


Bellringer

What is slope intercept form?

$$y = mx + b$$

What is it used for?

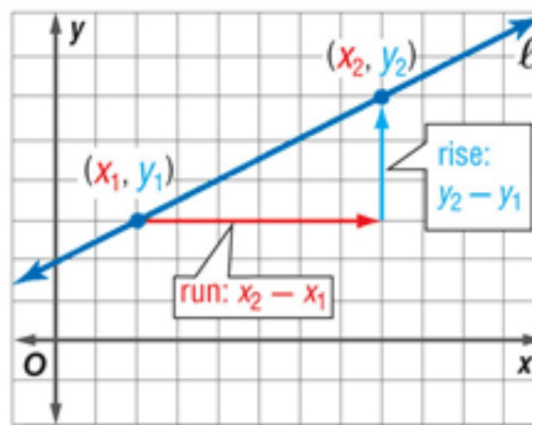
- **slope** - the ratio of change along the y-axis to the change along the x-axis between any two points on a line. $\frac{\text{rise}}{\text{run}}$
- **rate of change** - how a quantity y changes in relation to quantity x.

 **Key Concept** Slope of a Line

In a coordinate plane, the **slope** of a line is the ratio of the change along the y -axis to the change along the x -axis between any two points on the line.

The slope m of a line containing two points with coordinates (x_1, y_1) and (x_2, y_2) is given by the formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}, \text{ where } x_1 \neq x_2.$$



$$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

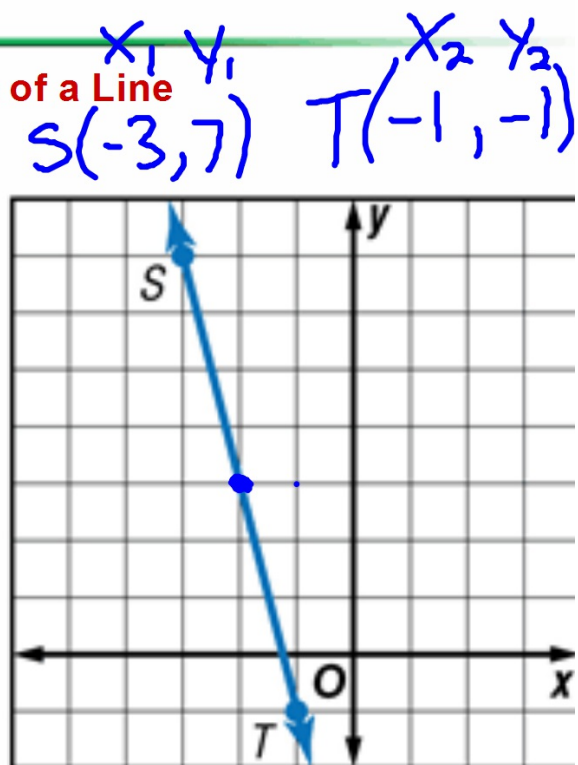
3-3 Slopes of Lines

EXAMPLE 1

Find the Slope of a Line

A. Find the slope of the line.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 7}{-1 + 3} = \frac{-8}{2} = -4$$



3-3 Slopes of Lines

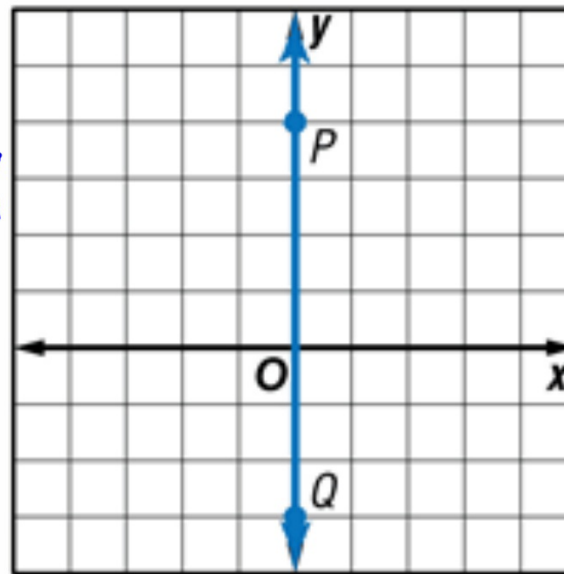
EXAMPLE 1

Find the Slope of a Line

B. Find the slope of the line.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 4}{0 - 0} = \frac{-7}{0}$$

Undefined



x_1, y_1 x_2, y_2
 $P(0, 4)$ $Q(0, -3)$

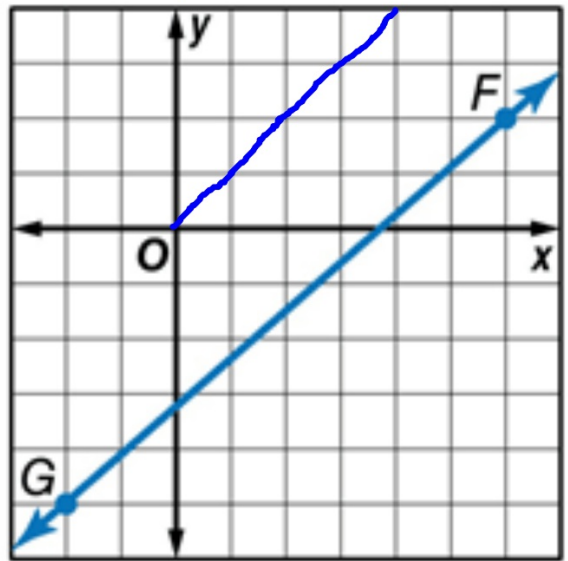
3-3 Slopes of Lines

EXAMPLE 1

Find the Slope of a Line

C. Find the slope of the line.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - 2}{-2 - 6} = \frac{-7}{-8} = \frac{7}{8}$$



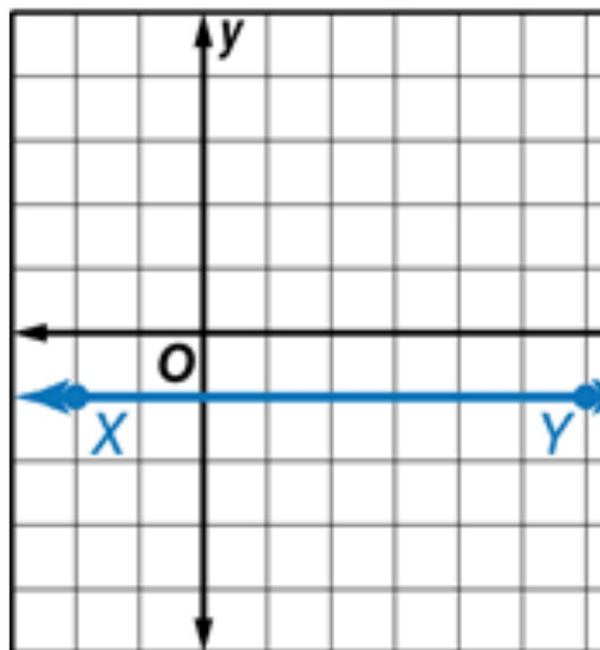
3-3 Slopes of Lines

EXAMPLE 1

Find the Slope of a Line

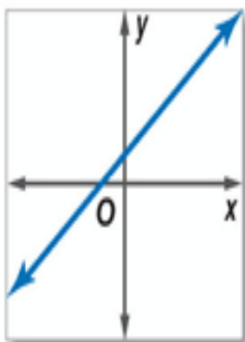
D. Find the slope of the line.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 + 1}{6 + 2} = \frac{0}{8} = 0$$

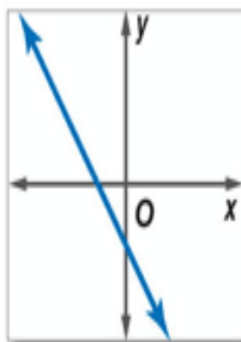


**Concept**Summary Classifying Slopes

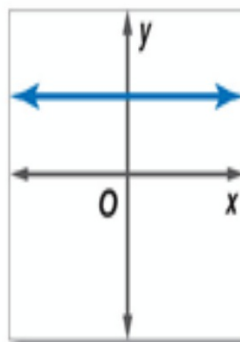
Positive Slope



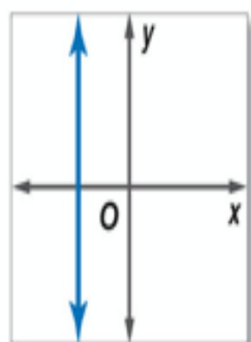
Negative Slope



Zero Slope



Undefined Slope



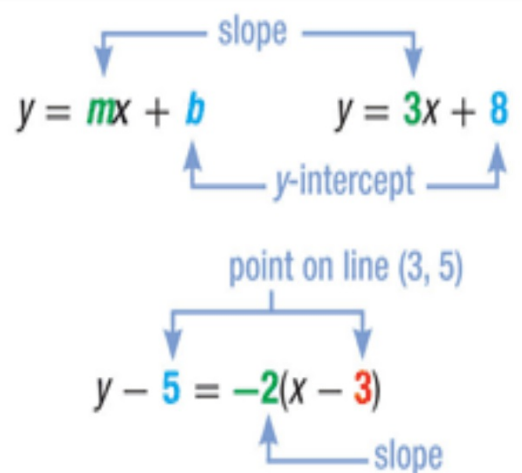
Key Concept Nonvertical Line Equations

The **slope-intercept form** of a linear equation is $y = mx + b$, where m is the slope of the line and b is the y-intercept.

$$y = m x + b$$

The **point-slope form** of a linear equation is $y - y_1 = m(x - x_1)$, where (x_1, y_1) is any point on the line and m is the slope of the line.

$$y - y_1 = m(x - x_1)$$



EXAMPLE 2**Slope and y-intercept**

Write an equation in slope-intercept form of the line with slope of 6 and y-intercept of -3. Then graph the line.

$$y = 6x - 3$$

EXAMPLE 2

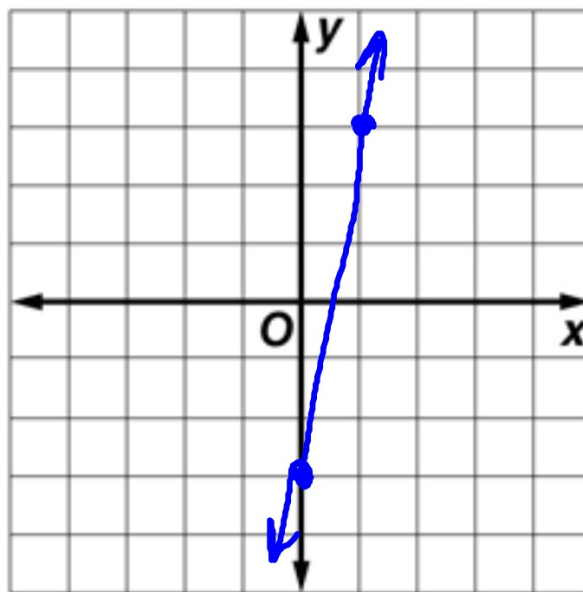
Slope and y-intercept

$$y = 6x - 3$$

Second thing first thing

$$\frac{\text{rise}}{\text{run}} = \frac{6}{1}$$

Answer:



EXAMPLE 3**Slope and a Point on the Line**

Write an equation in point-slope form of the line whose slope is $-\frac{3}{5}$ that contains $(-10, 8)$. Then graph the line.

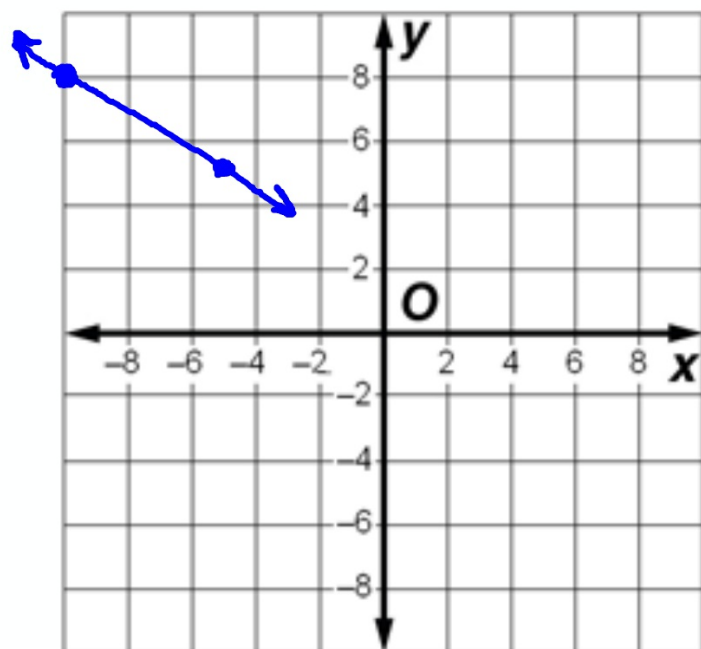
 x_1, y_1

$$y - y_1 = m(x - x_1)$$

$$y - 8 = -\frac{3}{5}(x + 10)$$

EXAMPLE 3**Slope and a Point on the Line**

$$-\frac{3}{5} = \frac{\text{rise}}{\text{run}}$$
$$(-10, 8)$$

Answer:

EXAMPLE 4

Two Points

$$y = mx + b$$

A. Write an equation in slope-intercept form for a line containing (4, 9) and (-2, 0).

$$m = \frac{0-9}{-2-4} = \frac{-9}{-6} = \frac{3}{2}$$

$$\begin{matrix} x_1 & y_1 \\ x_2 & y_2 \end{matrix}$$

$$y - 0 = \frac{3}{2}(x + 2)$$

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

EXAMPLE 4

Two Points

B. Write an equation in slope-intercept form for a line containing $(-3, -7)$ and $(-1, 3)$.

$$m = \frac{3 + 7}{-1 + 3} = \frac{10}{2} = 5$$

$$\begin{matrix} x_1 & y_1 \\ x_2 & y_2 \end{matrix}$$

$$y - 3 = 5(x + 1)$$

$$y - 3 = 5x + 5$$

$$+3 \quad +3$$

$$y = 5x + 8$$

EXAMPLE 5 Horizontal Line $m = 0$

Write an equation of the line through $(5, -2)$ and $(0, -2)$ in slope-intercept form.

b

$$y = 0x - 2$$

$$y = -2$$

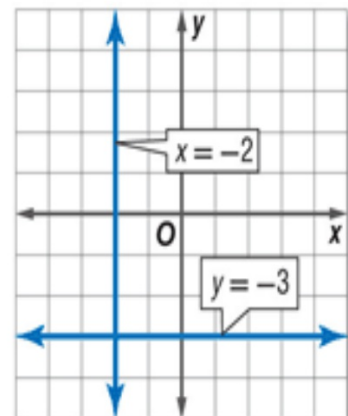
3–4 Equations of Lines**Key Concepts** Horizontal and Vertical Line Equations

The equation of a horizontal line is $y = b$, where b is the y -intercept of the line.

Example $y = -3$

The equation of a vertical line is $x = a$, where a is the x -intercept of the line.

Example $x = -2$





Real-World Example 6

Write Linear Equations

RENTAL COSTS An apartment complex charges \$525 per month plus a \$750 annual maintenance fee.

A. Write an equation to represent the total first year's cost A for r months of rent.

$$y = 525x + 750$$



$$A = 525r + 750$$

**Real-World Example 6****Write Linear Equations**

RENTAL COSTS An apartment complex charges \$525 per month plus a \$750 annual maintenance fee.

B. Compare this rental cost to a complex which charges a \$200 annual maintenance fee but \$600 per month for rent. If a person expects to stay in an apartment for one year, which complex offers the better rate?

On your own or with your group. Try these

Skills Practice 3-4,
problem #'s 1-12 all, 15-20 all

****You will need graph paper for 1-8****

You have 15 minutes!!!

Times UP!!!
Solutions/ Questions

Assignment

Practice 3-4

Problem #'s 1 - 9 all, 12 - 18 all