1) Evaluate the following expression.

$$(2^2)^4 \cdot 2^{-5}$$

1)

2) Find the value of x.

$$5(3x - 4) = 2x + 7 + 4x$$

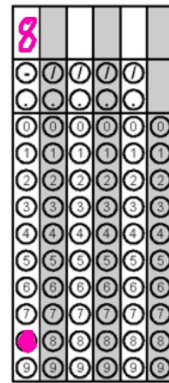2)

1) Evaluate the following expression.

$(2^2)^4 \cdot 2^{-5}$

$2^{2(4)} \cdot 2^{-5}$

$2^8 \cdot 2^{-5}$

2^3

$2 \cdot 2 \cdot 2 = 8$

2) Find the value of x.

$5(3x - 4) = 2x + 7 + 4x$

$15x - 20 = 2x + 7 + 4x$

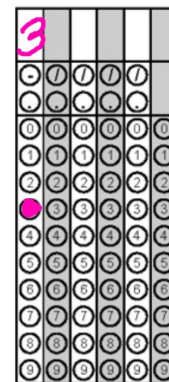$15x - 20 = 6x + 7$

$9x - 20 = 7$

$9x = 27$

$x = 3$

1) **8**

2) **3**

34   A town's buildings were graphed on a coordinate grid.

Which equation would represent a line drawn to connect the Town Hall and Post Office?

A $y = \dfrac{-2}{3}x + \dfrac{28}{3}$

B $y = \dfrac{-1}{8}x + \dfrac{53}{8}$

C $y = \dfrac{3}{5}x + 9$

D $y = \dfrac{1}{8}x + \dfrac{59}{3}$
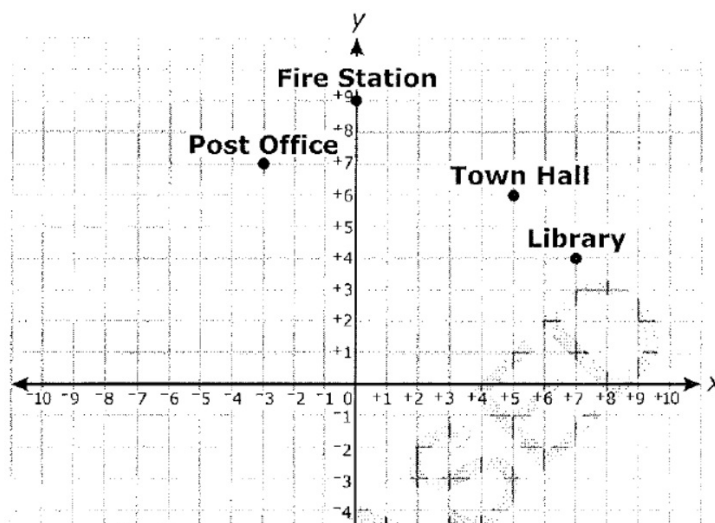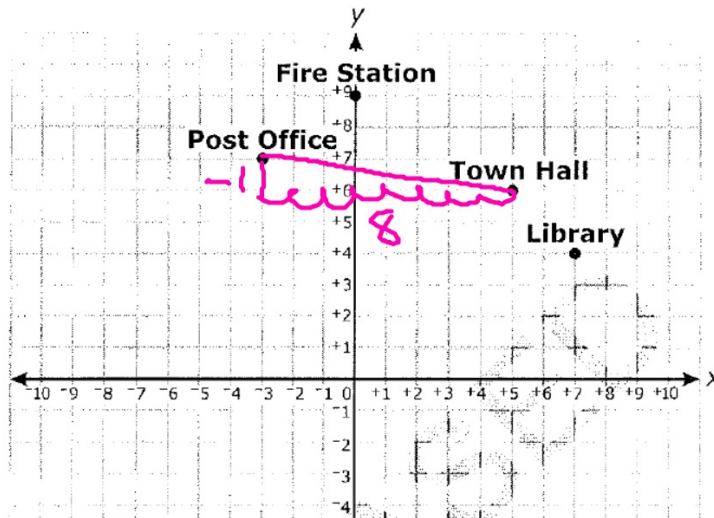
34 A town's buildings were graphed on a coordinate grid.

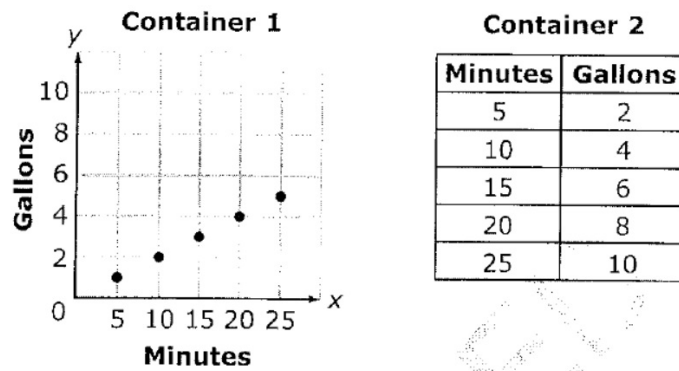Which equation would represent a line drawn to connect the Town Hall and Post Office?

A $y = \frac{-2}{3}x + \frac{28}{3}$

B $y = \frac{-1}{8}x + \frac{53}{8}$

C $y = \frac{3}{5}x + 9$

D $y = \frac{1}{8}x + \frac{59}{3}$

35   Rain is flowing into two containers at different rates. The figure below shows the
      volume of water in each container at different times.

Container 1

Container 2

Minutes	Gallons
5	2
10	4
15	6
20	8
25	10

What is the difference in the rate of change between the two containers?

A $\frac{1}{5}$ gallon per minute

B $\frac{3}{5}$ gallon per minute

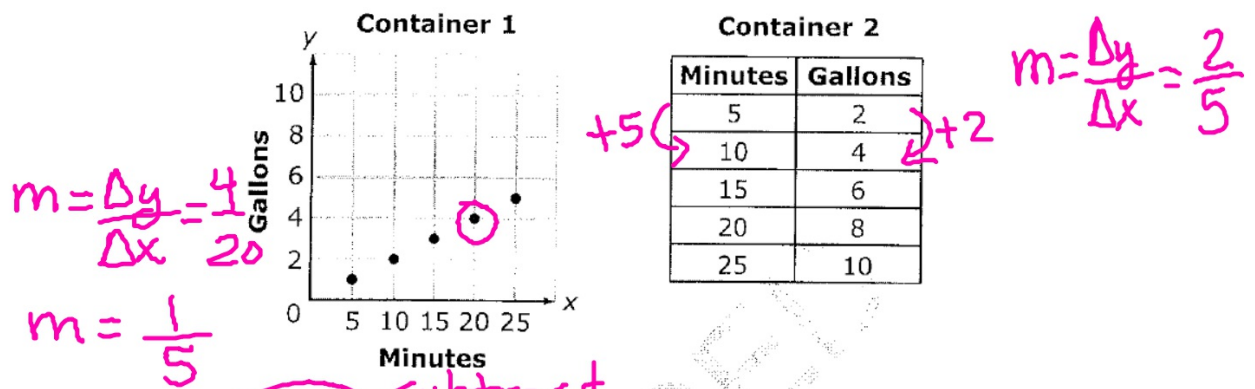C $\frac{5}{2}$ gallons per minute

D $\frac{15}{2}$ gallons per minute

35 Rain is flowing into two containers at different rates. The figure below shows the volume of water in each container at different times.

Container 1

Container 2

Minutes	Gallons
5	2
10	4
15	6
20	8
25	10

What is the difference in the rate of change between the two containers?

A $\frac{1}{5}$ gallon per minute

B $\frac{3}{5}$ gallon per minute

C $\frac{5}{2}$ gallons per minute

D $\frac{15}{2}$ gallons per minute

36   A system of equations is shown below.

$$2x + 4y = 0$$
$$y = \frac{1}{2}x - 3$$

What is the x-value in the solution to the system of equations?

A   ⁻3

B   ⁻1.5

C   1.5

D   3

36   A system of equations is shown below.

$$2x + 4y = 0$$
$$y = \frac{1}{2}x - 3$$

What is the x-value in the solution to the system of equations?

A   ⁻3

B   ⁻1.5

C   1.5

D   3

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

$$4y = -2x$$
$$y = -\frac{1}{2}x$$

$$2x + 4\left(\frac{1}{2}x - 3\right) = 0$$
$$2x + 2x - 12 = 0$$
$$4x - 12 = 0$$
$$4x = 12$$
$$x = 3$$

Homework Check:

Top part #2   Right Side #6
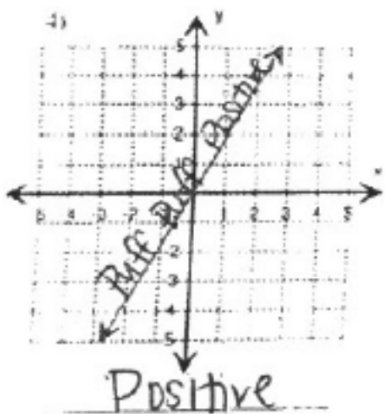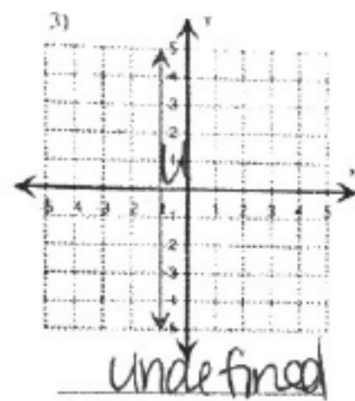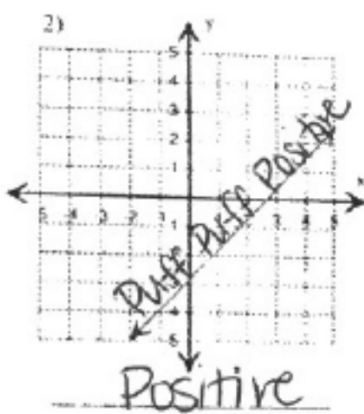
... of the line is positive, negative, zero or undefined.

1)

This Zero Fun

zero

2)

Ruff Ruff Positive

Positive

3)

undefined

4)

Ruff Ruff Positive

Positive

5)

Nice Negative

6)

This is Zero Fun

zero

Find the slope of each line.

1)

2)

3)
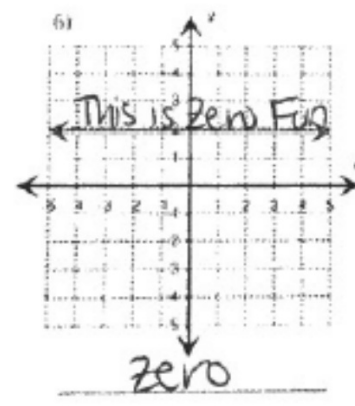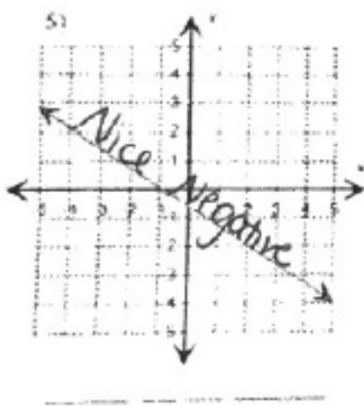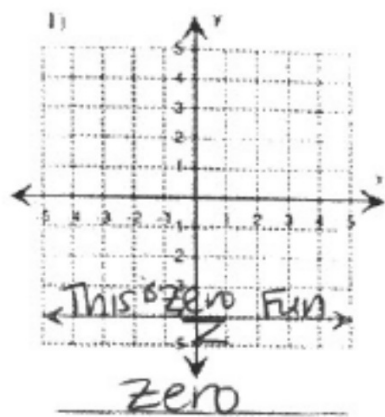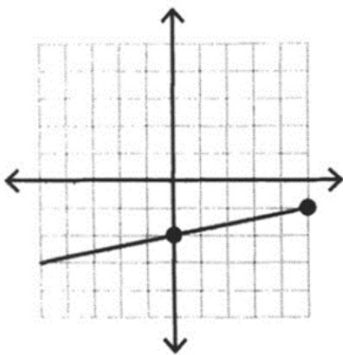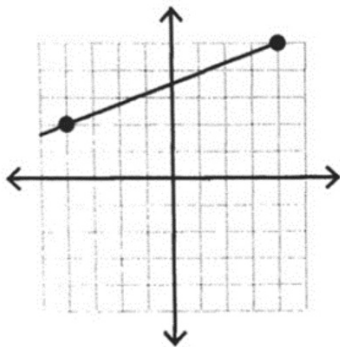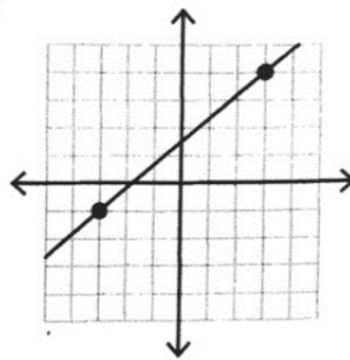
4)

Find the slope of each line.

1)

$m = \dfrac{\Delta y}{\Delta x} = \dfrac{1}{5}$

2)

$m = \dfrac{\Delta y}{\Delta x} = \dfrac{5}{6}$

3)

$m = \dfrac{\Delta y}{\Delta x} = \dfrac{3}{8}$

4)
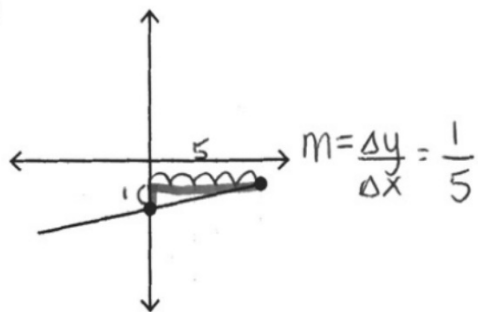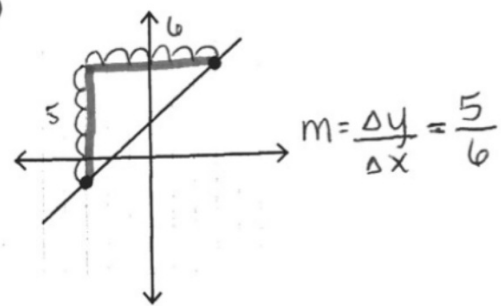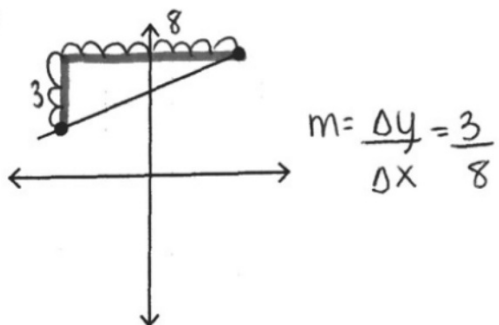
$m = \dfrac{\Delta y}{\Delta x} = \dfrac{-4}{1} = -4$
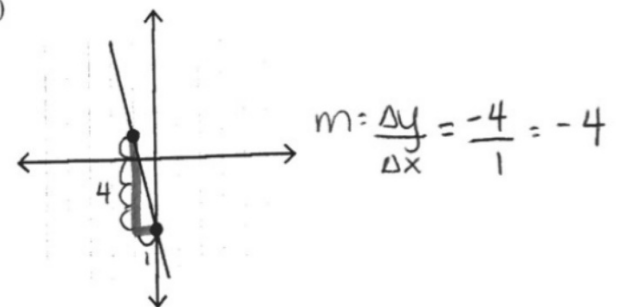
Find the slope of the line through each pair of points.

2) $(-6, -1), (12, 13)$

4) $(-5, -18), (9, 10)$

6) $(-18, 2), (-1, -7)$

8) $(11, 15), (-14, 13)$

Kahoot

Rate of Change: Another name for <u>Slope</u>.

Remember to find the slope between 2 points, use the formula:

(x_1, y_1)

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$ $-(x_2, y_2)$

Rate of Change (slope) From a Table~ Things to Know:
1) The information given in the _independant___ set of your table will always represent the _x___-values (will not always be labeled x).
2) The information given in the dependant____ set of your table will always represent the _y____-values (will not always be labeled y).
Examples:

x
|
y

x | y
|

Steps to finding slope from a table: ·
1) Choose any ___2___ points from the table.
2) Use these ___2___ points and label them $(x_1, y_1), (x_2, y_2)$
3) Use the ____formul_____ for finding slope of 2 points and plug your points into it.

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

**Or your can:
-find change in y over change in x
-Graph and Count
-Stack, Subtract, Write Back

4) Always check to make sure the slope is true for the ENTIRE table!

Example 1:

Cost of Renting a Computer	
Number of Days	Rental Charge
1	$60
2	$75
3	$90
4	$105
5	$120

Change in y:

Change in x:

$$\frac{15}{1} = \frac{\Delta\ 120 - 75 = 45}{\Delta\ 5 - 2 = 3}$$

Find the rate of change using Days 5 and 2.

Example 2:

Grace Adler is going scuba diving. At t=0 seconds, she is at a depth of 6 feet below the surface. At time t=15 seconds, Grace is at a depth of 20 feet. What is Grace's average rate of change in depth?

Try These!

Example 3:

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

Change in y: $\Delta\ -1$

Change in x: $\Delta\ 1$

Example 4:

x	y
1	1
3	5
5	9
7	13

+2   +4

Change in y: $\Delta\ 4$

$2 =$

Change in x: $\Delta\ 2$

Example 5:

Find the rate of change:

x	y
1	5
2	7
3	9
4	11

Change in y: Δ
_____
Change in x: Δ

Your turn

Determine the slope of the line represented by the table of values.

Describe graph of line.

x	y
-2	3
-1	5
0	7
1	9
2	11

x	y
-3	5
-2	2
-1	-1
0	- 4
1	-7

x	y
1	-17
2	-13
3	-9
4	-5
5	-1

x	y
-6	- 4
-5	-9
- 4	-14
-3	-19
-2	-24

m =

x	y
0	3
1	5.5
2	8
3	10.5
4	13

x	y
-2	5
-1	4.75
0	4.5
1	4.25
2	4

x	y
-2	$\frac{2}{5}$
-1	$\frac{4}{5}$
0	$\frac{6}{5}$
1	$\frac{8}{5}$

x	y
-1	1
1	2
3	3
5	4
7	5

Determine the slope of the line represented by the table of values. Describe the graphs of the line as increasing, decreasing, horizontal, or vertical. Copy one of these tables on the back of this page and write a situation that describes the data.

1.

x	y
−2	3
−1	5
0	7
1	9
2	11

$m = \dfrac{2}{1} = 2$

Graph Description
increasing

2.

x	y
−3	5
−2	2
−1	−1
0	− 4
1	−7

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

Graph Description
decreasing

3.

x	y
1	−17
2	−13
3	−9
4	−5
5	−1

$m = \dfrac{4}{1} = 4$

Graph Description
increasing

4.

x	y
−6	− 4
−5	−9
− 4	−14
−3	−19
−2	−24

$m = \dfrac{-5}{1} = -5$

Graph Description
decreasing

5.

x	y
0	3
1	5.5
2	8
3	10.5
4	13

6.

x	y
−2	5
−1	4.75
0	4.5
1	4.25
2	4

7.

x	y
−2	$\dfrac{2}{5}$
−1	$\dfrac{4}{5}$
0	$\dfrac{6}{5}$
1	$\dfrac{8}{5}$

8.

x	y
−1	1
1	2
3	3
5	4
7	5

Constant Rate of Change

The slope is always the change in output (y) divided by the input (x). It is described as rise over run

It is the variable "m" because you move by this value.

In the $y = mx + b$ slope-intercept form

Y - Intercept

The y - intercept is always on the y - axis

It is the varible "b" because it is where you begin

In the $Y = mx + b$ slope-intercept form

Kahoot 🌐

Equations from a Graph

To Convert from a graph to an equation:
1) Identify the slope (m= ?)
2) Identify the y-intercept (b= ?)
3) Plug into slope-intercept form (y = mx + b)

Converting Graphs to Equations
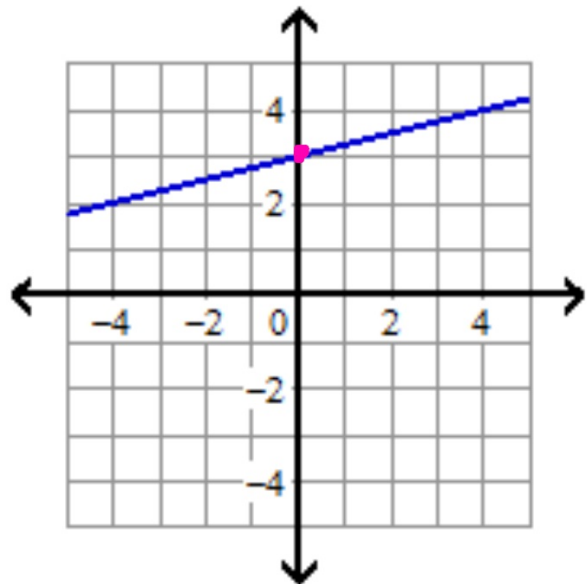
1. What is the y intercept (b) of this line?

3

2. What is the slope (m) of this line?
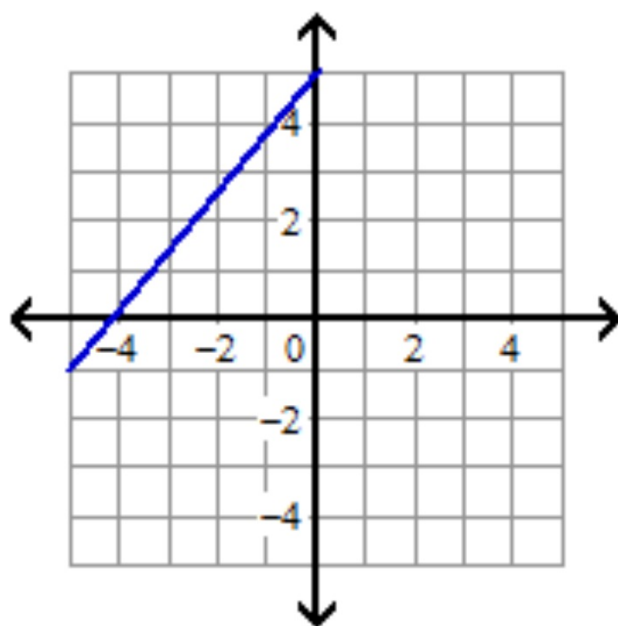
$\dfrac{1}{4}$

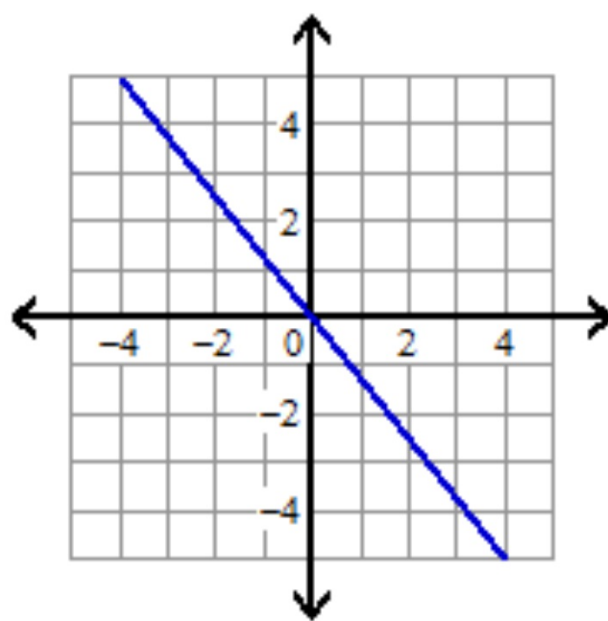3. What is this lines equation?

$y = \dfrac{1}{4}x + 3$

2)

Your turn

4)

5)

Problems for homework

...to [make a table?] of [points?] and use the formula for the slope of two points. SHOW YOUR WORK.

Find the slope of the line that passes through each pair of points.

1) $(2,5)(3,6)$ _____   2) $(-2,4)(6,6)$ _____

3) A soft drink bottle filling machine can fill 22 bottles per minute. The table shows the relationship between the number of minutes and the number of bottles filled.

Time (minutes)	1	2	3	4	5
Bottles filled	22	44	66	88	110

4) The table shows the volume of water released by Hoover Dam over a certain period of time.

Water Released from Hoover Dam	
Time (s)	Volume of Water (m³)
5	75,000
10	150,000
15	225,000
20	300,000

5)

Sound Intensity					
Input Signal Power (W)	6	8	12	20	28
Output Sound Intensity $\left(\frac{W}{m}\right)$	6	16	36	76	116

6) The table shows an employee's pay per number of hours worked.

Hours Worked	0	1	2	3	4	5	6
Pay ($)	0	9.50	19.00	28.50	38.00	47.50	57.00

slope and rate of change   Period ____

The rate of change is constant in the table. Find the rate of change. Explain what the rate of change means for the situation.

1.
Time (days)	Cost (dollars)
3	75
4	100
5	125
6	150

2.
| Time (hours)	Distance (miles)
4	232
6	348
8	464
10	580

Part 1 For each t-shirt company:

- Plot the ordered pairs on the grid that is on the right of the table.
- Find the slope for this t-shirt company using the values in the table
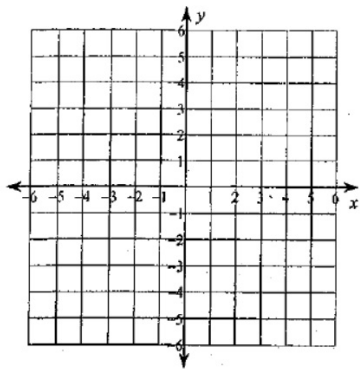
1.

Number of t-shirts	Cost (in dollars)
x	y
2	87
4	99
6	111

Part 1 For each t-shirt company:

- Plot the ordered pairs on the grid that is on the right of the table.
- Find the slope for this t-shirt company using the values in the table

1.
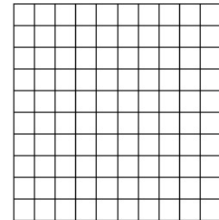
Number of t-shirts	Cost (in dollars)
x	y
2	87
4	99
6	111
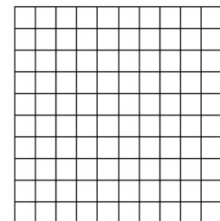
3.

x	5	10	15
y	23	43	63

4.

x	4	10	17
y	22	58	100

Sketch the graph of each line.   pg 2 homework

1) $y = -\frac{3}{5}x + 5$
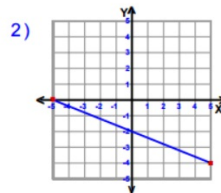
2) $y = -\frac{1}{2}x$

Find the Slope of Each Line

1) slope = _____

2) slope = _____

3) slope = _____

4) slope = _____