name: **Key**   class: _____

linear functions 2

Find the rate of change in each table:

X	Y
1	10
2	20
3	30
4	40
5	50

$+1$, $+10$

$m = \dfrac{+10}{+1} = 10$

X	Y
-2	-2
-1	-1
0	0
1	1
2	2

$+1$, $+1$

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

X	Y
0	10
1	8
2	6
3	4
4	2

$+1$, -2

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

Input	Output
2	10
4	9
6	8
8	7
10	6

$+2$, -1

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

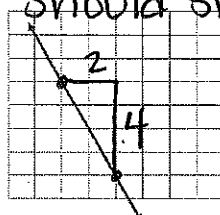| X	Y
7	20
6	15
5	10
4	5
3	0

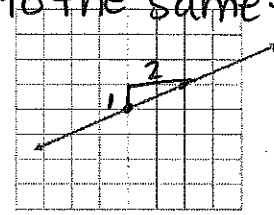-1, -5

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

Find the slope of each line: Remember, you can choose any 2 points – our fractions should still reduce to the same thing.
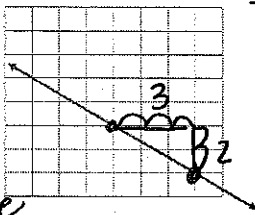
Negative because line is decreasing → $m = -\dfrac{2}{3}$

(graph 1: 3, 2)
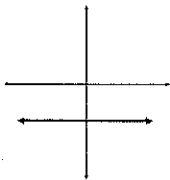
$m = \dfrac{-4}{2} = \dfrac{-2}{1} = -2$

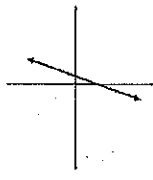(graph 2: 2, 4)

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

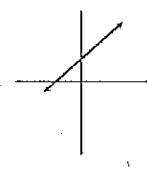(graph 3: 2, 1)

Describe each slope below as either positive, negative, zero, or undefined.
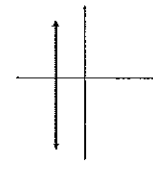
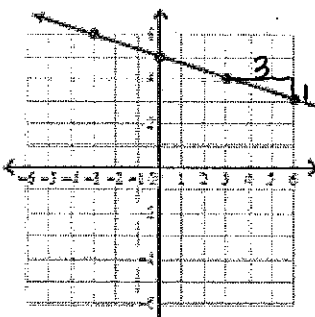Slope: **Zero**   Slope: **Negative**   Slope: **Positive**   Slope: **Undefined**

Write an equation in slope intercept form for each given linear function. * to write equation, you need both slope & y.int.
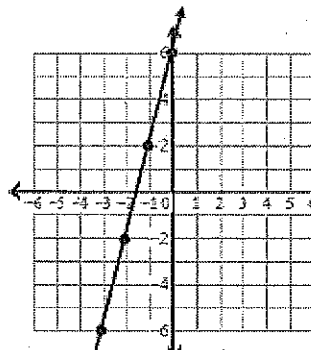
Function 1:

$m = -\dfrac{1}{3}$
$b = 5$

Equation: $y = -\dfrac{1}{3}x + 5$

Function 2:

$m = \dfrac{4}{1} = 4$
$b = 6$

Equation: $y = 4x + 6$

Function 3:

x	y
3	10
4	9
5	8
6	7

$+1$, -1

Follow the pattern to find y-int. $(0, \_)$

$m = \dfrac{-1}{1} = -1$
$b = 13$

Equation: $y = -1x + 13$ OR $y = -x + 13$

If a function has a rule of $y = 5x+2$ what is the output when the input is 4? __22__

$y = 5(4)+2$
$y = 20+2$
$y = 22$

Using the same rule, what is the input if the output is 12? __2__

$12 = 5x+2$
$-2 \quad\quad -2$
$10 = 5x \quad x = 2$

Answer the questions for each scenario below:

Scenario 1: Mike had a balance of $81 on his credit card for a department store. He just purchased 3 sweatshirts, and his balance is now $147.

X = # of sweatshirts
y = $ on credit card

x	0	3
y	81	147

A. What is the rate of change and what does it mean in context? __rate of change = $\frac{66}{3}$ =__

__22. It means he paid $22 per sweatshirt.__

B. What is the y intercept and what does it mean in the context? __81. It means before__
__he purchased any shirts, his balance was $81.__

C. Write the equation for the context: __$y = 22x + 81$__ ~ starting balance

$ on credit card   price per shirt   # of shirts

D. What would the balance be on his card if he purchased 5 sweatshirts? __$y = 22(5) + 81$__
+5
$y = 110 + 81$
$y = 191$

Scenario 2:

weeks	8	13
lbs	149	134

$\frac{-15}{5} = -3$

One dieter in a weight-loss contest weighed 149 pounds after 8 weeks on his diet. By week 13, he weighed 134 pounds.

*The slope would be −3 to indicate his total weight is decreasing by 3 lbs each week!

1. What is his weight loss per week? __3 lbs__

2. How much will he weigh after 16 weeks? __125__

3. What was his weight when he started the diet? __173__

Scenario 3:

Eddie is interested in hiring a moving company to move across the state. He has researched various companies to use.

Company 1 charges based on the equation $c = 12m + 250$.
cost   miles

Company 1
$c = 12(50) + 250$
$c = 600 + 250$
$c = 850$

Company 2 charges based on the following table:

Miles (m)	50	100
Cost (c)	$1000	$1500

Company 2: $1,000

1. **Which company offers the best rate for a move that is less than 50 miles?**
__Company 1 would be less (850) than company__
__2 @ 1,000.__

2. **Which company has the greatest rate of change?** __Company 1__

Company 1: 12
Company 2: 10