

3. The table shows the number of pages Garrett has left to read after a certain number of minutes. The points lie on a line. Find the slope of the line.

Time (min), x	Pages left, y
1	12
3	9
5	6
7	3

Choose any two points from the table to find the changes in the x - and y -values.

$$\begin{aligned} \text{slope} &= \frac{\text{change in } y}{\text{change in } x} \\ &= \frac{9 - 12}{3 - 1} \\ &= \frac{-3}{2} \text{ or } -\frac{3}{2} \end{aligned}$$

Definition of slope

Use the points (1, 12) and (3, 9).

Simplify.

Slope

In linear relationships, no matter which two points you choose, the slope, or rate of change, of the line is always constant.

To check, choose two different points from the table and find the slope.

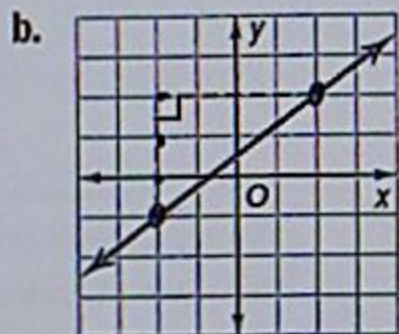
$$\begin{aligned} \text{Check slope} &= \frac{\text{change in } y}{\text{change in } x} \\ &= \frac{3 - 6}{7 - 5} \\ &= \frac{-3}{2} \text{ or } -\frac{3}{2} \checkmark \end{aligned}$$

① Pick any two ordered pairs
 ② Find Δy over Δx (subtract)
 $\frac{6-3}{5-7} = \frac{y_1 - y_2}{x_1 - x_2} = \frac{3}{-2} = -\frac{3}{2}$

Show your work.

Got It? Do these problems to find out.

Find the slope of each line.



c.

x	-6	-2	2	6
y	-2	-1	0	1

$(-6, -2)$ $\Delta y = -2 - (-1) = -1$
 $(-2, -1)$ $\Delta x = -6 - (-2) = -4$
 $\frac{-1}{-4} = \frac{1}{4}$
 $(2, 0)$ $\frac{1-0}{6-2} = \frac{1}{4}$

Slope Formula

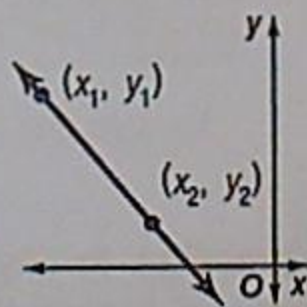
Words

The slope m of a line passing through points (x_1, y_1) and (x_2, y_2) is the ratio of the difference in the y -coordinates to the corresponding difference in the x -coordinates.

Symbols

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

Model



Key Concept

It does not matter which point you define as (x_1, y_1) and (x_2, y_2) . However the coordinates of both points must be used in the same order.

Example



Using the Slope Formula

To check Example 4, let $(x_1, y_1) = (-4, 3)$ and $(x_2, y_2) = (1, 2)$. Then find the slope.

4. Find the slope of the line that passes through $R(1, 2)$, $S(-4, 3)$.

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

$$m = \frac{3 - 2}{-4 - 1}$$

$$m = \frac{1}{-5} \text{ or } \left(-\frac{1}{5}\right)$$

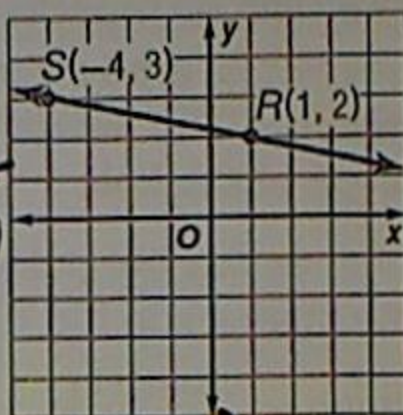
Slope formula

$$(x_1, y_1) = (1, 2)$$

$$(x_2, y_2) = (-4, 3)$$

Simplify.

$$\frac{2-3}{1+4} = -\frac{1}{5}$$



(x, y)

d. $\frac{1}{3}$

Show your work.

e. $\frac{1}{2}$

Got It? Do these problems to find out.

- d. $A(2, 2), B(5, 3)$

$$y \frac{3-2}{x \ 5-2} = \frac{1}{3}$$

- e. $J(-7, -4), K(-3, -2)$

$$\frac{-4+2}{-7+3} = \frac{-2}{-4} \div \frac{2}{2} = \frac{-1}{-2} = \frac{1}{2}$$



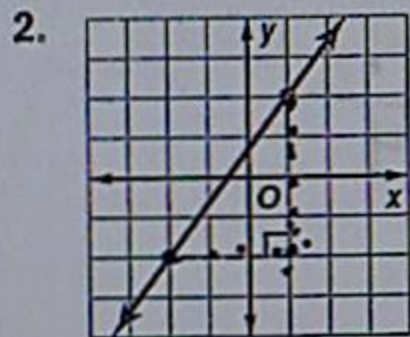
Guided Practice

1. Find the slope of the storage shed's roof. (Example 1)

$$\frac{-3}{15} \div 3 = -\frac{1}{5}$$



- Find the slope of each line. (Examples 2 and 3)



$$\frac{-4}{-3} = \frac{4}{3}$$

3.

x	0	1	2	3
y	1	3	5	7

$(1, 3)$
 $(2, 5)$
 $\frac{5-3}{2-1} = \frac{2}{1}$

2 or $\frac{2}{1}$

- Find the slope of the line that passes through each pair of points. (Example 4)

4. $A(-3, -2), B(5, 4)$

$$\frac{-2-4}{-3-5} = \frac{-6}{-8} \div \frac{2}{2} = \frac{-3}{-4} = \frac{3}{4}$$

5. $E(-6, 5), F(3, -3)$

$$\frac{5-(-3)}{-6-3} = \frac{8}{-9} = -\frac{8}{9}$$

6. Building on the Essential Question In any linear relationship, explain why the slope is always the same.

Rate Yourself!

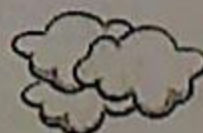
How well do you understand slope? Circle the image that applies.



Clear



Somewhat Clear



Not So Clear

For more help, go online to access a Personal Tutor.

