Lesson 7
Comparing Rate of Change in Graphs/ Tables/ Equations

Vocabulary

Rate of Change: The measure of how quickly a linear equation increases or decreases. In a line, that is measured by determining the slope. *[NOTE: The steeper the slope, the GREATER the rate of change]*

Examples: Determine the rate of change. ~ slope

$y = mx + b$

1) $y = -5x + 4$

-5

2) $6 - x = y$

$y = -x + 6$

-1

3) $3y - 9x = 42$

$y = 3x + 14$

$\frac{3y}{3} = \frac{9x}{3} + \frac{42}{3}$

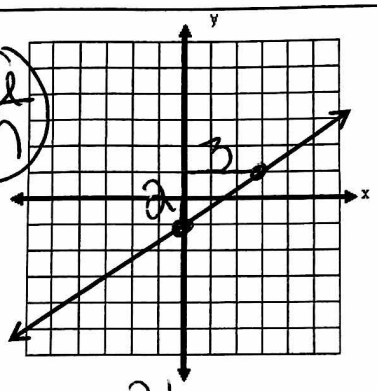
3

4) $4y = 8x - 16$

$y = 2x - 4$

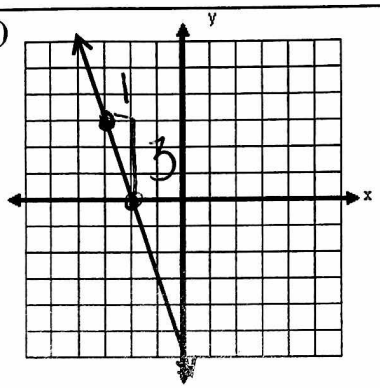
2

5) $m = \frac{rise}{run}$



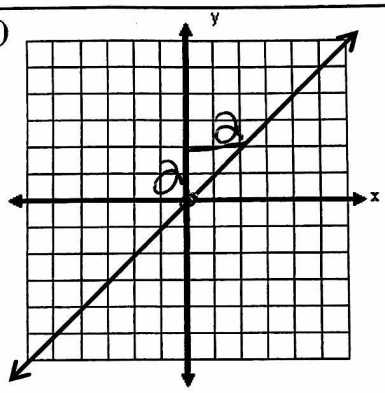
$m = 2/3$

6)



$m = -3$

7)



$m = 2/2 = 1$

8) $m = \frac{\Delta y}{\Delta x}$

x	y
5	15
6	13
7	11
8	9
9	3

1 < > -2

$m = -2$

9)

x	y
0	-2
2	6
4	14
6	22
8	31

2 < > 8

$m = 8/2 = 4$

10)

x	y
3	8
4	9
5	10
6	11
7	9

+1 < > +1

$m = 1$

11) During a rain storm, it rained 0.7" per hour. What is the rate of change?

$m = .7$

12) You buy a car with 4000 miles. Each year you drive an additional 10,300 miles per year. What is the rate of change?

$m = 10{,}300$

Comparing Rates of Change

13) The following table and graph represent two different linear functions. Determine which has the greater rate of change.

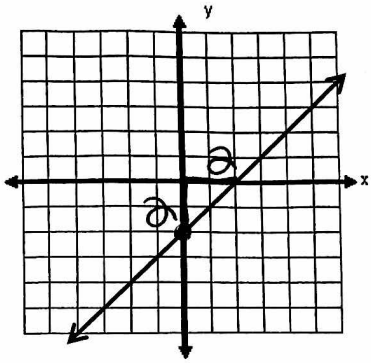
A)

x	y
-4	-3
-2	-2
0	-1
2	0
4	1

+2 +1 $m = 1/2$

OR

B) *



$m = 2/2 = 1$

14) Which has the greater rate of change?

A) $y = x - 6$

$m = 1$

OR

B) $\frac{2y}{2} = \frac{4x}{2} + \frac{16}{2}$ $y = 2x + 8$

* $m = 2$

15) Which has the greater rate of change?

A) A balloon deflates at 3 cubic centimeters per hour. At first the balloon is filled up to 30 cubic centimeters. *

$m = 3$

OR

B)

hour	deflate
0	30
2	25
4	20
6	15

+2 −5

$m = \frac{-5}{2} = 2\frac{1}{2}$

16) In question #15, which example will have more air after 6 hours? A

A) $y = 3x + 30$

$3(6) + 30$

$18 + 30$

48

B) $y = -\frac{5}{2}x + 30$

$-\frac{5}{2}(6) + 30$

$-15 + 30$

15

Try These: Determine the rate of change.

1) $2y = -2x + 12$

$\frac{2y}{2} = \frac{-2x}{2} + \frac{12}{2}$

$y = -x + 6$

$m = -1$

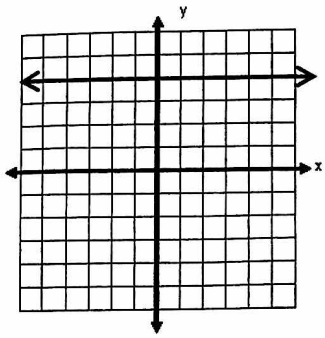
2) $3y - 2x = 1$

$\frac{3y}{3} = \frac{2x}{3} + \frac{1}{3}$

$y = \frac{2}{3}x + 1/3$

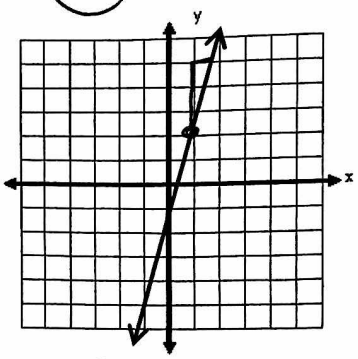
$m = 2/3$

3)



$m = 0$

* 4)



$m = 3$

---

* 5)

x	y
0	11
1	8
2	5
3	2

1 < > −3

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

−3

6)

x	y
2	5
4	8
6	11
8	14

2 < > +3

3/2

---

7) The hair on Bill's head grows 1.5" per month. His hair is 6" long. What is the rate of change?

1.5

8) The growth of the NY population increases by 95,000 per year. The current population is about 19.5 million. What is the rate of change?

95,000

---

9) The following table and graph represent two different linear functions. Write the equation of each and then determine which has the greater rate of change.

A)

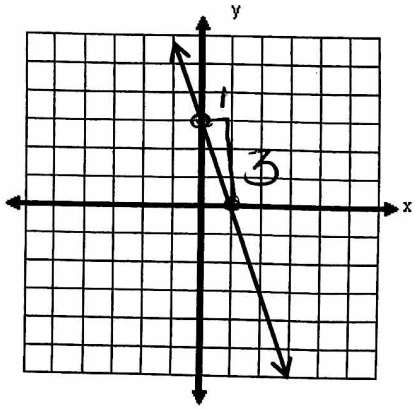
x	y
-2	7
0	11
2	15
4	19

+2 < > +4

$m = 4/2 = 2$

OR

* B)



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

---

10) In question #9, which y will be the greatest when x = 3?

A

A) $y = 2x + 11$
$2(3) + 11$
$6 + 11$
17

B) $y = -3x + 3$
$-3(3) + 3$
$-9 + 3 = -6$

Lesson 7 - Homework

Determine the rate of change

1) $y = -2x + 1$

$m = -2$

2) $y - 3x = 5$

$y = 3x + 5$

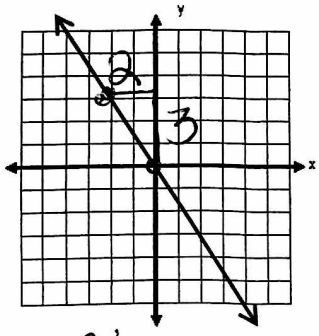
$m = 3$

3) $\frac{4x}{3} - \frac{9}{3} = \frac{3y}{3}$

$y = 4/3x - 3$

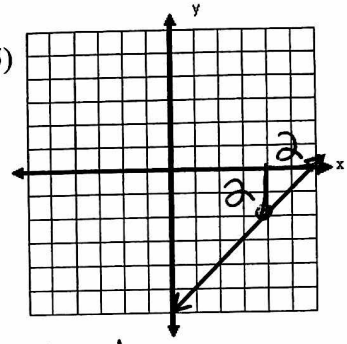
$m = 4/3$

4)



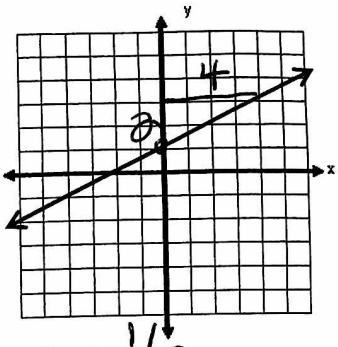
$m = -3/2$

5)



$m = 1$

6)



$m = 1/2$

7)

x	y
0	2
1	5
5	17
12	38

+3

1

$m = 3/1$

$m = 3$

8)

x	y
-3	2
-1	4
0	5
9	14

+9 +9

$m = 9/9$

$m = 1$

9)

x	y
4	5
6	6
12	9
14	10

+2 +1

$m = 1/2$

10) A jogger can run about 2.5 miles per hour. They run 5 days per week. What is the rate of change?

$m = 2.5$

11) A baby is born and is 20 inches long. If the baby grows on average 5" per year for 17 years, what is the rate of change of growth?

$m = 5$

Comparison of Rates of Change

12) Compare the following functions. Write the equation of each function.

A)

Age of Child	Weight of a Child (lb)
0	10
3	34
4	40
6	52

+3 $\frac{+24}{3} = 8$

B) $2y = 10x + 28$

C) When Joe was born he weighed exactly 8 lb. His doctor predicted he would gain 5.5 lbs per year.

Equation $y = 8x + 10$ Equation $y = 5x + 14$ Equation $y = 5.5x + 8$

13) Based on situations in #12, which of the three would have the greatest rate of change? A

14) From question #12, at age, 10, which example will produce the child with the largest weight? A

A) $y = 8x + 10$
$8(10) + 10$
$80 + 10$
90

B) $y = 5x + 14$
$y = 5(10) + 14$
$50 + 14$
64

C) $y = 5.5x + 8$
$5.5(10) + 8$
63

15) Which has the greater rate of change?

A) $y = -x + 8$

$m = -1$

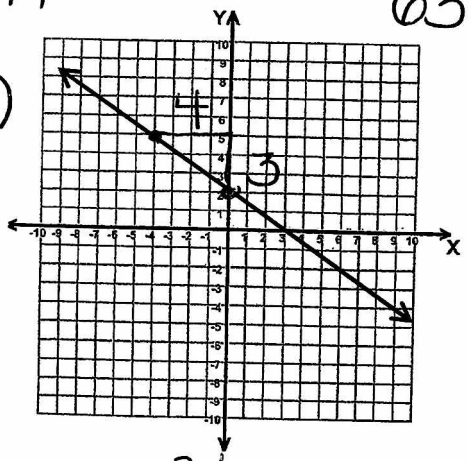
B)

x	y
0	5
2	4
6	2
12	-1
14	-2

2 < 5 > -1

$m = -1/2$

C)



$m = -3/4$