EXAMPLE 2 Graph an equation using slope-intercept form

Graph the equation $2x + y = 3$.

Solution

STEP 1 **Rewrite** the equation in slope-intercept form.

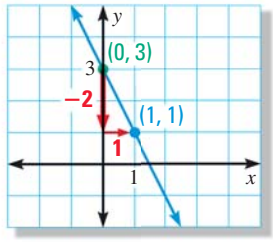
$y = -2x + 3$

STEP 2 **Identify** the slope and the y-intercept.

$m = -2$ and $b = 3$

STEP 3 **Plot** the point that corresponds to the y-intercept, $(0, 3)$.

STEP 4 **Use** the slope to locate a second point on the line. Draw a line through the two points.



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CHECK REASONABLENESS
To check the line drawn in Example 2, substitute the coordinates of the second point into the original equation. You should get a true statement.

MODELING In real-world problems that can be modeled by linear equations, the y-intercept is often an initial value, and the slope is a rate of change.

EXAMPLE 3 Change slopes of lines

ESCALATORS To get from one floor to another at a library, you can take either the stairs or the escalator. You can climb stairs at a rate of 1.75 feet per second, and the escalator rises at a rate of 2 feet per second. You have to travel a vertical distance of 28 feet. The equations model the vertical distance d (in feet) you have left to travel after t seconds.

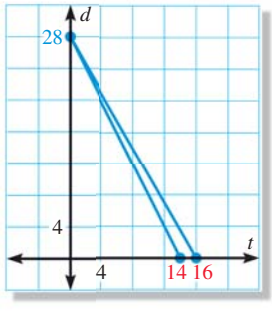
Stairs: $d = -1.75t + 28$ **Escalator:** $d = -2t + 28$

a. Graph the equations in the same coordinate plane.

b. How much time do you save by taking the escalator?

Solution

a. Draw the graph of $d = -1.75t + 28$ using the fact that the d-intercept is 28 and the slope is -1.75. Similarly, draw the graph of $d = -2t + 28$. The graphs make sense only in the first quadrant.



b. The equation $d = -1.75t + 28$ has a t-intercept of **16**. The equation $d = -2t + 28$ has a t-intercept of **14**. So, you save $16 - 14 = 2$ seconds by taking the escalator.

GUIDED PRACTICE for Examples 2 and 3

4. Graph the equation $y = -2x + 5$.

5. **WHAT IF?** In Example 3, suppose a person can climb stairs at a rate of 1.4 feet per second. How much time does taking the escalator save?