4.5 Graph Using Slope-Intercept Form

Goal • Graph linear equations using slope-intercept form.

Your Notes

VOCABULARY

Slope-intercept form A linear equation written in the form $y = mx + b$

Parallel Two lines in the same plane that do not intersect

FINDING THE SLOPE AND *Y*-INTERCEPT OF A LINE

Words

A linear equation of the form $y = mx + b$ is written in slope-intercept form where m is the slope and b is the y-intercept of the equation's graph.

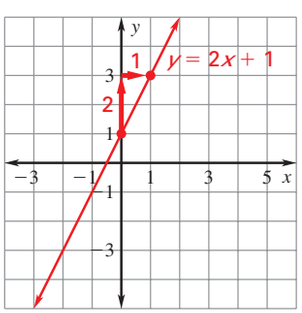
Symbols

$y = mx + b$

slope: m ; y-intercept: b

$y = 2x + 1$

Graph



Your Notes

Example 1 ***Identify slope and y-intercept***

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

a. $y = x + 3$ **b.** $-2x + y = 5$

Solution

a. The equation is in the form $y = mx + b$. So, the slope of the line is 1, and the *y*-intercept is 3.

b. Rewrite the equation in slope-intercept form by solving for y.

$-2x + y = 5$ **Write original equation.**

$y = 2x + 5$ **Subtract $-2x$ from each side.**

The line has a slope of 2 and a *y*-intercept of 5.

Checkpoint **Identify the slope and *y*-intercept of the line with the given equation.**

1. $y = 4x - 1$ slope: 4 *y*-intercept: -1	**2.** $4x - 2y = 8$ slope: 2 *y*-intercept: -4
3. $4y = 3x + 16$ slope: $\frac{3}{4}$ *y*-intercept: 4	**4.** $6x + 3y = -21$ slope: -2 *y*-intercept: -7

Your Notes

Example 2 ***Graph an equation using slope-intercept form***

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

Solution

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

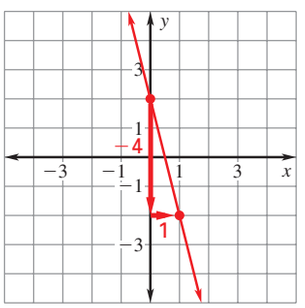
$y = -4x + 2$

Step 2 Identify the slope and the y-intercept.

$m =$ -4 $b =$ 2

Step 3 Plot the point that corresponds to the y-intercept, (0, 2).

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

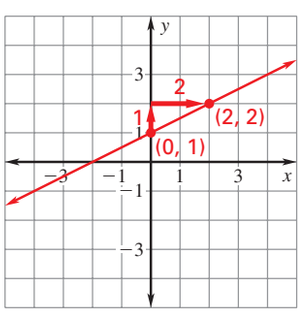


✔ ***Checkpoint*** **Complete the following exercise.**

5. Graph the equation $-\frac{1}{2}x + y = 1$.

$m = \frac{1}{2}$

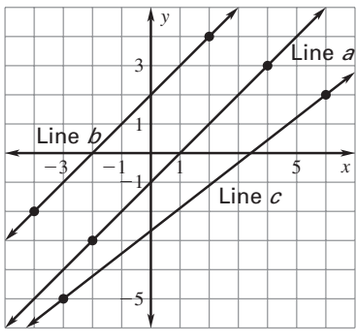
$b = 1$



Your Notes

Example 3 ***Identify parallel lines***

Determine which of the lines are parallel.



Solution

Find the slope of each line.

Line *a*: $m = \dfrac{-3 - 3}{-2 - 4} = \dfrac{-6}{-6} = 1$

Line *b*: $m = \dfrac{-2 - 4}{-4 - 2} = \dfrac{-6}{-6} = 1$

Line *c*: $m = \dfrac{-5 - 2}{-3 - 6} = \dfrac{-7}{-9} = \dfrac{7}{9}$

Lines *a* and *b* have the same slope. They are parallel.

✔ ***Checkpoint*** **Complete the following exercise.**

6. Determine which lines are parallel.

Line *a*: through (2, 5) and (−2, 2)

Line *b*: through (4, 1) and (−3, −4)

Line *c*: through (2, 3) and (−2, 0)

Lines *a* and *c* are parallel with slope $\frac{3}{4}$.

Homework