

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 $y = mx + b$

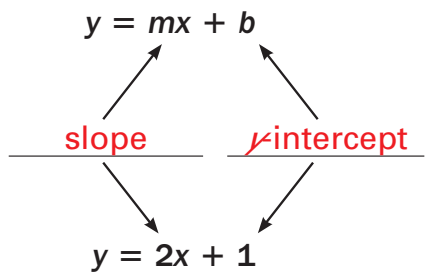
Parallel Two lines in the same plane that do not intersect

FINDING THE SLOPE AND Y-INTERCEPT OF A LINE

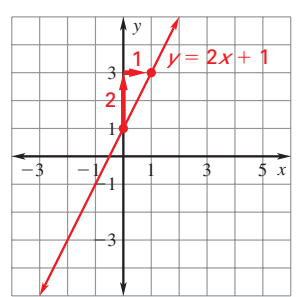
Words

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



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.

$$y = \underline{2x + 5}$$

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.

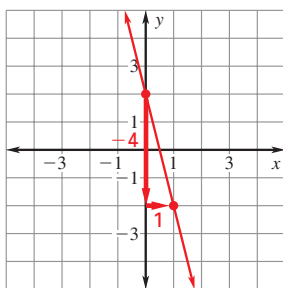
$$y = -4x + 2$$

Step 2 Identify the slope and the y-intercept.

$$m = -4 \qquad b = 2$$

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.

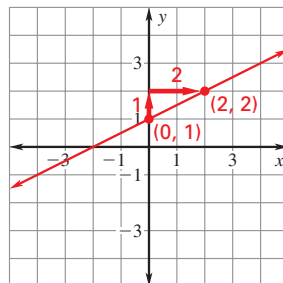


✔ **Checkpoint** Complete the following exercise.

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

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

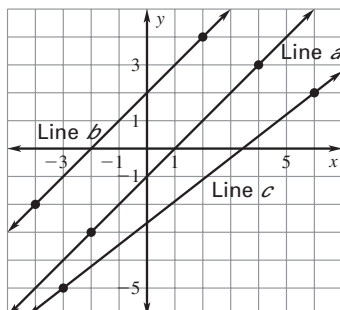
$$b = 1$$



Your Notes

Example 3 Identify parallel lines

Determine which of the lines are parallel.



Solution

Find the slope of each line.

$$\text{Line } a: m = \frac{-3 - 3}{-2 - 4} = \frac{-6}{-6} = 1$$

$$\text{Line } b: m = \frac{-2 - 4}{-4 - 2} = \frac{-6}{-6} = 1$$

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

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