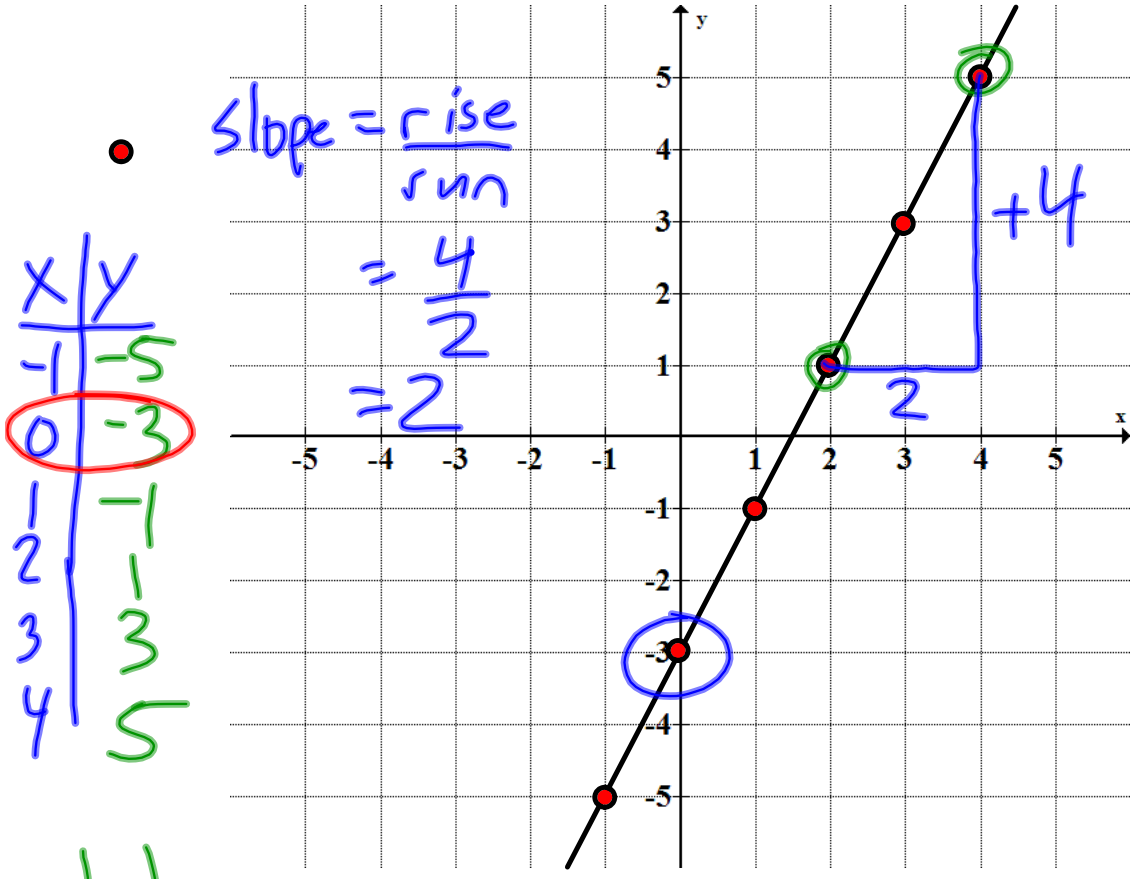
What's Going On?

Checking In	Word Wall!
Minds on	Who's the fastest?
Action!	First Differences
Consolidation	Is it linear? What's the slope?

Learning Goal - I will understand how to use first differences.

a) Determine the slope of the given line.
b) Write the equation of the given line.



slope = rise / run
= 4/2
= 2

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

b)

$y = mx + b$

$y = 2x - 3$

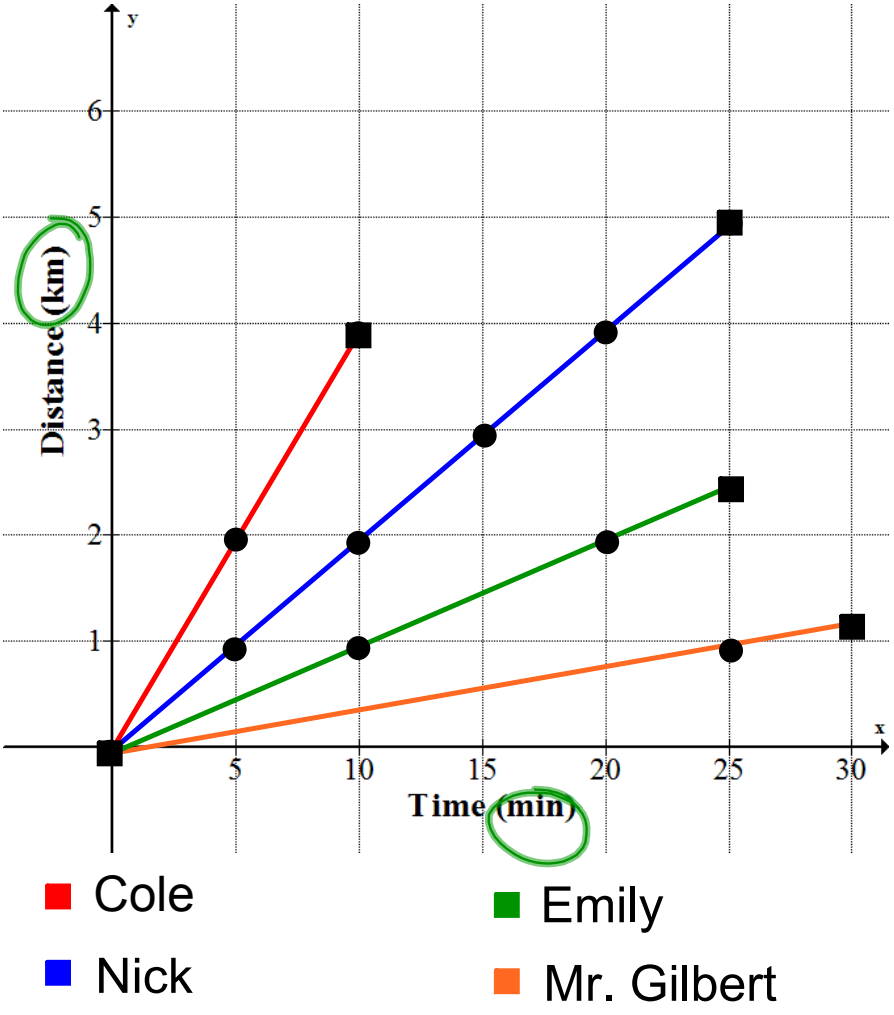
$m = 2$

$b = -3$

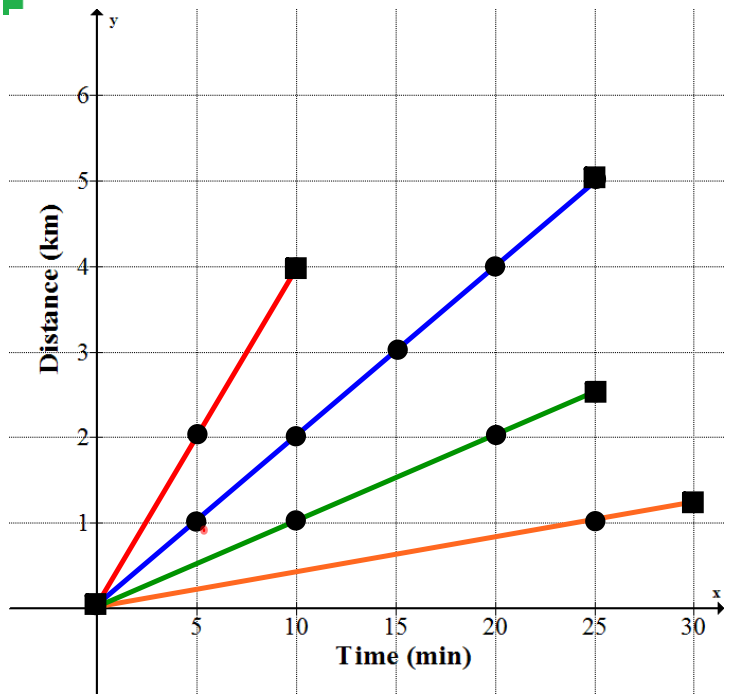
Minds on

Who's the Fastest?

km/min



Minds on



Cole
Emily
Nick
Mr. Gilbert

Slowest?

Mr. Gilbert

Who ran longest (time)?

Mr. Gilbert

Who ran farthest?

Nick

Who ran for the least amount of time?

Cole

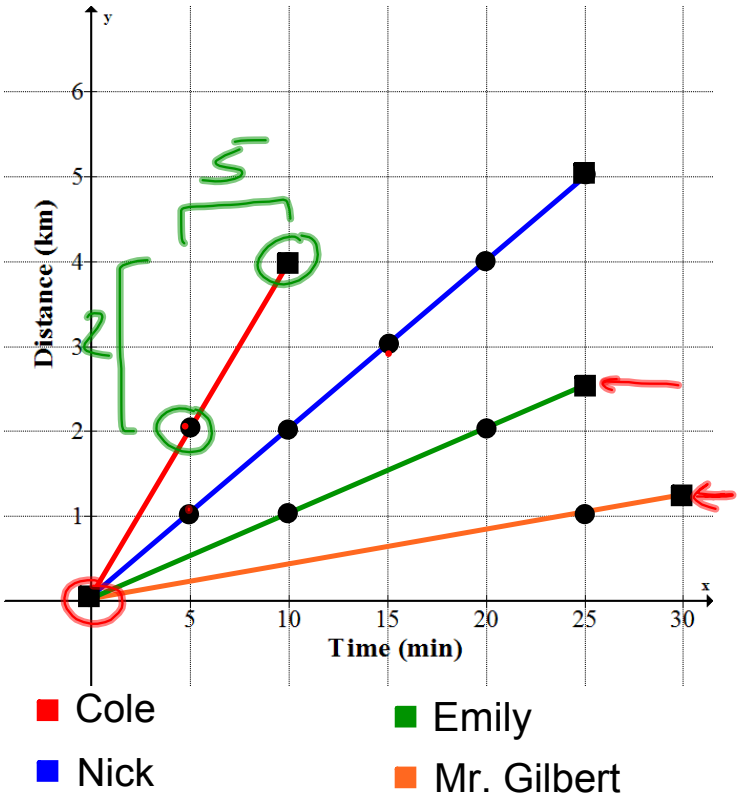
Who ran the shortest distance?

Mr. Gilbert

Action!

What is each person's rate of change?

time	distance
0	0



Make Tables of Values!

Action!

Rate of Change

Cole

Time (min)	Distance (km)
0	0
5	2
10	4

+2, +2

5 min

$\frac{2}{5}$

What is Cole's Rate of Change?

~~2 km/min~~

~~2.5 km/min~~

0.4 km/min

The rate of change is **not** 2 km/min!

Time is going up by 5s, not by 1!

~~$\frac{5\text{ min}}{2\text{ km}}$~~

Action!

Rate of Change

Time	Distance
0	0
+5 5	+2 2
+5 10	+2 4

The rate of change is 2 km for every 5 minutes.

OR

$$\frac{2 \text{ km}}{5 \text{ min}} = 0.4 \text{ km/min}$$

Action!

What is each person's rate of change?

Cole

Time	Distance
0	0
5	2
10	4

0.4 km/min

Nick

Time	Distance
0	0
5	1
10	2
15	3

+5, +1

0.2 km/min

Emily

Time	Distance
0	0
10	1
20	2

0.1 km/min

Mr. Gilbert

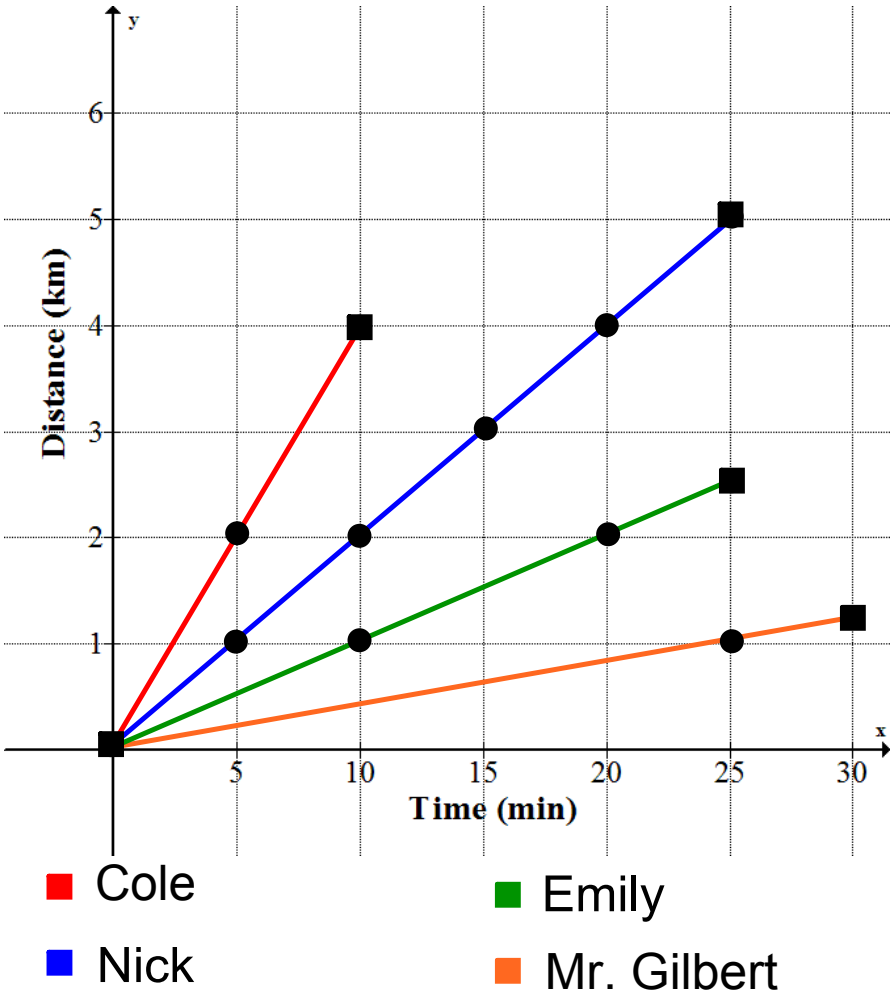
Time	Distance
0	0
25	1

25, 1

0.04 km/min

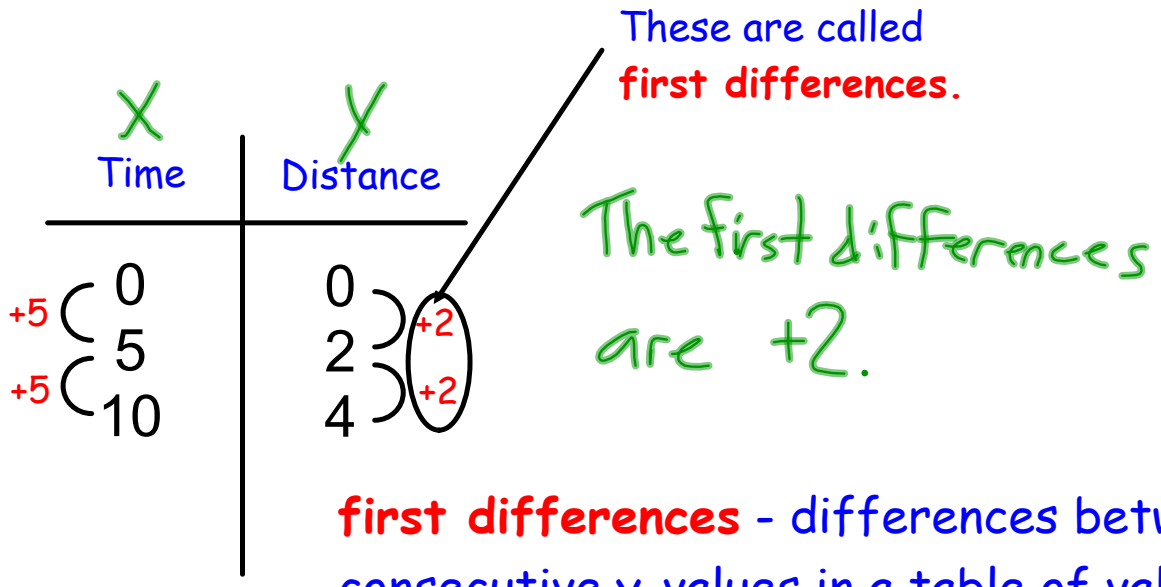
Minds on

Who's the Fastest?



Action!

First Differences



first differences - differences between consecutive y-values in a table of values with **evenly spaced x-values**

Consolidation

What are the First Differences?

x	y
0	3
1	5
2	7
3	9

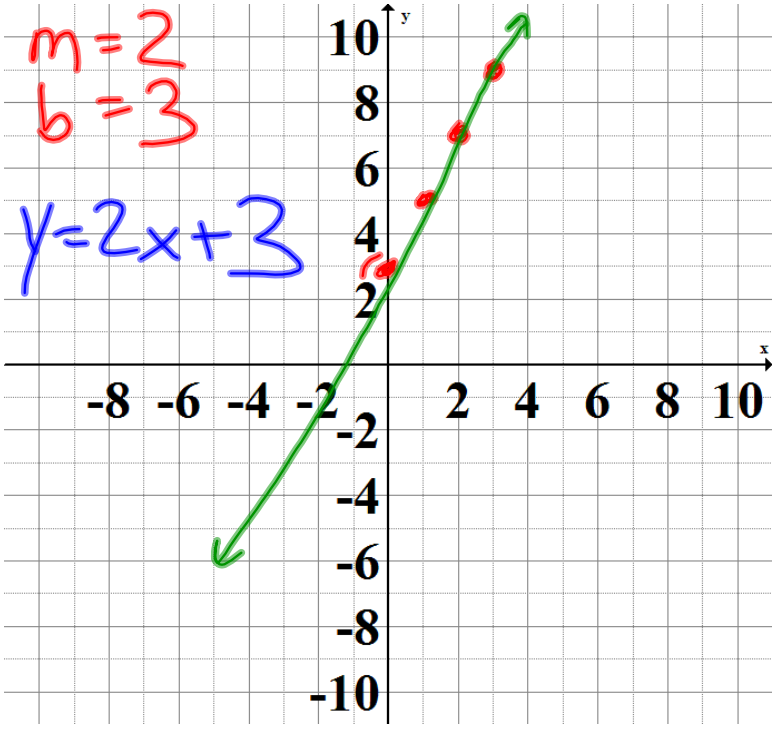
+1 +2 +2 +2

$\frac{2}{1} = 2$

$m = 2$

$b = 3$

$y = 2x + 3$



Consolidation

What are the First Differences?

b = -5

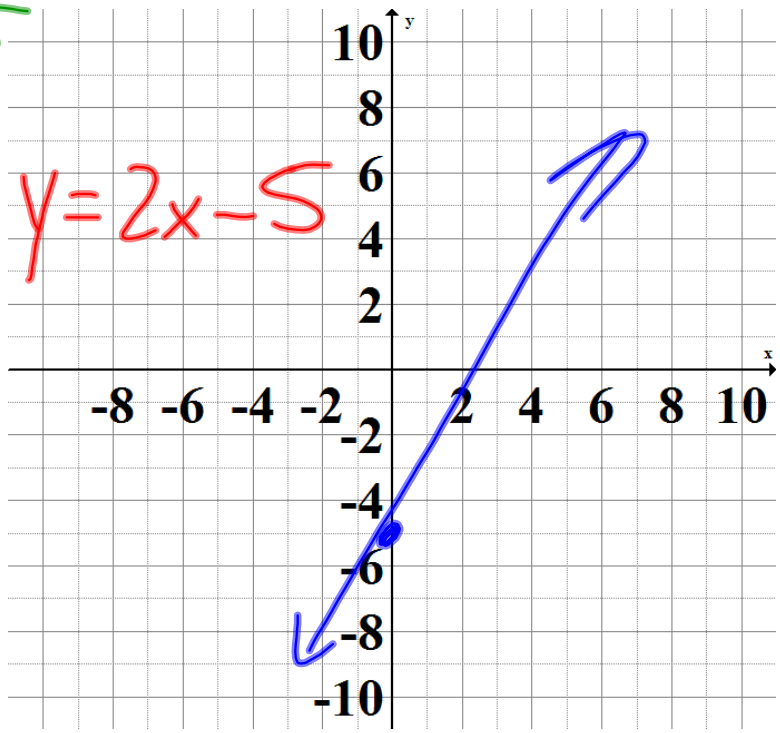
x	y
0	-5
1	-3
2	-1
3	1

+1, +2, +2, +2

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

$m = 2$

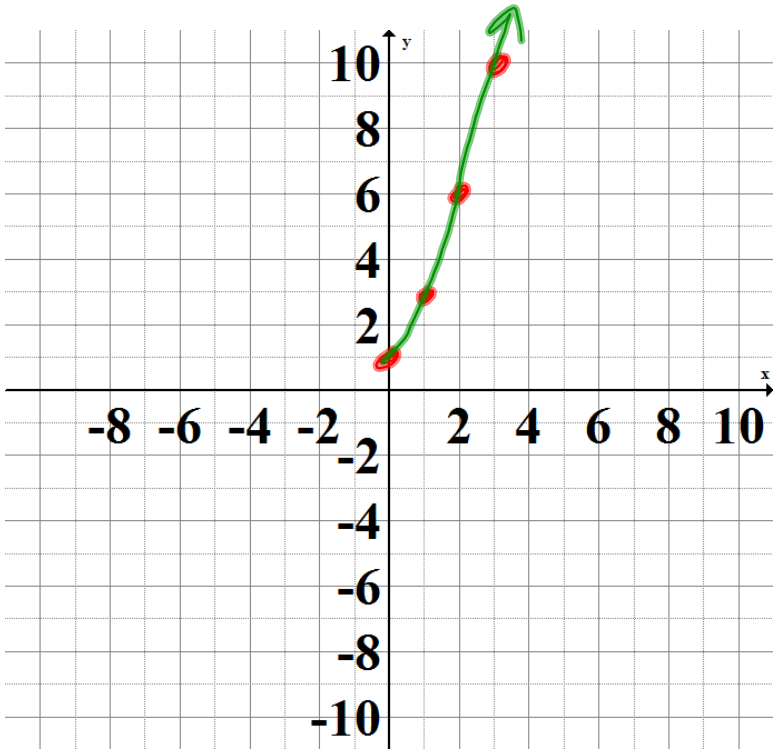
$y = 2x - 5$



Consolidation

What are the First Differences?

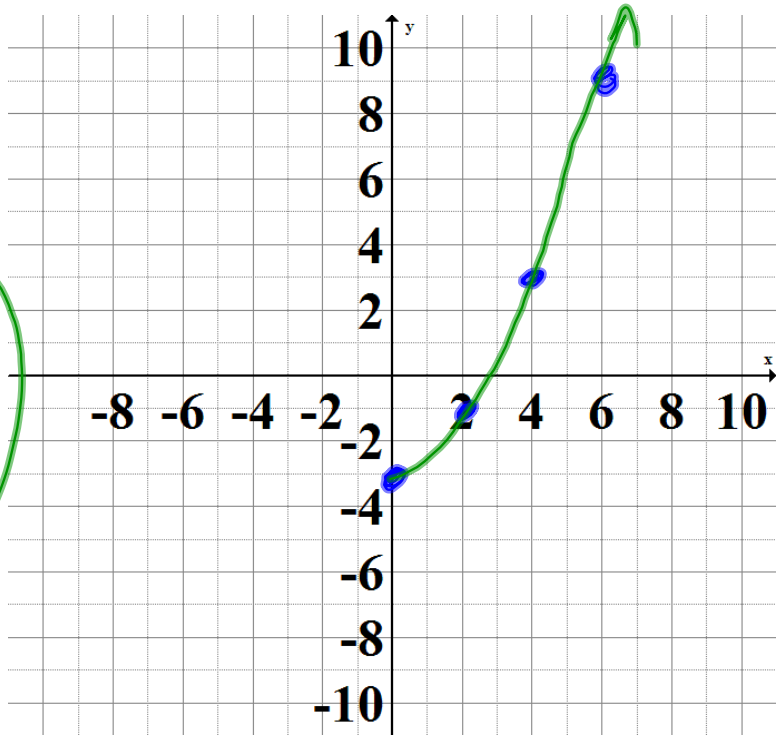
x	y	
0	1	
1	3	+2
2	6	+3
3	10	+4



Consolidation

What are the First Differences?

x	y	
0	-3	
2	-1	+2
4	3	+4
6	9	+6

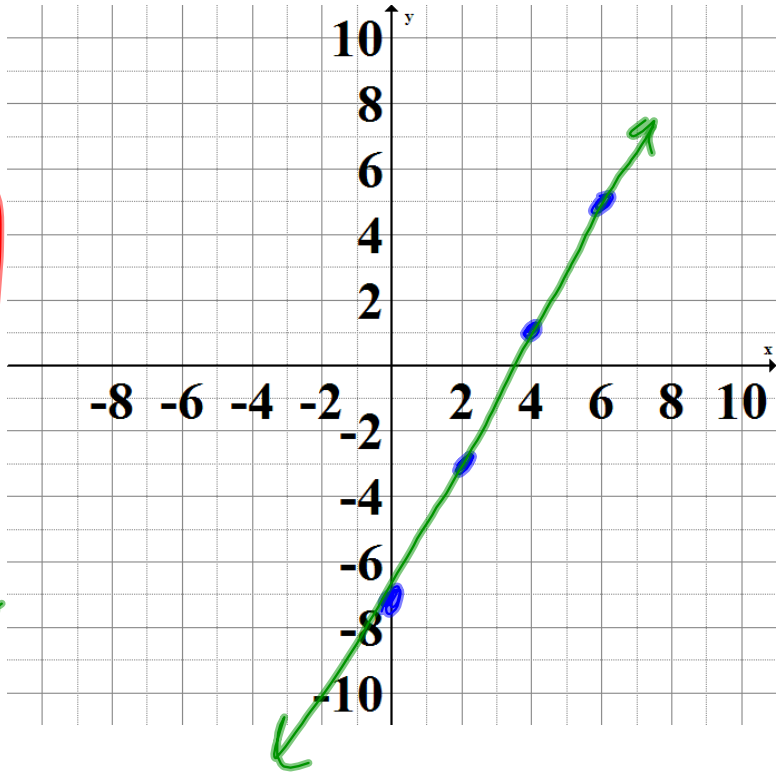


Consolidation

What are the First Differences?

x	y	
0	-7	
2	-3	+4
4	1	+4
6	5	+4

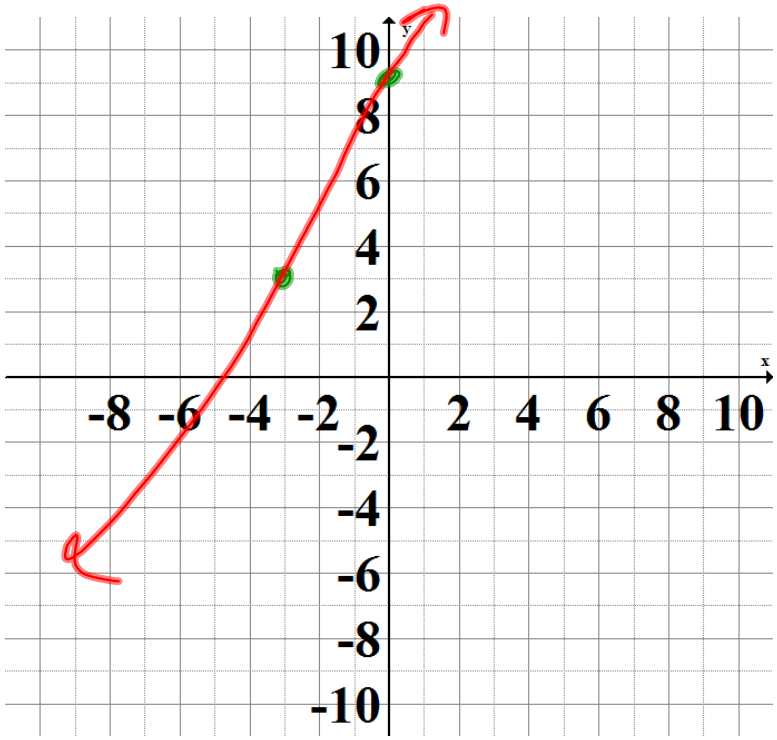
First differences are +4



Consolidation

What are the First Differences?

x	y
-3	3
0	9
3	15
6	21



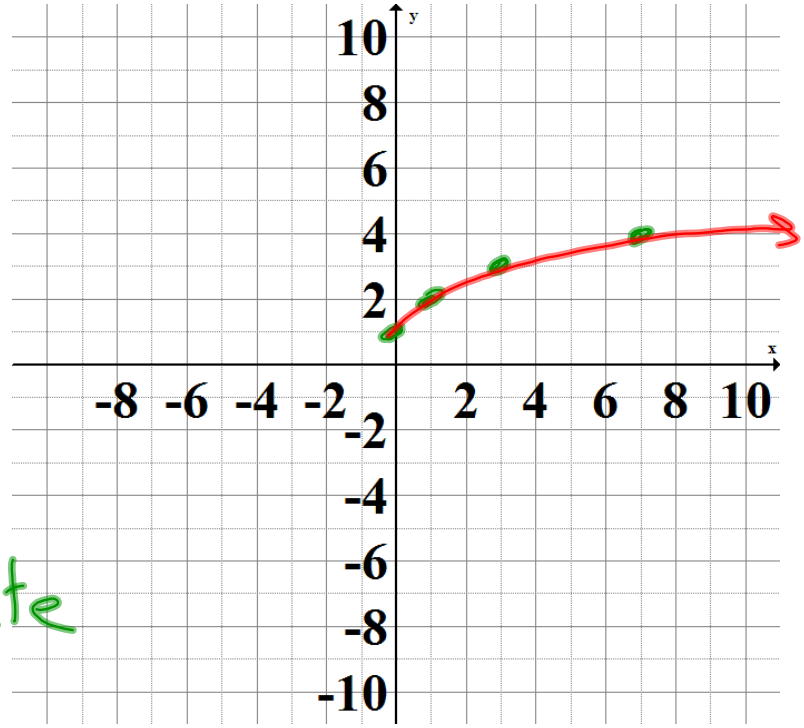
Consolidation

What are the First Differences?

x	y
0	1
1	2
3	3
7	4

1
2
4

We cannot calculate First differences.



Consolidation

What do the First Differences Tell Us?

If the first differences of a relation are constant the relation is linear.

Consolidation

What do the First Differences Tell Us?

If the first differences of a relation

are not constant the relation is

not linear.

Pg 275
#2-7

Consolidation

Practice it!