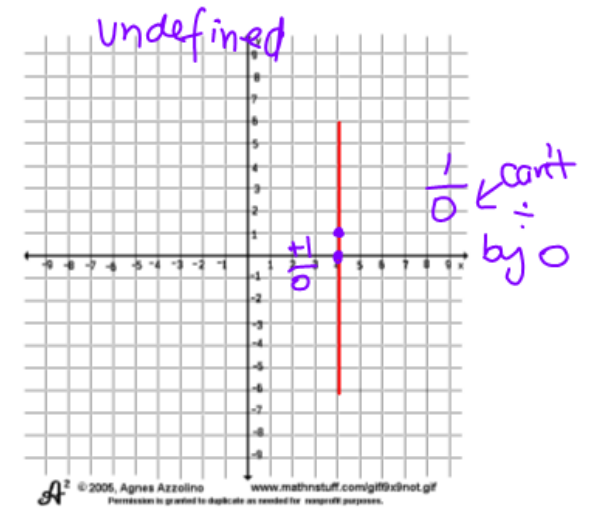# 6.1 - Rate of Change and Slope
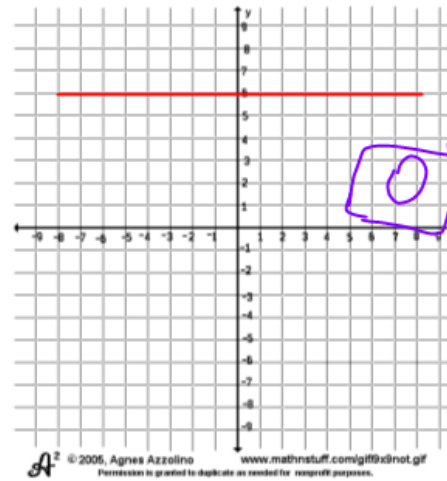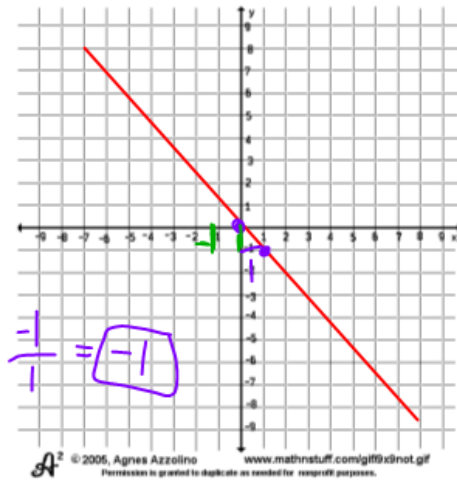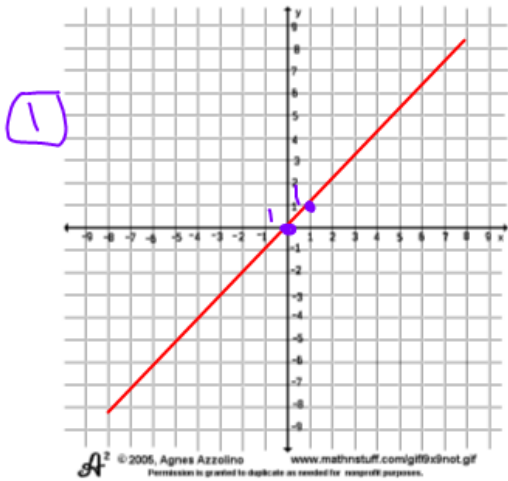
Vocabulary:
- Rate of Change
- Slope

$$\frac{rise}{run}$$

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

①

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

0

undefined

$$\frac{1}{0} \leftarrow can't \div by\ 0$$

$$\frac{0}{1}$$

Slope

1 EXAMPLE For the data in the table, is the rate of change the same for each pair of consecutive mileage amounts?

x y

Fee for Miles Driven

Miles	Fee
100	$30
150	$42
200	$54
250	$66

$$\frac{rise}{run}$$

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

$$\frac{42 - 30}{150 - 100} = \frac{12}{50} \div 2 = \frac{6}{25}$$

$$\frac{66 - 54}{250 - 200} = \frac{12}{50} \div 2 = \boxed{\frac{6}{25}}$$

yes

Find the rate. Explain what
the rate of change means.

#1.

$\frac{3}{1}$ y's
x's

Time (hrs)	Temp ($^\circ$F)
1	-2
4	7
7	16
10	25
13	34

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

$$\frac{7-(-2)}{4-1} = \frac{9}{3} = \boxed{3}$$

$$\frac{25-16}{10-7} = \frac{9}{3} = \boxed{3}$$

2 EXAMPLE Below is a graph of the distance traveled by a motorcycle from its starting point. Find the rate of change. Explain what this rate of change means.
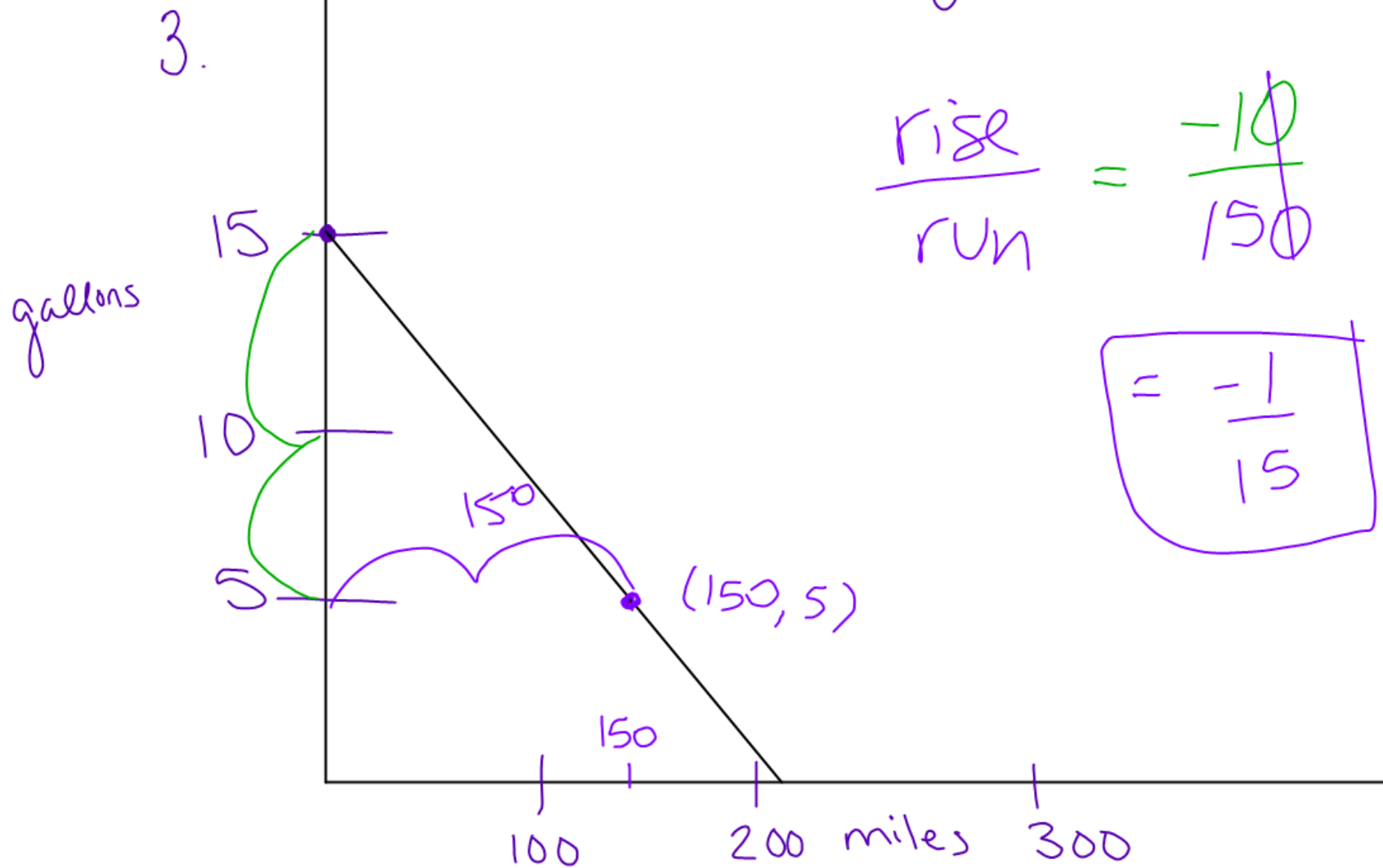
Motorcycle Ride
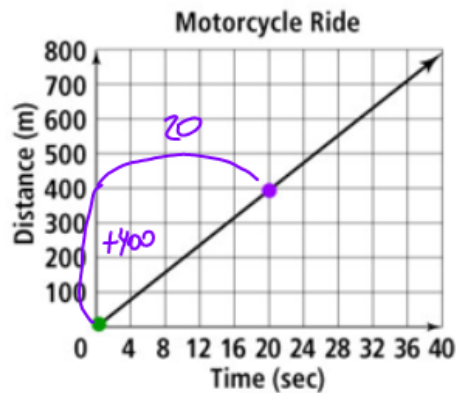
$$\frac{\text{rise}}{\text{run}} = \frac{400}{20}$$

$$= 20 \text{ or } \frac{20}{1}$$
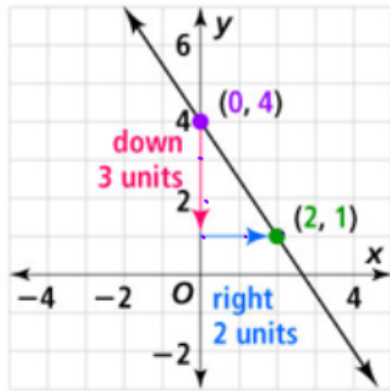
$$\frac{20}{1} \quad \frac{\text{rise}}{\text{run}} \quad \boxed{\frac{20\text{m.}}{1 \text{ sec.}}}$$

A tank of gas

3.

$$\frac{rise}{run} = \frac{-10}{150}$$

$$= \frac{-1}{15}$$

gallons

15

10

5

150

(150, 5)

150

100   200 miles 300

3 EXAMPLE   Find the slope of each line.

a.

$$\frac{rise}{run} = \boxed{\frac{-3}{2}}$$

b. Find the slope of the line.
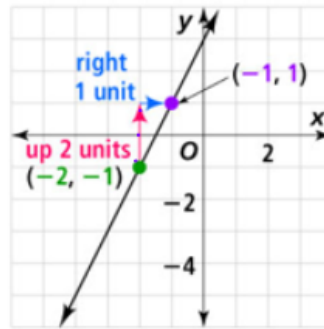
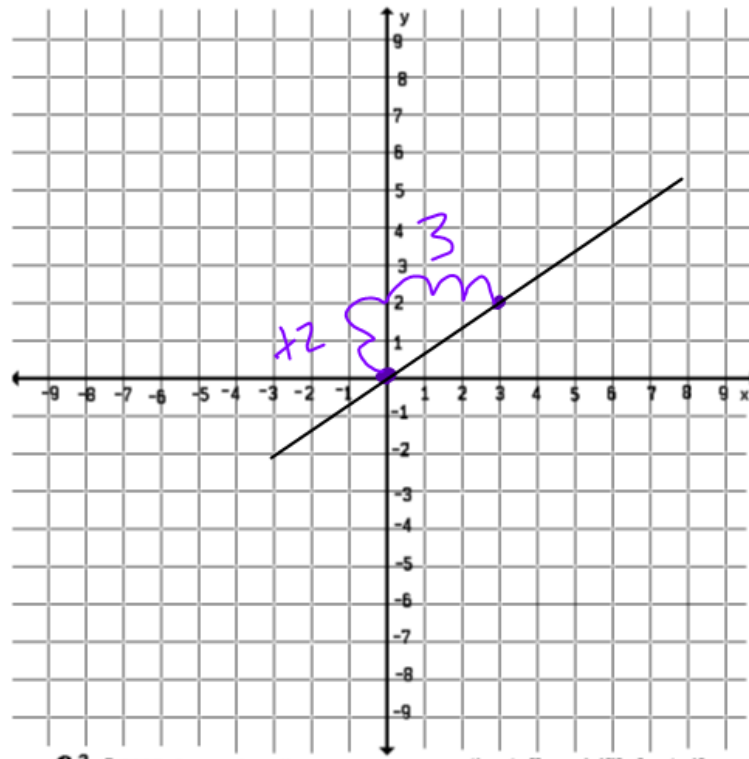$$\boxed{\frac{2}{1}}$$

or

$$\boxed{2}$$

Find the slope.

#9.

$$\frac{rise}{run} = \boxed{\frac{2}{3}}$$

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4 **EXAMPLE** Find the slope of each line through $E(3, -2)$ and $F(-2, -1)$.

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

$$\frac{x_1 \quad y_1 \qquad x_2 \quad y_2}{}$$

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

$$+$$

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

Find the slope of a line that goes
through the points.

#11. $(5, 6)$ & $(3, 2)$ $\dfrac{rise}{run}$ $\dfrac{y_2 - y_1}{x_2 - x_1}$

x_1 y_1 x_2 y_2

$$\dfrac{2-6}{3-5} = \dfrac{-4}{-2} = \boxed{2}$$

#19. $(5, 0)$ & $(0, 2)$

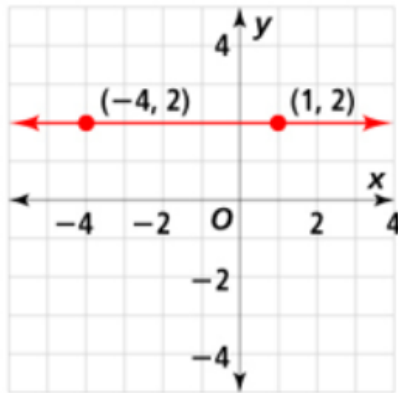x_1 y_1 x_2 y_2

$$\dfrac{2-0}{0-5} = \boxed{\dfrac{2}{-5}} \text{ or } \boxed{\dfrac{-2}{5}}$$

5 **EXAMPLE** Find the slope of each line.

b. Find the slope of the line.

a.

0
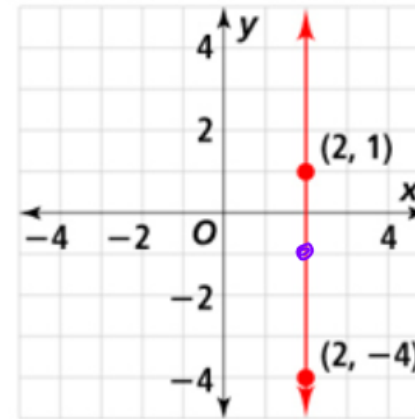
undefined

#25.

$$\left(4,3\right) \quad \text{\&} \quad \left(4,-3\right) \qquad \frac{rise}{run} \qquad \frac{y_2 - y_1}{x_2 - x_1}$$

$x_1 \ y_1 \qquad\qquad x_2 \ y_2$

$$\frac{-3-3}{4-4} = \frac{-6}{0} \qquad \boxed{undefined}$$

Homework: pg. 312 #2, 6-16even, 22, 26, 28, 48, 53