

Putting it all together!  
One final method for the equation of a line

Given  $y = 4x + 3$ ,

you know the slope = 4 and y-intercept is 3

What if you were given this table to fill in:

x	y	1st diff
-2	$4(-2) + 3 = -5$	$-1 - (-5) = 4$
-1	$= -1$	$3 - (-1) = 4$
0	$= 3$	$7 - 3 = 4$
1	$= 7$	$11 - 7 = 4$
2	$= 11$	$y_2 - y_1 = 15 - 11 = 4$
3	$= 15$	

$y = 4x + 3$   
1st diff

\*When  $x = 0$   
you have  
the y-int

Slope is found by values  
that "y" increases or  
decreases by in table

### First Differences

- Check to see if the values of the independent variable are changing by a constant amount (this is a must).
- Calculate first differences by subtracting the consecutive dependent variable values.
- If the first differences are constant then the relationship is linear.
- If the first differences are not constant the relationship is non-linear relation.

Now Try the following:

x	y
1	4
2	8
3	12
4	16
5	20

1st diff  
 $y_2 - y_1 = 8 - 4 = 4$   
 $12 - 8 = 4$   
 $16 - 12 = 4$   
 $20 - 16 = 4$

Linear

Linear because  
1st Difference are  
Constant

Calculate the first differences. Decide whether the relation is linear or non-linear.

x	y	diff
-2	5	
-1	2	$2 - 5 = -3$
0	-1	$-1 - 2 = -3$
1	-4	$-4 - (-1) = -3$
2	-7	$-7 - (-4) = -3$
3	-10	$-10 - (-7) = -3$
4	-13	$-13 - (-10) = -3$

y-int 1

$y = -3x - 1$

\* Linear  
b/c

slope

$-13 - (-10)$   
 $-13 + 10 = -3$

x	y	diff
-2	5	
-1	9	4
0	12	3
1	14	2
2	15	1
3	15	0
4	14	-1

non-linear  
relation b/c  
the 1st diff  
are not constant

Given the tables above, what is the equation of each line?