

9, 15, 21, 27

# 2.2 Rate of Change/ Slope

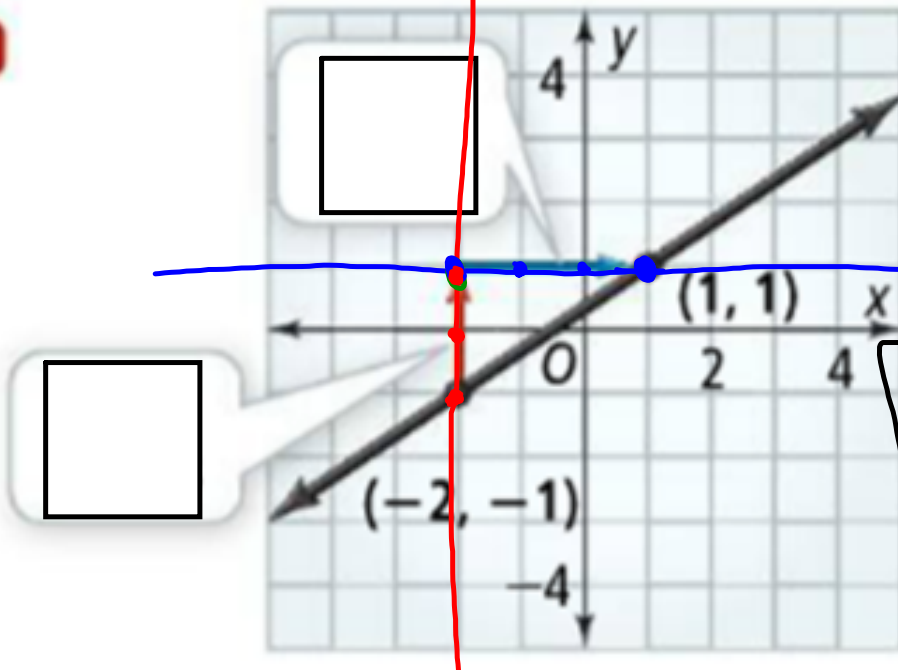
Rate of Change: shows relationship  
between two changing  
quantities (variables)

Rate of Change: change in dependent variable  
change in independent variable

$$\frac{\text{change in } y}{\text{change in } x}$$

rate of change  
What is the ~~slope~~ of each line?

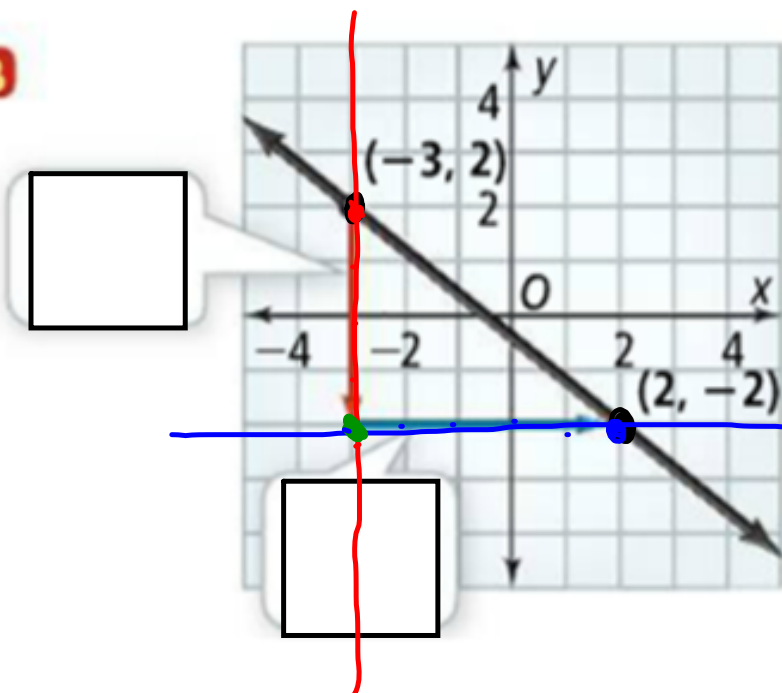
A



$\frac{\text{change } y}{\text{change } x}$

$$\frac{2}{3}$$

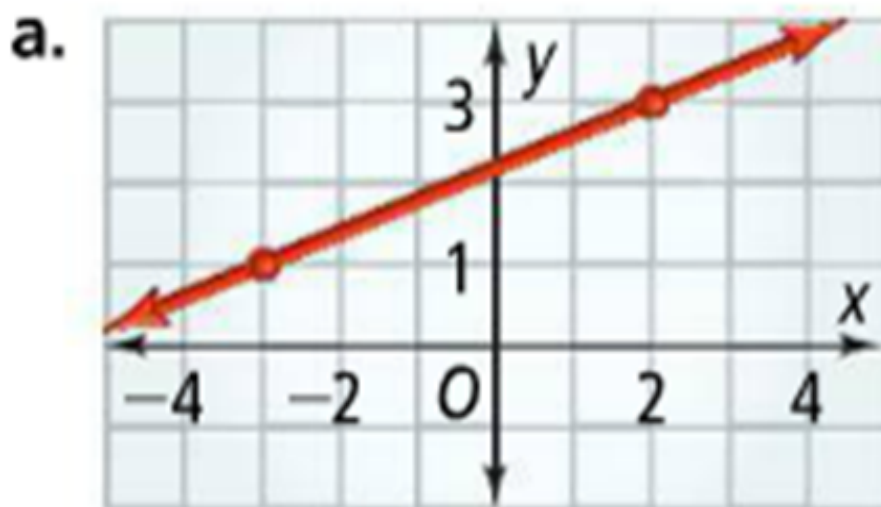
**B**



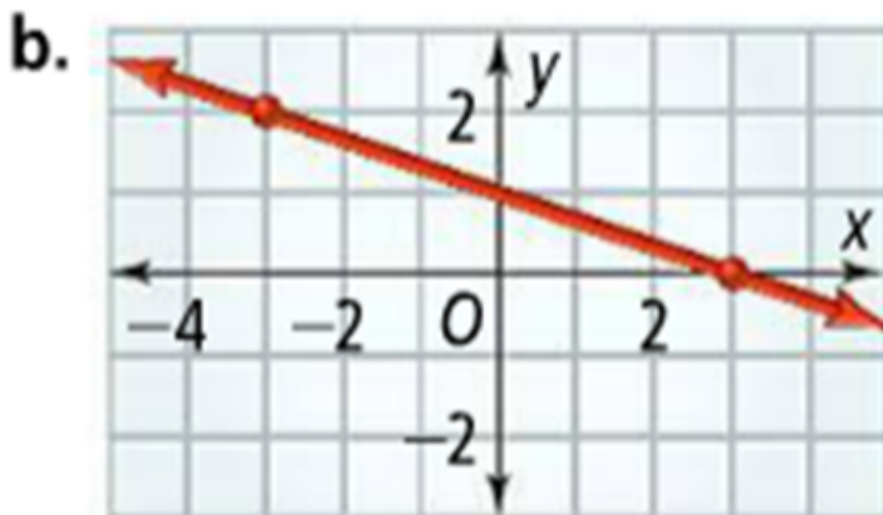
change y  
change x

$$\frac{-4}{5}$$

What is the slope of each line in parts (a) and (b)?



What is the slope of each line in parts (a) and (b)?



## Using two points to find the rate of change (slope)

① Label the points:  
 $(x_1, y_1)$        $(x_2, y_2)$

② Substitute into equation

$$\frac{\text{rise}}{\text{run}} = \frac{Y_2 - Y_1}{X_2 - X_1}$$



# Finding Slope from a table

## Distance Marched

Time (min)	Distance (ft)
1	260
2	520
3	780
4	1040



$$\begin{matrix} (1, 200) & (2, 520) \\ x_1 & x_2 \\ y_1 & y_2 \end{matrix}$$

$$\frac{\begin{matrix} y_2 \\ (520) \end{matrix} - \begin{matrix} y_1 \\ (200) \end{matrix}}{\begin{matrix} (2) \\ x_2 \end{matrix} - \begin{matrix} (1) \\ x_1 \end{matrix}}$$

$$= \frac{200}{1}$$

X	Y
-3	0
-1	2
0	4

$$2 - 0 \neq 1 - 12$$

$$\begin{matrix} (-3, 0) & (-1, 2) \\ x_1, y_1 & x_2, y_2 \end{matrix}$$

$$\frac{(2) - (0)}{(-1) - (-3)}$$

$$\frac{2}{2}$$

$$= 1$$

1. What is one thing you learned today?
2. What is something you need help with?
3. Find the slope for each of the following

$$(3, 0) (4, 2)$$

$$(-1, -6) (9, 1)$$

$$(3, -1) (2, -7)$$

### Problem 3 Finding Slope Using Points

What is the slope of the line through  $(-1, 0)$  and  $(3, -2)$ ?

$$\begin{array}{cc}
 (-1, 0) & (3, -2) \\
 \begin{array}{cc} x_1 & y_1 \end{array} & \begin{array}{cc} x_2 & y_2 \end{array} \\
 \hline
 \begin{array}{c} y_2 \\ (-2) \end{array} - \begin{array}{c} y_1 \\ (0) \end{array} \\
 \hline
 \begin{array}{c} (3) \\ x_2 \end{array} + \begin{array}{c} (+1) \\ x_1 \end{array} \\
 \hline
 \begin{array}{c} -2 \div 2 \\ \hline 4 \div 2 \end{array} = \boxed{\frac{-1}{2}}
 \end{array}$$

What is the slope of the line through  $(1, 3)$  and  $(4, -1)$ ?

$$\begin{array}{cc} (1, 3) & (4, -1) \\ x_1, y_1 & x_2, y_2 \end{array}$$
$$\frac{\begin{array}{c} y_2 \\ (-1) \end{array} - \begin{array}{c} y_1 \\ (3) \end{array}}{\begin{array}{c} x_2 \\ (4) \end{array} - \begin{array}{c} x_1 \\ (1) \end{array}} = \frac{-4}{3}$$

$$\begin{matrix} (1, 2) & (6, -8) \\ x_1 & y_1 & x_2 & y_2 \end{matrix}$$

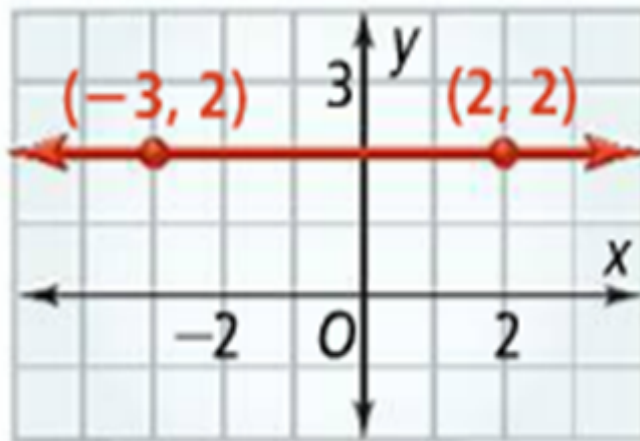
$$\frac{\begin{pmatrix} y_2 \\ -8 \end{pmatrix} - \begin{pmatrix} y_1 \\ 2 \end{pmatrix}}{\begin{pmatrix} x_2 \\ 6 \end{pmatrix} - \begin{pmatrix} x_1 \\ 1 \end{pmatrix}} = \frac{-10}{5}$$
$$\boxed{= -2}$$

$2-2$  #  $4-12$  all  
(P. 3)



What is the slope of each line?

**A**



What is the slope of each line?

