

## What's Going On?

**Checking In**

**Minds on**

Whiteboards!

**Action!**

Slope as a rate of change

**Consolidation**

Fuel Consumption.

**Learning Goal - I will understand how slope can be interpreted as a rate of change!**

# L.G.L.

A line with slope  $\frac{2}{3}$  goes through the point  $(2, -1)$ .

Determine the coordinates of three other points on the line. Be sure that you find at least one point on either side of  $(2, -1)$ .

$$\text{slope} = \frac{2}{3}$$

$\leftarrow$  rise (affects y's)  
 $\leftarrow$  run (affects x's)

$$(-1, -3)$$

run back 3  $\uparrow$   $\uparrow$  fall 2

Start with  $(2, -1)$

run 3  $\downarrow$   $\downarrow$  rise 2

$$(5, 1)$$

run 3  $\downarrow$   $\downarrow$  rise 2

$$(8, 3)$$

## Consolidation

### Finishing Yesterday

#### Slope from Two Points

$$\begin{array}{cc} 1 & 2 \\ (-4, 9) & \text{and } (2, -7) \\ x_1 & y_1 \quad x_2 \quad y_2 \end{array}$$

$$\frac{-16}{6}$$

x	y
-4	9
2	-7

2 - -4
6
-16
-7 - 9

## Consolidation

### Finishing Yesterday

#### Slope from Two Points

1	2
(-4, 9)	and (2, -7)
$x_1$ $y_1$	$x_2$ $y_2$

Yesterday I showed you how to label the points as above... here's why!

$\begin{array}{c c} x & y \\ \hline -4 & 9 \\ 2 & -7 \end{array}$	$\left. \begin{array}{l} \text{run} \rightarrow 2 - -4 \\ \text{rise} \leftarrow -7 - 9 \end{array} \right\} -16$
$\frac{-7 - 9}{2 - -4}$	
$= \frac{-16}{6} \Rightarrow \boxed{\frac{-8}{3}}$	

1	2
$(-4, 9)$	$(2, -7)$
$x_1$ $y_1$	$x_2$ $y_2$

$$y = mx + b$$

$$m = \frac{-7 - 9}{2 - (-4)}$$

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

← rise

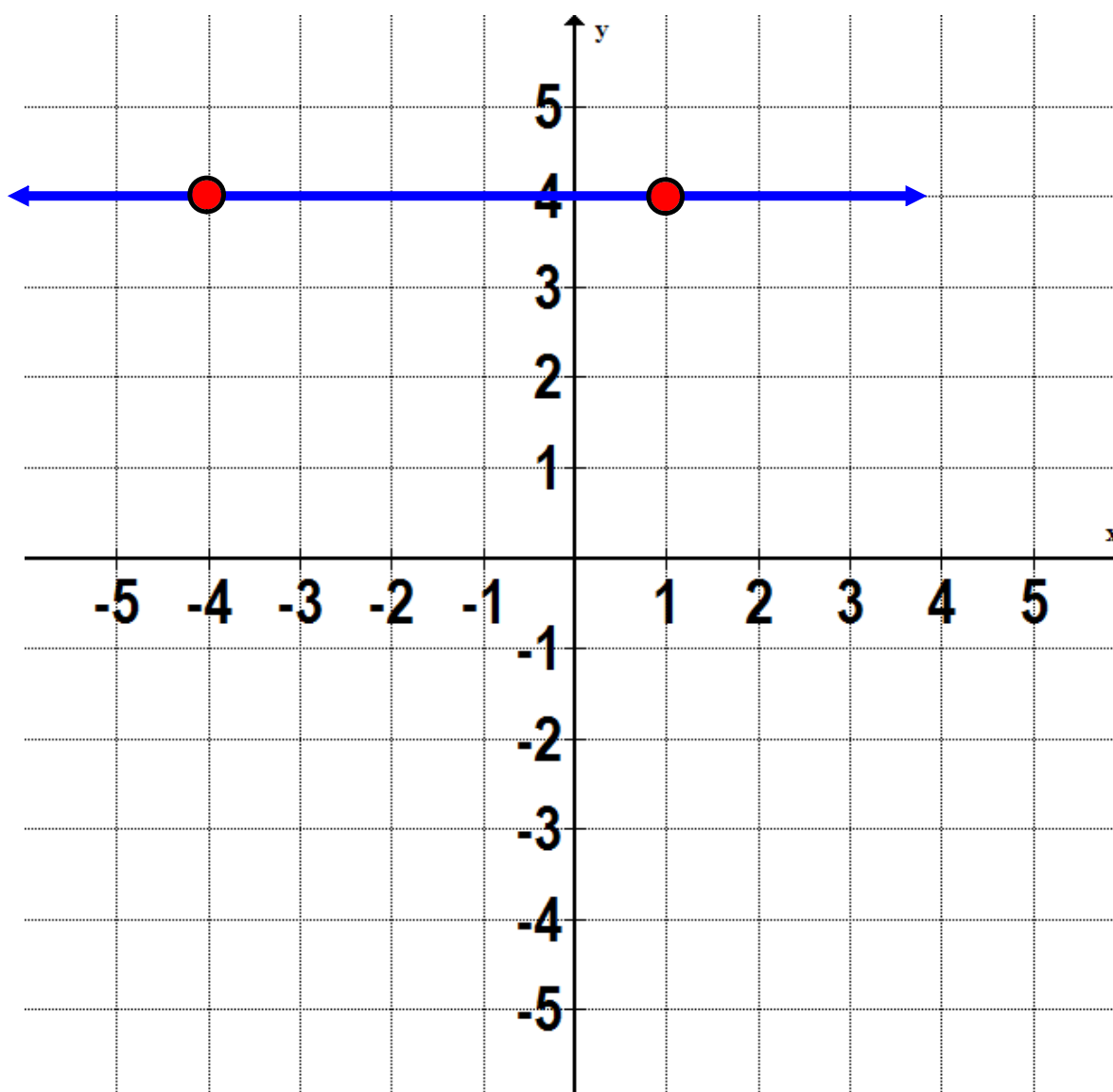
← run

**Unit Test Next Tuesday!**

**Minds on**

# Whiteboards!

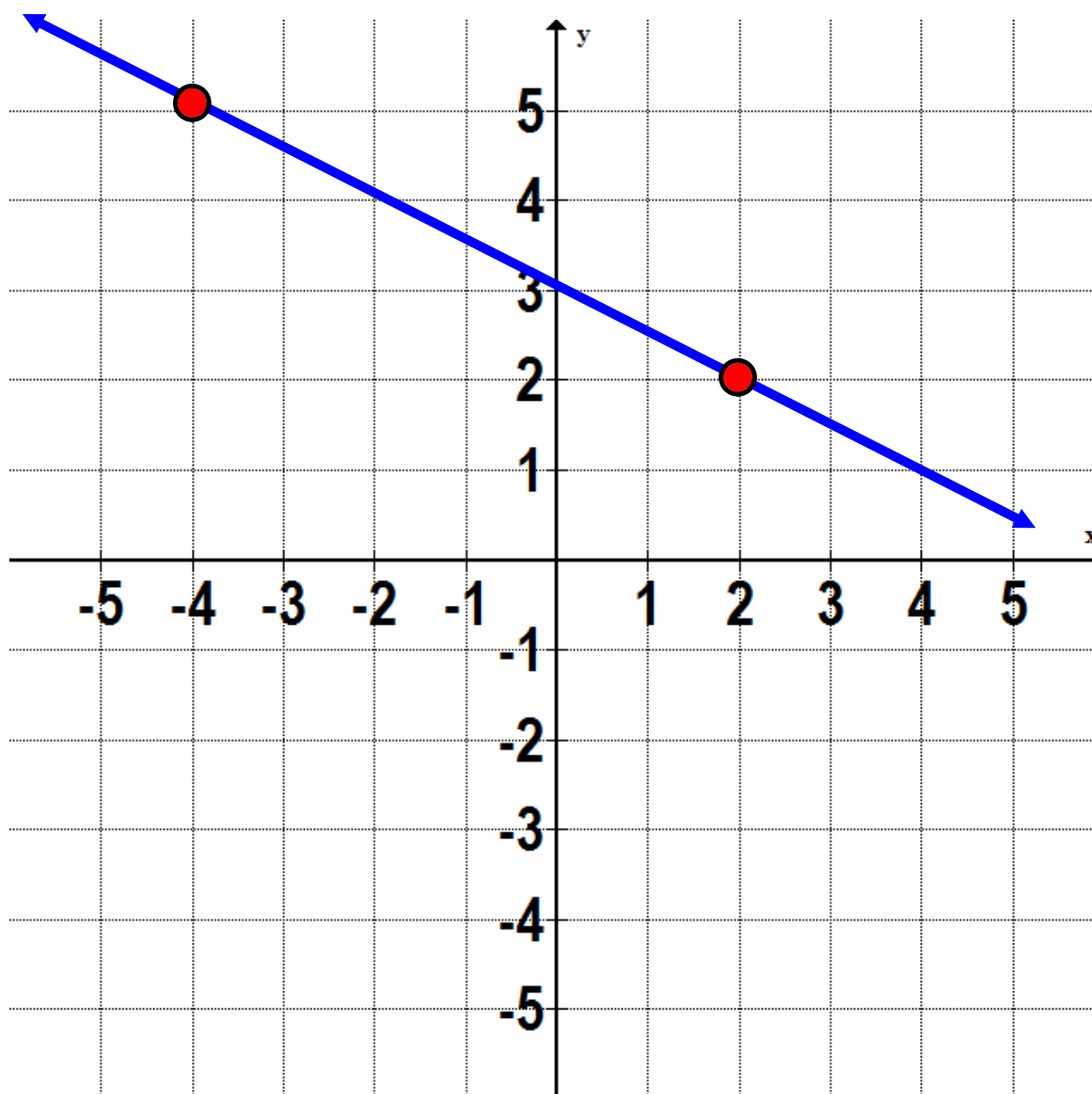
**What's the slope?**



**Minds on**

# Whiteboards!

**What's the slope?**

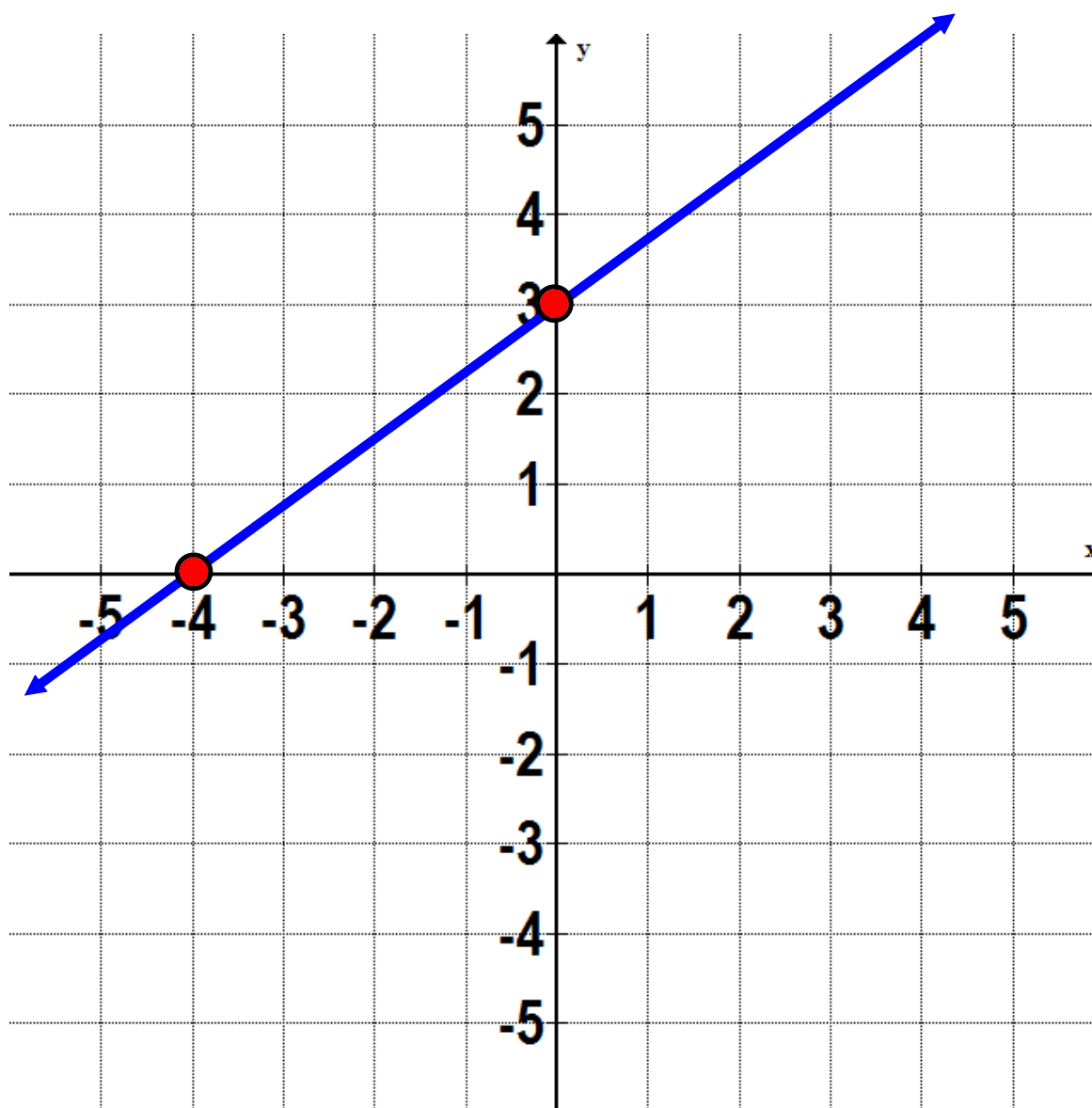




**Minds on**

# Whiteboards!

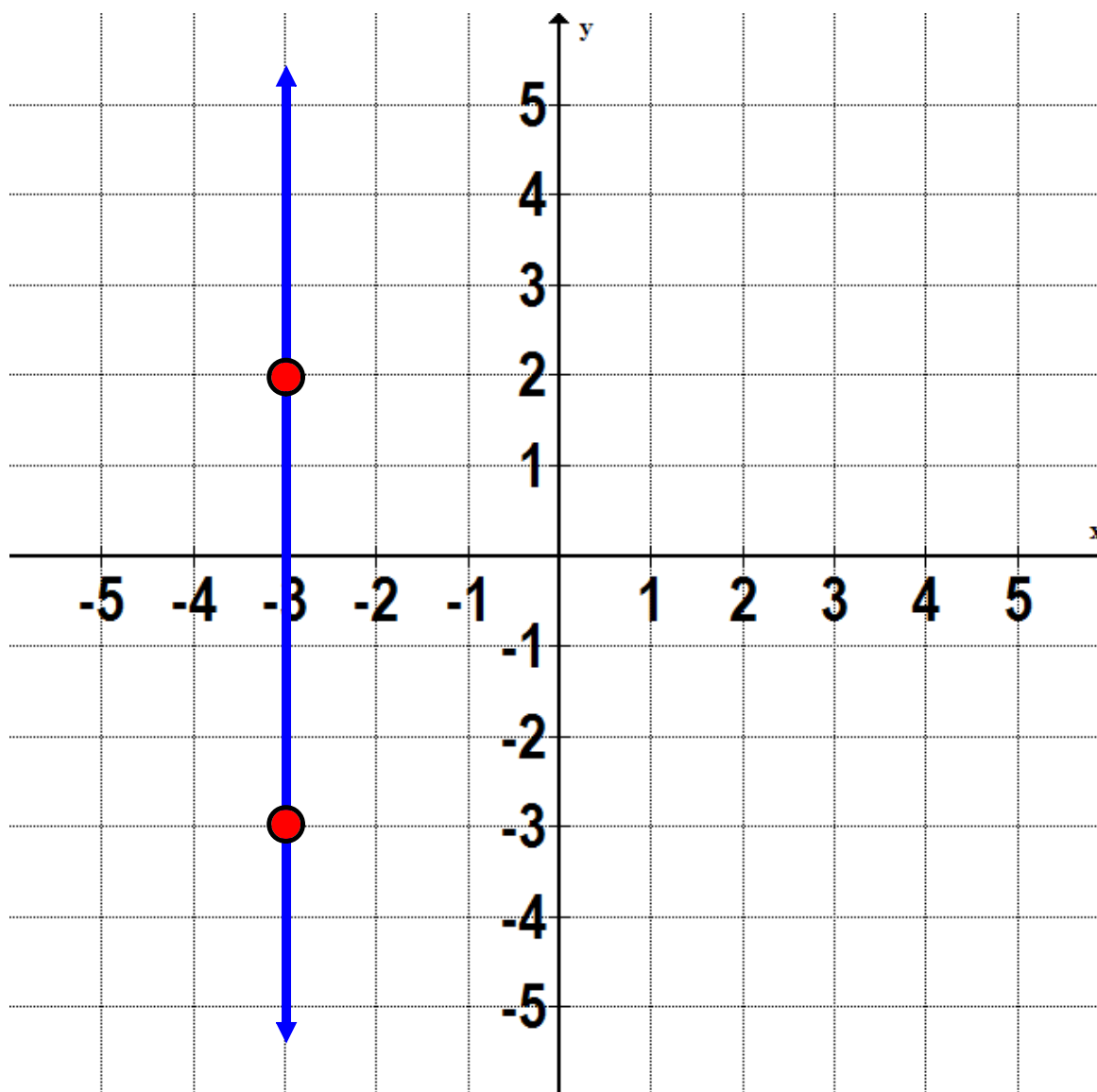
**What's the slope?**



**Minds on**

# Whiteboards!

## What's the slope?



**Minds on**

# Whiteboards!

**What's the slope?**

$x$	$y$
-2	7
-1	4
0	1
1	-2

**Minds on****Whiteboards!****What's the slope?**

<b>x</b>	<b>y</b>
-3	4
-1	5
1	6
3	7

**Minds on****Whiteboards!****What's the slope?**

<b>x</b>	<b>y</b>
0	5
1	5
2	5
3	5

**Minds on****Whiteboards!****What's the slope?**

<b>x</b>	<b>y</b>
0	-2
3	-7
6	-12
9	-17

**Minds on****Whiteboards!****What's the slope?**

<b>x</b>	<b>y</b>
0	-2
3	-7
6	-12
9	-17

**Minds on****Whiteboards!****What's the slope?**

Line goes through  $(\overset{1}{3}, \overset{1}{5})$  and  $(\overset{2}{4}, \overset{2}{8})$ .  
 $x_1$   $y_1$   $x_2$   $y_2$

Line goes through  $(2, -4)$  and  $(3, -9)$ .

Line goes through  $(4, 7)$  and  $(8, 2)$ .

Line goes through  $(-1, 3)$  and  $(-5, 6)$ .



## Minds on

## Whiteboards!

What's the slope?

$$(3, 5) \text{ and } (4, 8).$$

$x_1 \quad y_1 \quad \quad \quad x_2 \quad y_2$

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

$$m = \frac{(8) - (5)}{(4) - (3)}$$

$$= \frac{3}{1}$$

$$(3, 5) \text{ and } (4, 8).$$

$x_2 \quad y_2 \quad \quad \quad x_1 \quad y_1$

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

$$m = \frac{(5) - (8)}{(3) - (4)}$$

$$= \frac{-3}{-1}$$

$$= \frac{3}{1}$$

## Minds on

## Whiteboards!

What's the slope?

Line goes through  $(2, -4)$  and  $(3, -9)$ .

$x_1, y_1$        $x_2, y_2$

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

$$m = \frac{(-9) - (-4)}{(3) - (2)}$$

$$= \frac{-5}{1}$$

$$= -5$$

## Minds on

## Whiteboards!

What's the slope?

Line goes through  $(4, 7)$  and  $(8, 2)$ .

$x_1, y_1$        $x_2, y_2$

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

$$= \frac{(2) - (7)}{(8) - (4)}$$

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

**Minds on**

# Whiteboards!

**What's the slope?**

Line goes through  $(-1, 3)$  and  $(-5, 6)$ .

$x_1 \ y_1$                    $x_2 \ y_2$

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

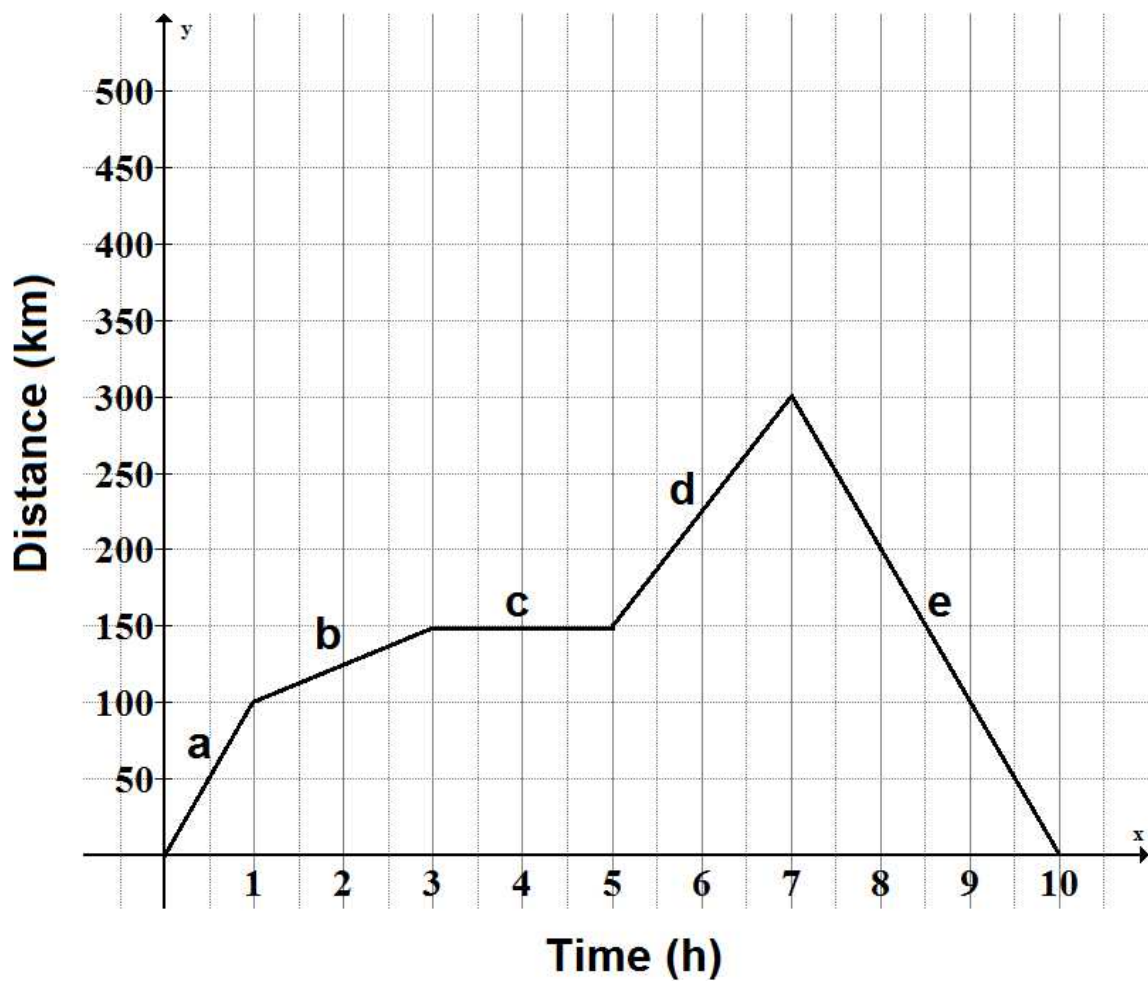
$$= \frac{(6) - (3)}{(-5) - (-1)}$$

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

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

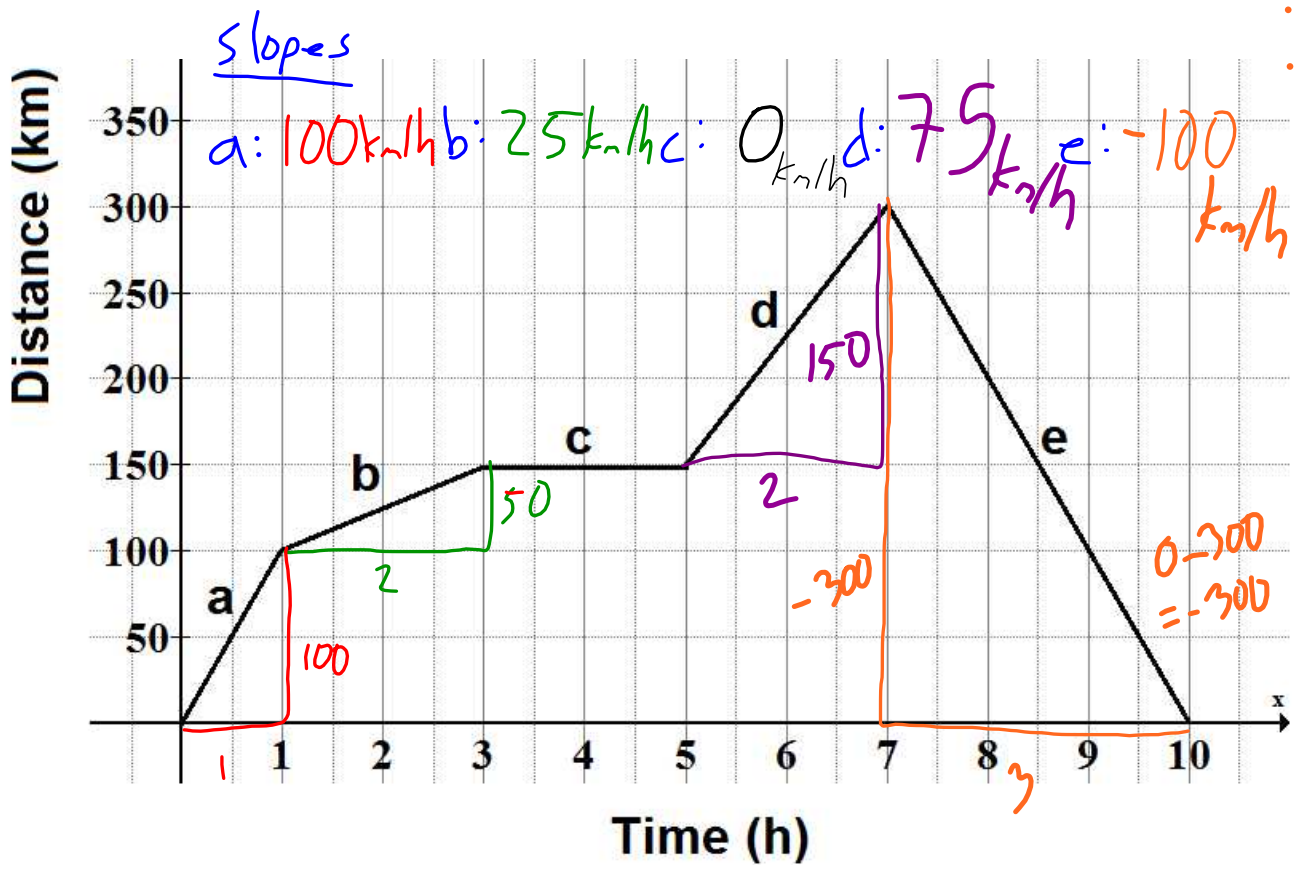
**Action!**

## Fastest Section?



**Action!**

## Fastest Section?



## Unit Rates and Rate of Change $km$

**rate of change** - a change in one quantity  
relative to the change in another quantity.  
(distance)  
(time)  
h

Rate of Change is slope **WITH UNITS**

## Unit Rates and Rate of Change

**unit rate** - a ratio of two different measurements where the second term is 1.

Speed (distance travelled per 1 hour)

Price (amount of money per 1 orange)

A unit rate is also an example of a **rate of change**.



A bag of 30 apples costs \$1.99

What is the unit rate?

dependent variable  $\rightarrow$  cost

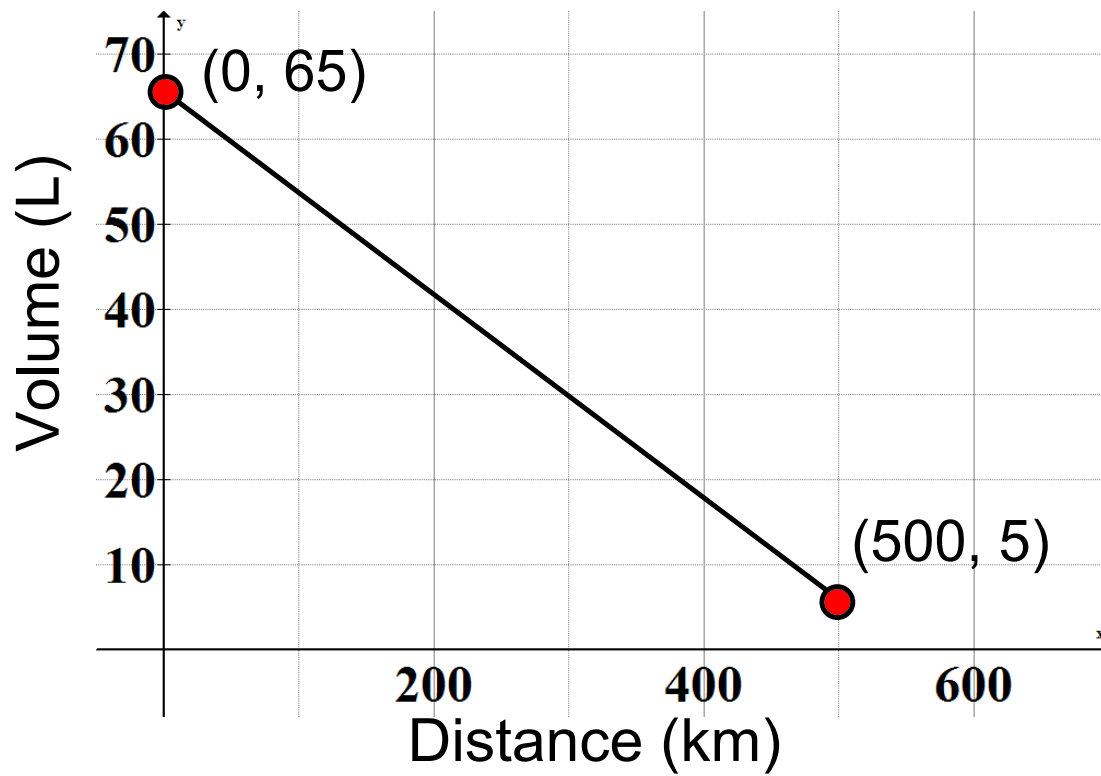
independent variable  $\rightarrow$  # of apples

$$\frac{\$1.99}{30 \text{ apples}}$$

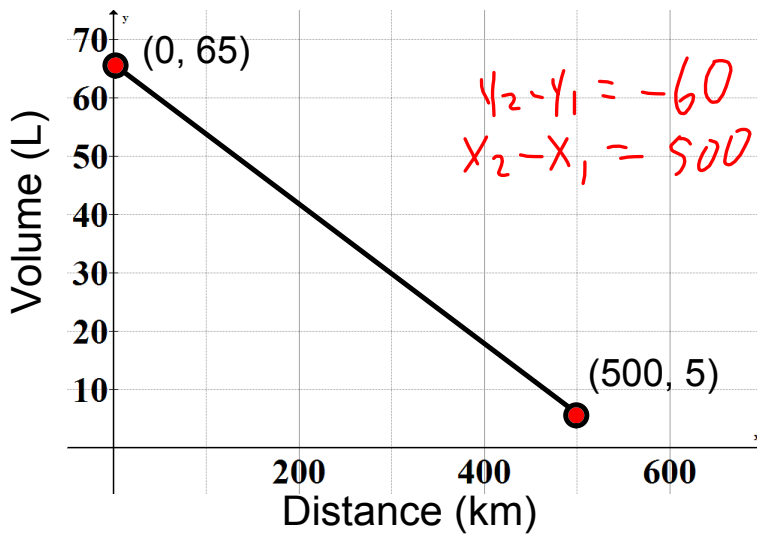
$$= \$0.0663 / \text{apple}$$

$$= \$0.07 / \text{apple}$$

$$7¢ / \text{apple}$$

**Consolidation****Fuel Consumption**

## Fuel Consumption



a) Calculate the slope of the graph.

$$\frac{-60}{500}$$

$$= \frac{-6}{50}$$

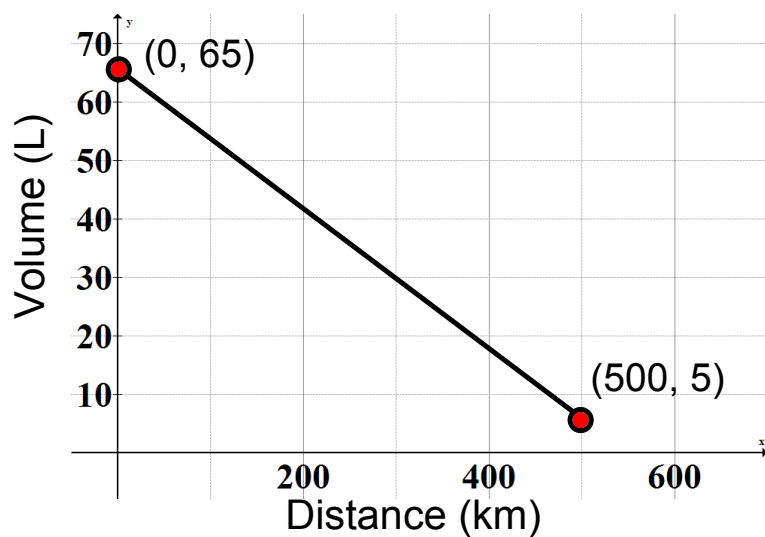
$$= \frac{-3}{25}$$

b) Interpret the slope as a rate of change.

Fuel consumption is ~~0.12~~ 0.12 L/km.

or  
12 L/100km

## Fuel Consumption



c) Determine an equation to represent the fuel consumption.