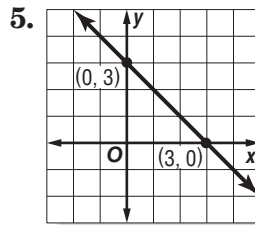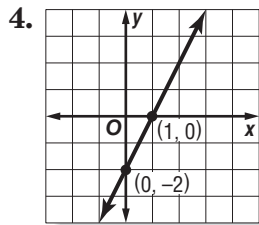
$y = \dfrac{3}{4}x - 2$ Simplify.

The y-intercept of $y = \dfrac{3}{4}x - 2$ is -2 and the slope is $\dfrac{3}{4}$. So graph the point $(0, -2)$. From this point, move up 3 units and right 4 units. Draw a line passing through both points.

Exercises

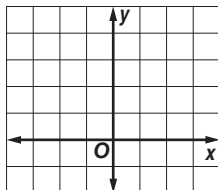**Write an equation of a line in slope-intercept form with the given slope and y-intercept.**

1. slope: 8, y-intercept -3 **2.** slope: -2, y-intercept -1 **3.** slope: -1, y-intercept -7
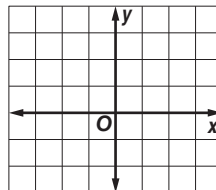
Write an equation in slope-intercept form for each graph shown.

4.

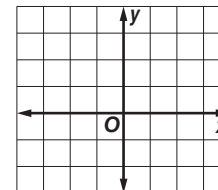**5.**

6.

Graph each equation.

7. $y = 2x + 1$

8. $y = -3x + 2$

9. $y = -x - 1$

4-1 Study Guide and Intervention *(continued)*

Graphing Equations in Slope-Intercept Form

Modeling Real-World Data

Example **MEDIA** Since 1999, the number of music cassettes sold has decreased by an average rate of 27 million per year. There were 124 million music cassettes sold in 1999.

a. Write a linear equation to find the average number of music cassettes sold in any year after 1999.

The rate of change is -27 million per year. In the first year, the number of music cassettes sold was 124 million. Let $N =$ the number of millions of music cassettes sold. Let $x =$ the number of years since 1999. An equation is $N = -27x + 124$.

b. Graph the equation.

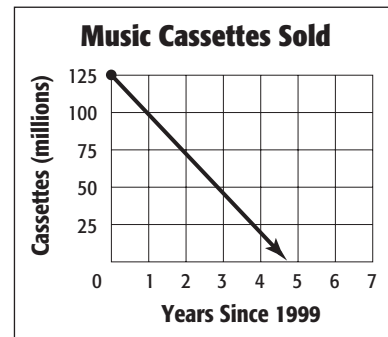The graph of $N = -27x + 124$ is a line that passes through the point at (0, 124) and has a slope of -27.

Music Cassettes Sold

c. Find the approximate number of music cassettes sold in 2003.

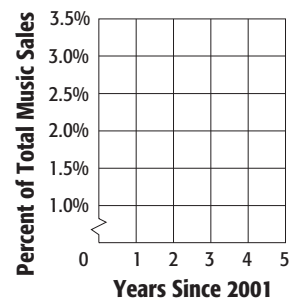|	
$N = -27x + 124$	Original equation
$N = -27(4) + 124$	Replace x with 4.
$N = 16$	Simplify.

There were about 16 million music cassettes sold in 2003.

Exercises

1. MUSIC In 2001, full-length cassettes represented 3.4% of total music sales. Between 2001 and 2006, the percent decreased by about 0.5% per year.

a. Write an equation to find the percent P of recorded music sold as full-length cassettes for any year x between 2001 and 2006.

b. Graph the equation on the grid at the right.

c. Find the percent of recorded music sold as full-length cassettes in 2004.

Full-length Cassette Sales

2. POPULATION The population of the United States is projected to be 300 million by the year 2010. Between 2010 and 2050, the population is expected to increase by about 2.5 million per year.

a. Write an equation to find the population P in any year x between 2010 and 2050.

b. Graph the equation on the grid at the right.

c. Find the population in 2050.

Projected United States Population