8.5 Slope-Intercept Form

Students will be able to graph linear equations in slope-intercept form.

Slope

The **slope**, *m*, of a line is the ratio of the line's vertical change (rise) to its horizontal change (run)

Rise - vertical change

Run - horizontal change

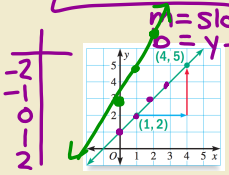
m = 4 m = -1/2

Slope-Intercept Form

Words A linear equation of the form $y = mx + b$ is said to be in **slope-intercept form**. The slope is m and the y-intercept is b.

Algebra $y = mx + b$ **Numbers** $y = 2x + 3$

m = slope
b = y-intercept



y = 1x + 1

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

y = mx + b

y = 3x + 2

Slope = 3/1

y-int = 2

3x + 5y = 10

-3x -3x

5y/5 = -3x/5 + 10/5

y = x - 4

Slope = 1/1

y-int = -4

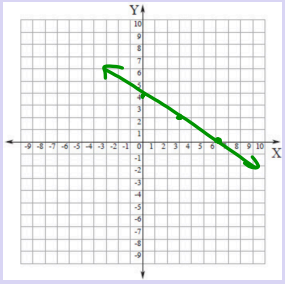
x + y = 3

y = -3/5 x + 2

Graphing an Equation in Slope-Intercept Form

y = -2/3x + 4

y = -2/3x + 4



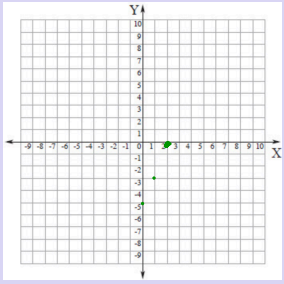
Graphing an Equation in Slope-Intercept Form

y - 2x = -5

+2x +2x

y = 2x - 5

y = 2/1 x - 5



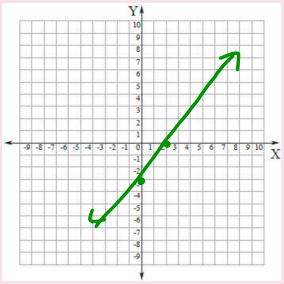
Graphing an Equation in Slope-Intercept Form

$3x - 2y = 6$

$-3x \quad -3x$

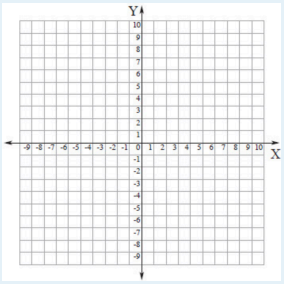
$\frac{-2y}{-2} = \frac{-3x}{-2} + \frac{6}{-2}$

$y = \frac{3}{2}x - 3$



Graphing an Equation in Slope-Intercept Form

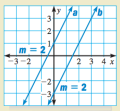
$y = 4x$



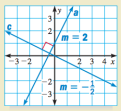
Steven has $42 in his bank account and each week he deposits another $3. Write an equation that models his account balance after x weeks. Use the equation to determine when he will have $120.

Slopes of Parallel and Perpendicular Lines

Two nonvertical parallel lines have the same slope. For example, the parallel lines a and b below both have a slope of 2.



Two nonvertical perpendicular lines, such as lines a and c below, have slopes that are negative reciprocals of each other.



Parallel

-same slope

Perpendicular

-slope is negative reciprocal

Find the slope of a line that has given relationship to the line with equation

$4x + 3y = -18$

Parallel to the line

Perpendicular to the line

For the line with the given equation, find the slope of a parallel line and the slope of a perpendicular line.

$y = -3x$

$y = 4x + 10$

$2x - 5y = 15$

8.5 Homework

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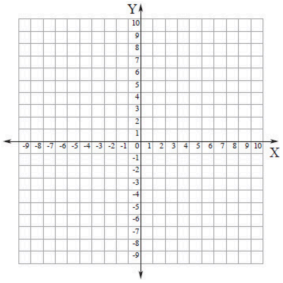
#1-12 all, 28, 30, 31

Graphing an Equation in Slope-Intercept Form

y = -x + 1



The temperature at Earth's surface averages about 20 degrees C. In the crust below the surface, the temperatures rises by about 25 degree C per kilometer of depth.

a. Write an equation that approximates the temperature below Earth's surface as a function of depth.

b. Underground bacteria exist that can survive temperatures of up to 110 degree C. Find the maximum depth at which these bacteria can live.

In 2002, a robot explored a tunnel 210 feet long inside the Great Pyramid in Egypt. The robot could travel about 10 feet per minute. Write and graph an equation giving the distance y (in feet) that the robot could travel in x minutes. Use the graph to estimate how quickly the robot could reach the end of the tunnel.