# 5.1 Write Linear Equations in Slope-Intercept Form

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| **Before** | You graphed equations of lines. |
| **Now** | You will write equations of lines. |
| **Why?** | So you can model distances in sports, as in Ex. 52. |

**Key Vocabulary**
• *y*-intercept, *p. 225*
• slope, *p. 235*
• slope-intercept form, *p. 244*

Recall that the graph of an equation in slope-intercept form, $y = mx + b$, is a line with a slope of $m$ and a $y$-intercept of $b$. You can use this form to write an equation of a line if you know its slope and $y$-intercept.

## EXAMPLE 1  Use slope and *y*-intercept to write an equation

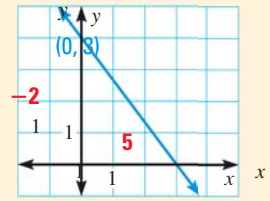**Write an equation of the line with a slope of −2 and a *y*-intercept of 5.**

$y = mx + b$      **Write slope-intercept form.**

$y = -x + 5$      **Substitute −2 for *m* and 5 for *b*.**

## EXAMPLE 2  TAKS PRACTICE: Multiple Choice

**Which equation represents the line shown?**

Ⓐ $y = -\frac{4}{3}x + 4$    Ⓑ $y = -\frac{3}{4}x + 4$

Ⓒ $y = -\frac{4}{3}x + 1$    Ⓓ $y = 4x + \frac{2}{5}$



**ELIMINATE CHOICES**
In Example 2, you can eliminate choices C and D because the *y*-intercepts of the graphs of these equations are not 4.

The slope of the line is $\dfrac{\text{rise}}{\text{run}} = \dfrac{-4}{3} = -\dfrac{4}{3}$.

The line crosses the $y$-axis at (0,4). So the $y$-intercept is 4.

$y = mx + b$      **Write slope-intercept form.**

$y = -\dfrac{4}{3}x + 4$      **Substitute $-\dfrac{4}{3}$ for *m* and 4 for *b*.**

▶ The correct answer is A. Ⓐ Ⓑ Ⓒ Ⓓ

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## ✔ GUIDED PRACTICE  for Examples 1 and 2

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

**1.** Slope is 8; *y*-intercept is −7.

**2.** Slope is $\frac{3}{4}$; *y*-intercept is −3.