Algebra 2 2.3

Find "rate of change"

Determine slope of a line

m

ordered pair

rate of change

slope $m = \frac{\text{rise}}{\text{run}}$

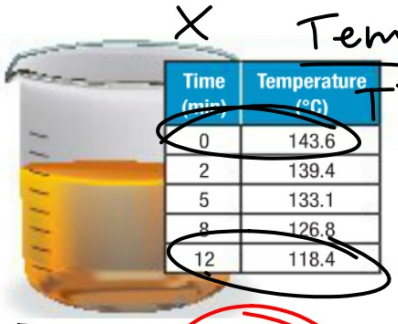
constant

↑ Same

Quiz 2.1-2.2 Mon.
(right away)

Real-World Example 1 Constant Rate of Change

CHEMISTRY The table shows the temperature of a solution after it has been removed from a heat source. Find the rate of change in temperature for the solution.



Time (min)	Temperature (°C)
0	143.6
2	139.4
5	133.1
8	126.8
12	118.4

X Temp / Time

m

(12, 118.4)

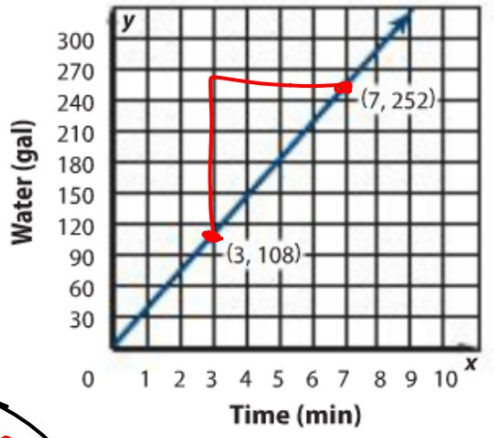
(0, 143.6)

$\frac{118.4 - 143.6}{12 - 0}$

$\frac{-25.2}{12} = -2.1 \frac{°C}{min}$

GuidedPractice

1. **RECREATION** The graph at the right shows the number of gallons of water in a swimming pool as it is being filled. At what rate is the pool being filled?



$m = \frac{252 - 108}{7 - 3}$ $\frac{144}{4}$

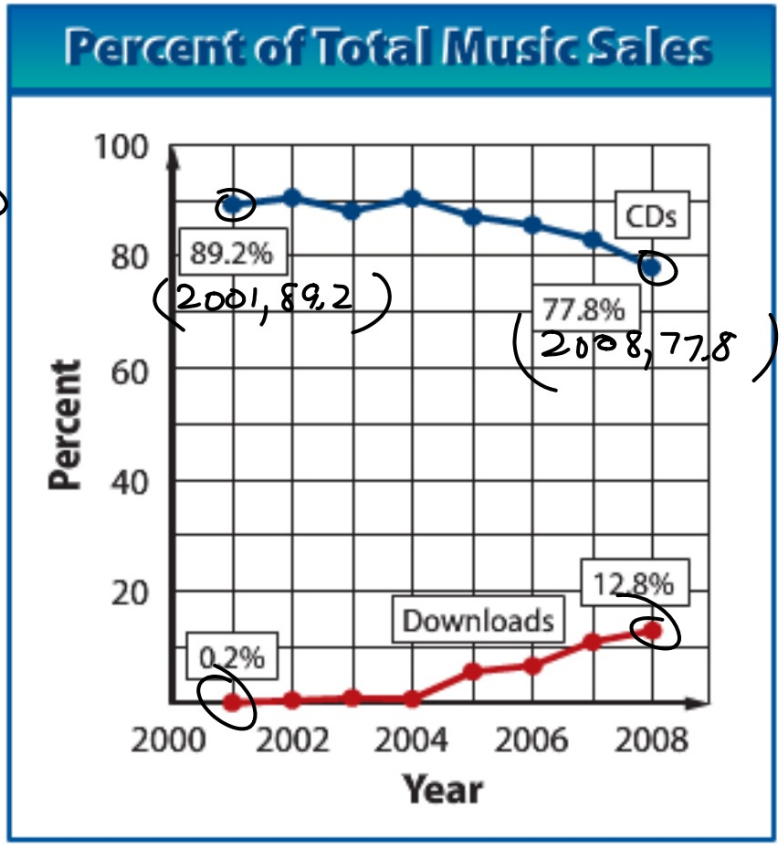
$m = \frac{36}{1} = 36 \frac{\text{gal}}{\text{min}}$

Real-World Example 2 Average Rate

MUSIC Refer to the graph at the right. Find the average rate of change of the percent of total music sales for both CDs and downloads from 2001 to 2008. Compare the rates.

$m_{CDs} = \frac{77.8 - 89.2}{2008 - 2001} = \frac{-11.4}{7} \approx -1.6\ \%/\text{year}$

$m_{DL} = \frac{12.8 - 0.2}{2008 - 2001} = \frac{12.6}{7} \approx +1.8\ \%/\text{year}$

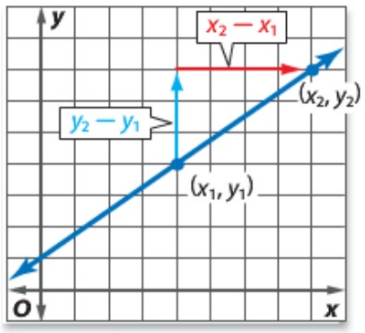


Source: Recording Industry Association of America

2 Slope The **slope** of a line is the ratio of the change in the y-coordinates to the corresponding change in the x-coordinates. The slope of a line is the same as its rate of change.

Suppose a line passes through points at (x_1, y_1) and (x_2, y_2).

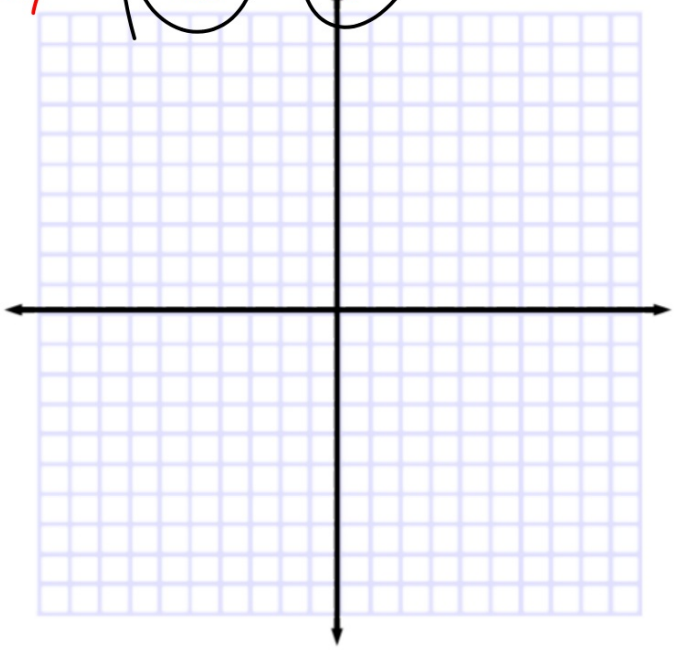
$$\text{Slope} = \frac{\text{change in } y\text{-coordinates}}{\text{change in } x\text{-coordinates}} = \frac{y_2 - y_1}{x_2 - x_1}$$



Example 3 Find Slope Using Coordinates

Find the slope of the line that passes through $(-4, 3)$ and $(2, 5)$.

$$m = \frac{5-3}{2--4} = \frac{2}{6} = \frac{1}{3}$$

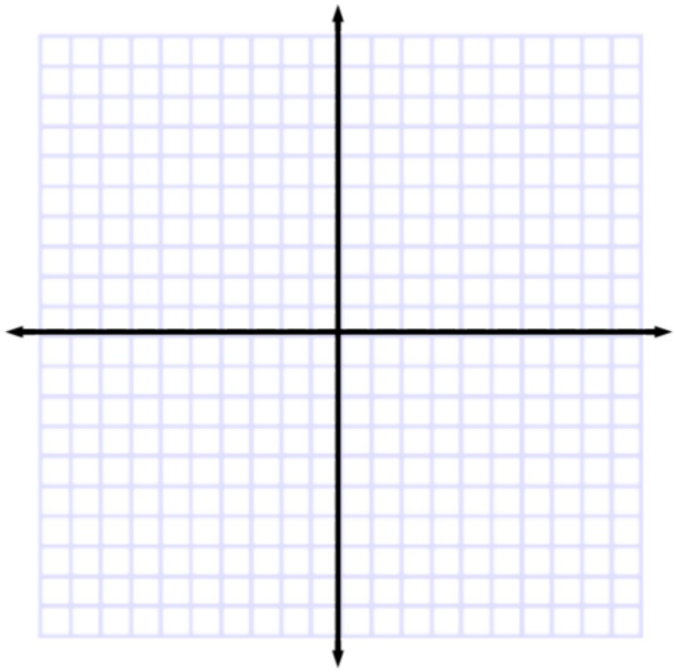


rise
run

GuidedPractice

Find the slope of the line

3A. (1, −3) and (3, 5)



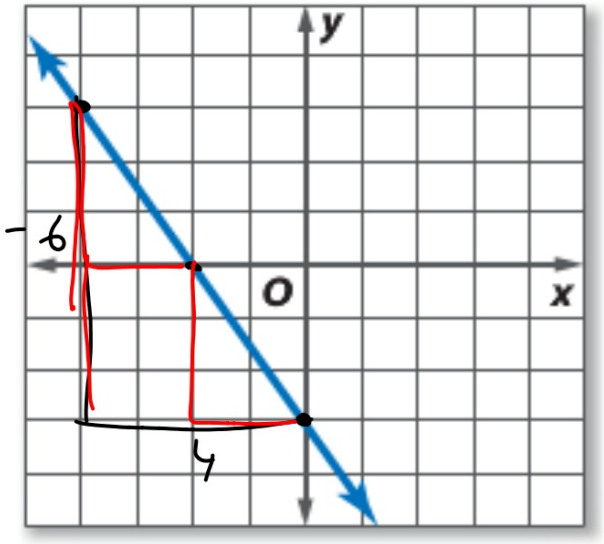
3B. (−8, 11) and (24, −9)

You can choose any two points from the graph of a line

Example 4 Find Slope Using a Graph

Find the slope of the line shown at the right.

Coordinates are not specified...
(make a good choice...)



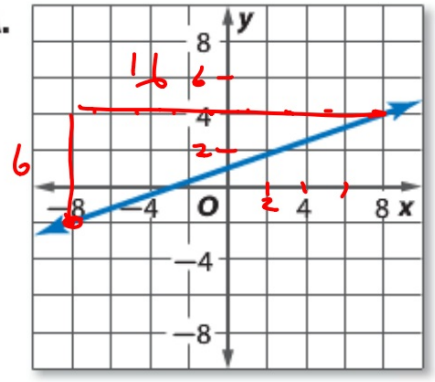
$$m = -\frac{6}{4} = -\frac{3}{2}$$

GuidedPractice

Find the slope of each line.

$\frac{6}{16} = \frac{3}{8}$

4A.



Slope song

2.3 9-33 odd p. 79