What's Going On?

Checking In

Minds on   Making Graphs, Making Tables

Action!   First Differences

Consolidation   Is it linear? What's the slope?

**Learning Goal - I will understand how to use first differences
to determine if a relation is linear or non-linear.**

`

L.G.L.

Copy the table below.

Answer the following questions about the table.

a. Is this an example of direct or partial variation? How do you know?

b. What is the initial value?

c. What is the slope?

d. What is the rate of change?

Time (s)	Distance (m)
0	2
5	4
10	6

e. What is an equation that could represent this data?

f. What would be the distance after 17 minutes?

L.G.L.

Copy the table below.

Answer the following questions about the table.

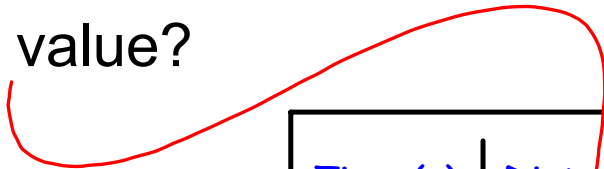a. Is this an example of direct or partial variation? How do you know?

Time (s)	Distance (m)
0	2
5	4
10	6

L.G.L.

Copy the table below.

Answer the following questions about the table.

   b. What is the initial value?

Time (s)	Distance (m)
0	2
5	4
10	6

`

L.G.L.

Copy the table below.

Answer the following questions about the table.

c. What is the slope?

$$\frac{2}{5}$$

Time (s)	Distance (m)
0	2
5	4
10	6

$$\frac{4}{10}$$

L.G.L.

Copy the table below.

Answer the following questions about the table.

  d. What is the rate of change?

Time (s)	Distance (m)
0	2
5	4
10	6

$2m$ per $5s$

$0.4 m/s$

`

L.G.L.

Copy the table below.

Answer the following questions about the table.

e. What is an equation that could represent this data?

Time (s)	Distance (m)
0	2
5	4
10	6

$$Y = \frac{2x}{5} + 2$$

slope

$$D = \frac{2}{5}t + 2 \leftarrow \text{initial value}$$

$$D = 0.4t + 2$$

L.G.L.

Copy the table below.

Answer the following questions about the table.

f. What would be the distance after 17 minutes?

Time (s)	Distance (m)
0	2
5	4
10	6

$$D = \frac{2}{5}t + 2$$

17 minutes = 17 × 60 seconds

$$= 1020$$

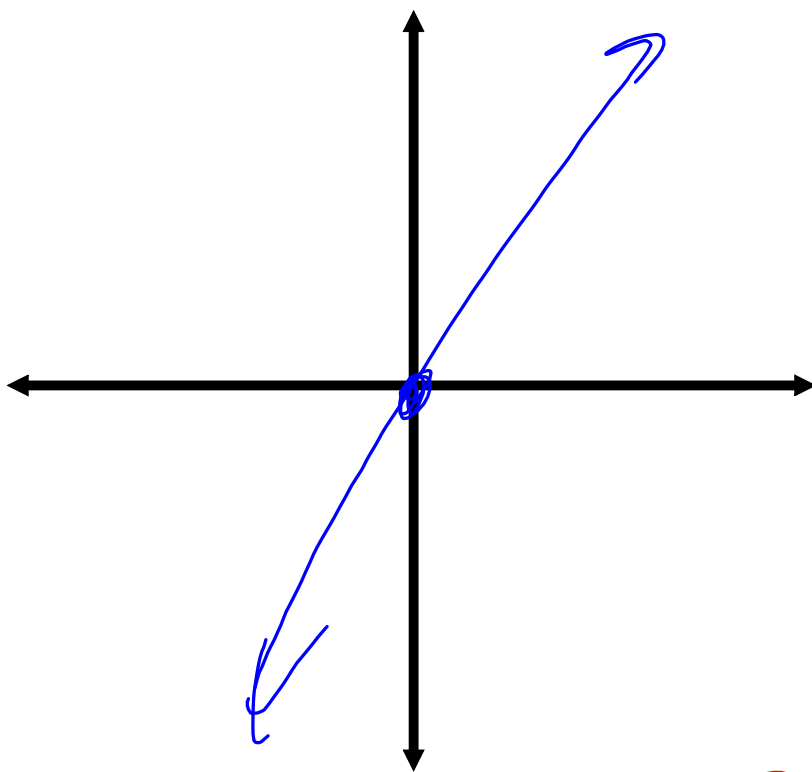$$D = \frac{2}{5}(1020) + 2$$

$$D = 408 + 2$$

$$= 410 \text{ m}$$

Test next Tuesday

Minds on

Making Tables, Making Graphs

Given the equation **y = 2x** — *slope!*

a. Copy and complete the table below.

b. Graph the equation identifying the initial value and slope.

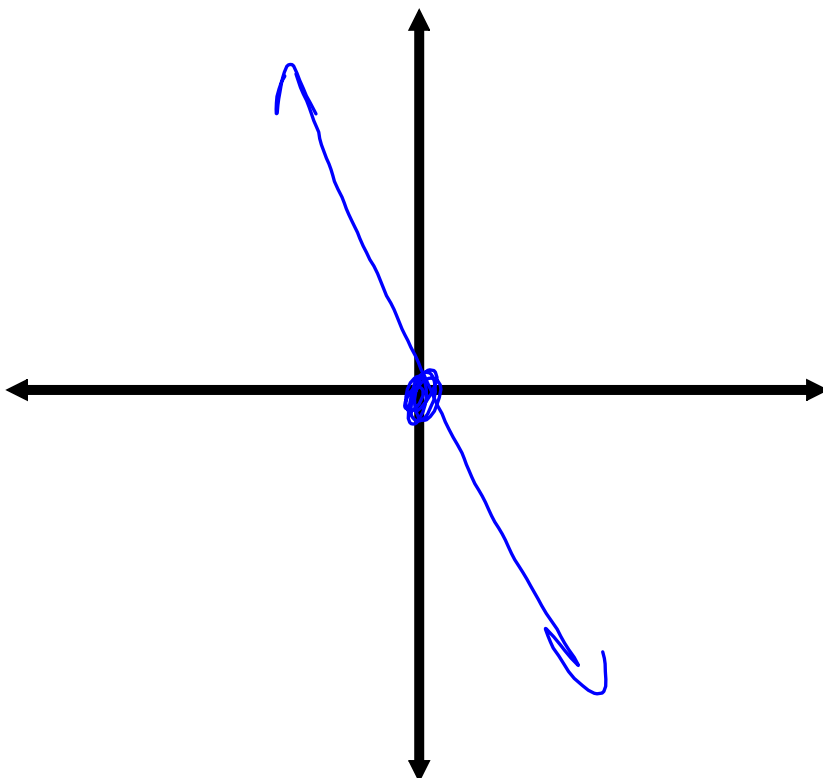| x	y
0	0
1	2
2	4

When x = 0, **y =** $2(0) = 0$

When x = 1, **y =** $2(1) = 2$

When x = 2, **y =** $2(2) = 4$

Minds on

Making Tables, Making Graphs

Given the equation **y = -3x**

a. Copy and complete the table below.

b. Graph the equation identifying the initial value and slope.

x	y
0	0
1	-3
2	-6

Minds on

Making Tables, Making Graphs

Given the equation $y = 2x - 3$

    a. Copy and complete the table below.

    b. Graph the equation, identifying the initial
value and slope.

x	y
0	-3
2	1
4	5
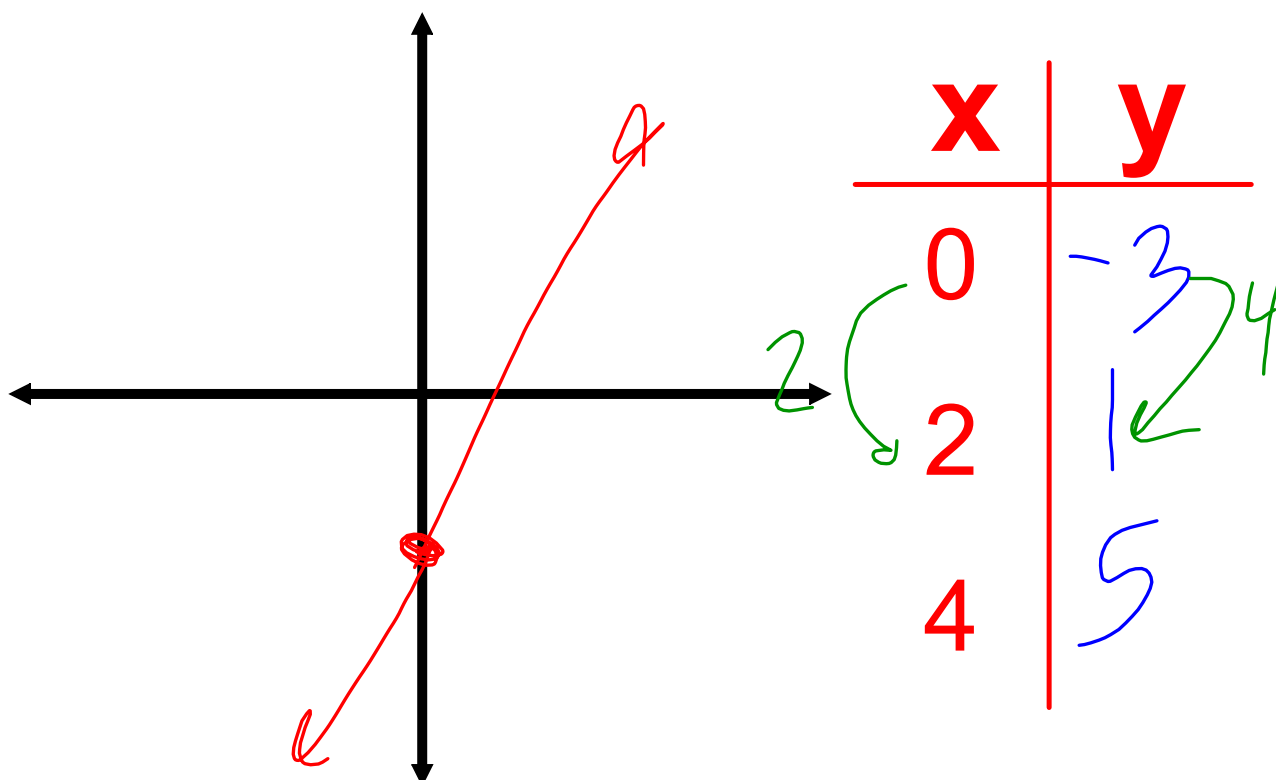
Minds on

Making Tables, Making Graphs

Given the equation **y = -3x + 2**

   a. Copy and complete the table below.

   b. Graph the equation, identifying the initial value and slope.
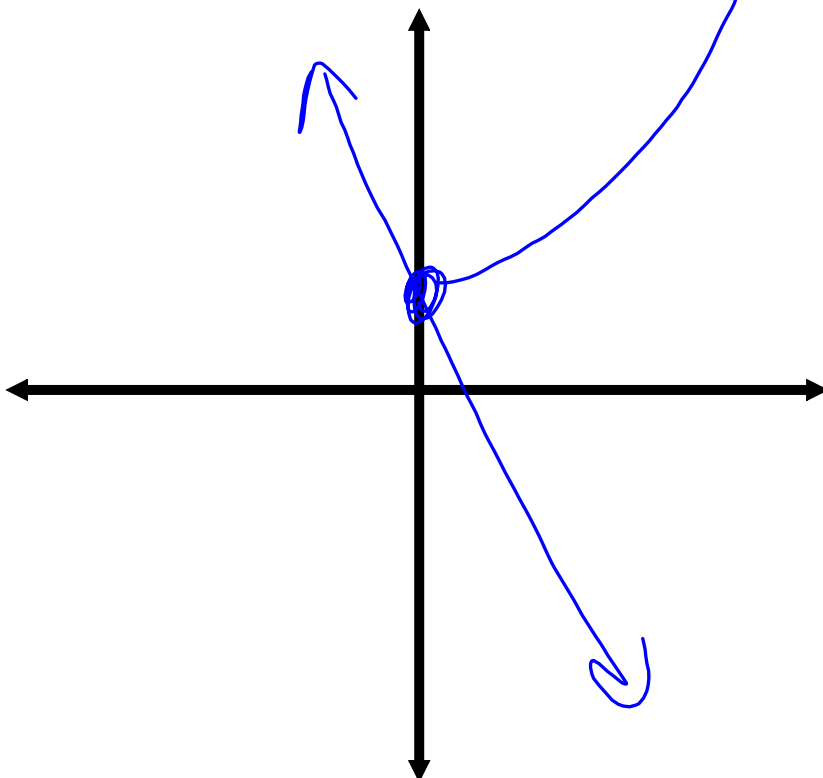
x	y
0	2
1	-1
5	-13

Action!

First Differences

These are called
first differences.

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

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
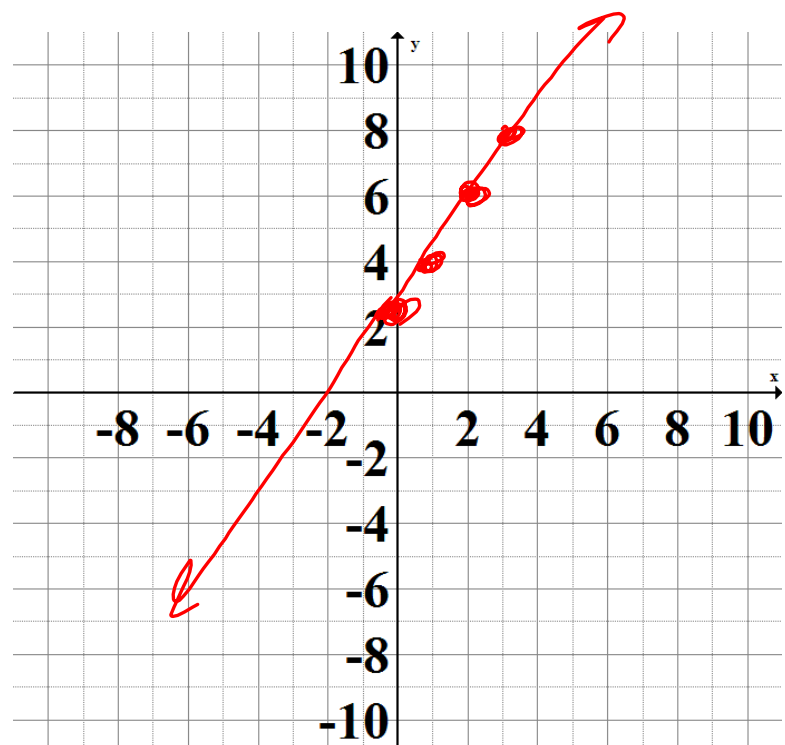
The first differences are: **2**

Consolidation

What are the First Differences?

$$-1 - -3$$

X	Y
0	-5
1	-3
2	-1
3	1

2
2
2

The first differences are: 2

Consolidation

What are the First Differences?

X	Y	
0	1	⟩2
1	3	⟩3
2	6	⟩4
3	10	

Can't draw a line through the points!
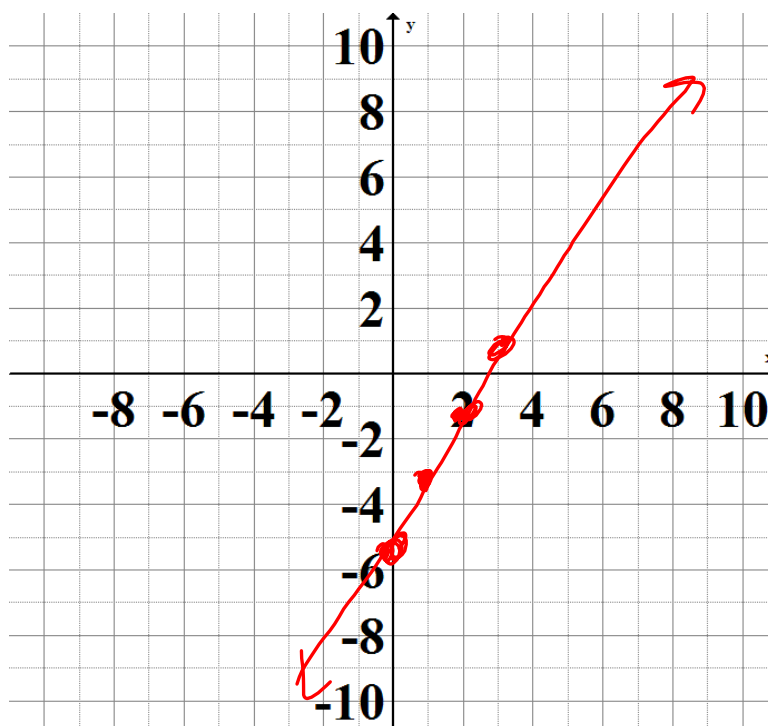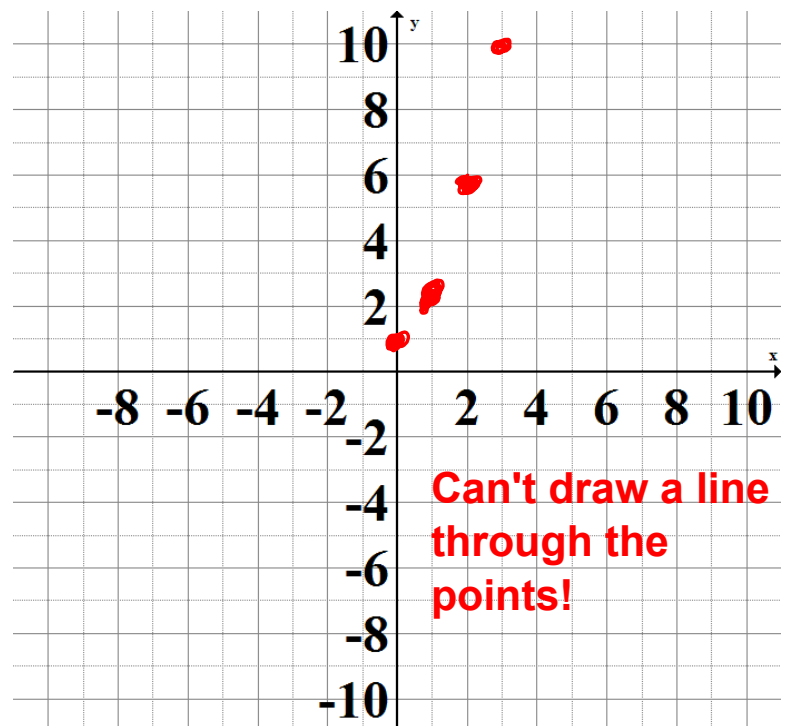
The first

differences are: 2, 3, 4

Consolidation

What are the First Differences?

x	y	
0	-3	$\Big\} 2$
2	-1	$\Big\} 4$
4	3	$\Big\} 6$
6	9	
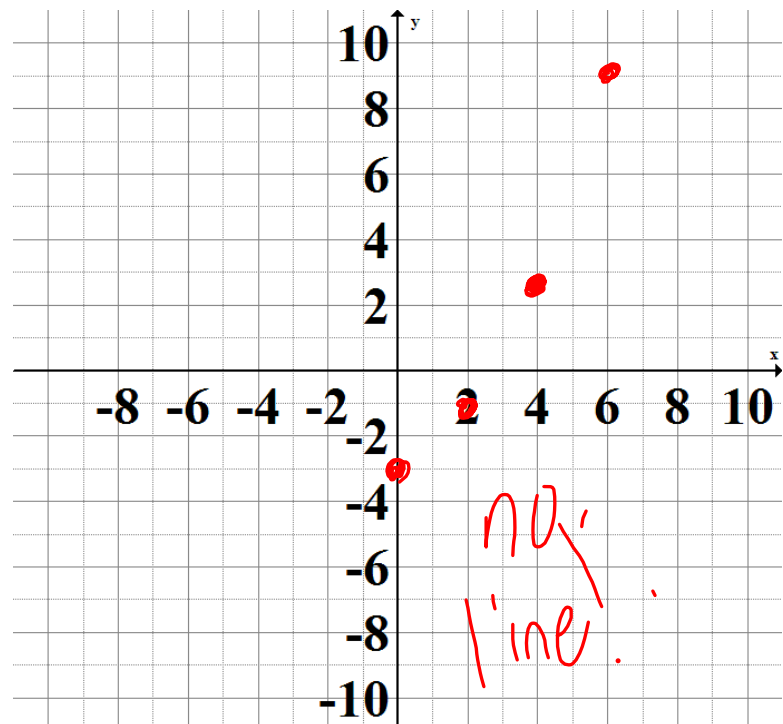
The first

differences are: $2, 4, 6$

Consolidation

What are the First Differences?

X	Y	
0	-7	74
2	-3	74
4	1	74
6	5	74
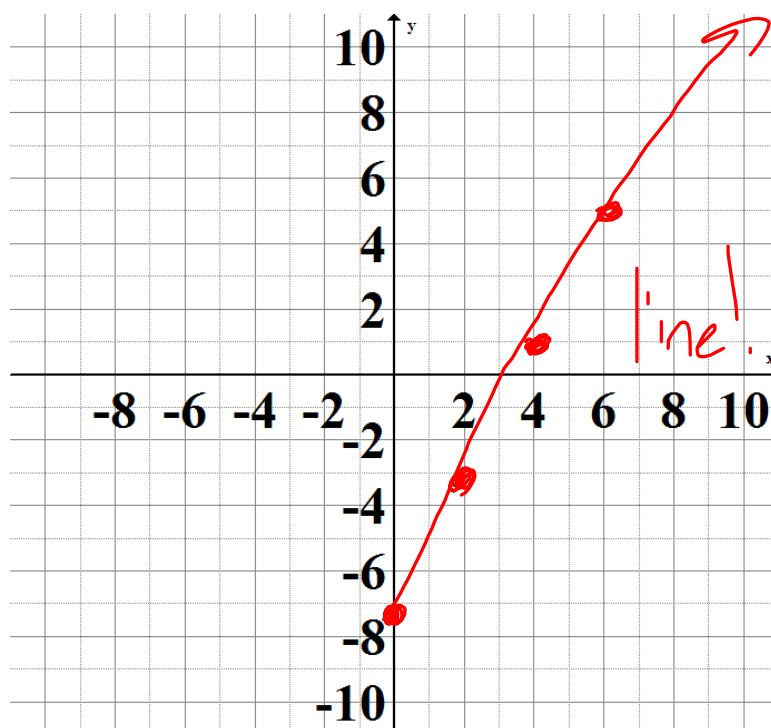
The first

differences are: 4

Consolidation

What are the First Differences?

X	Y
-3	3
0	9
3	15
6	21
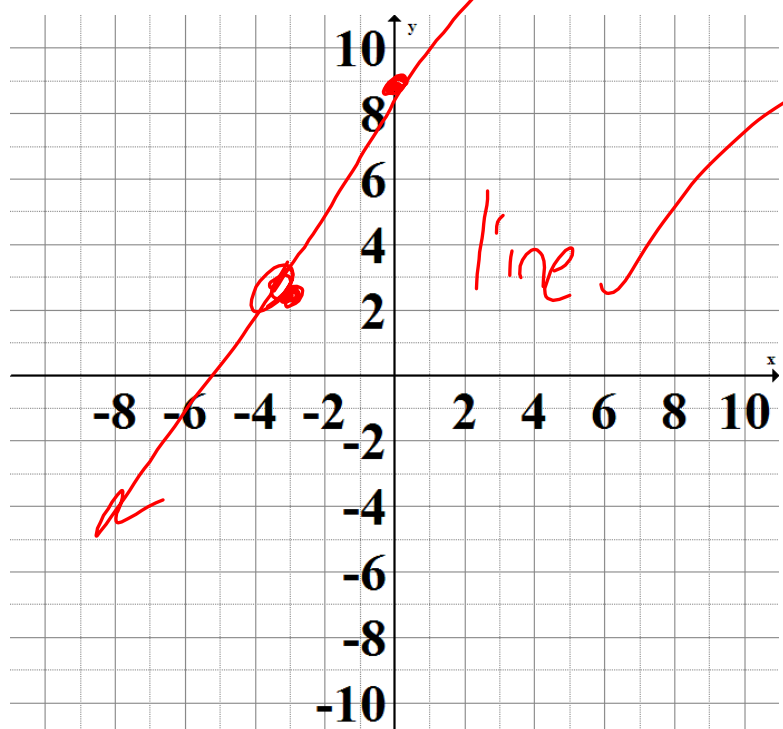
The first differences are:

(handwritten annotations on the y-values: 6, 6, 6; a graph showing a line labeled "line")

Consolidation

What are the First Differences?

not evenly spaced!!

x	y
0	1
1	2
3	3
7	4
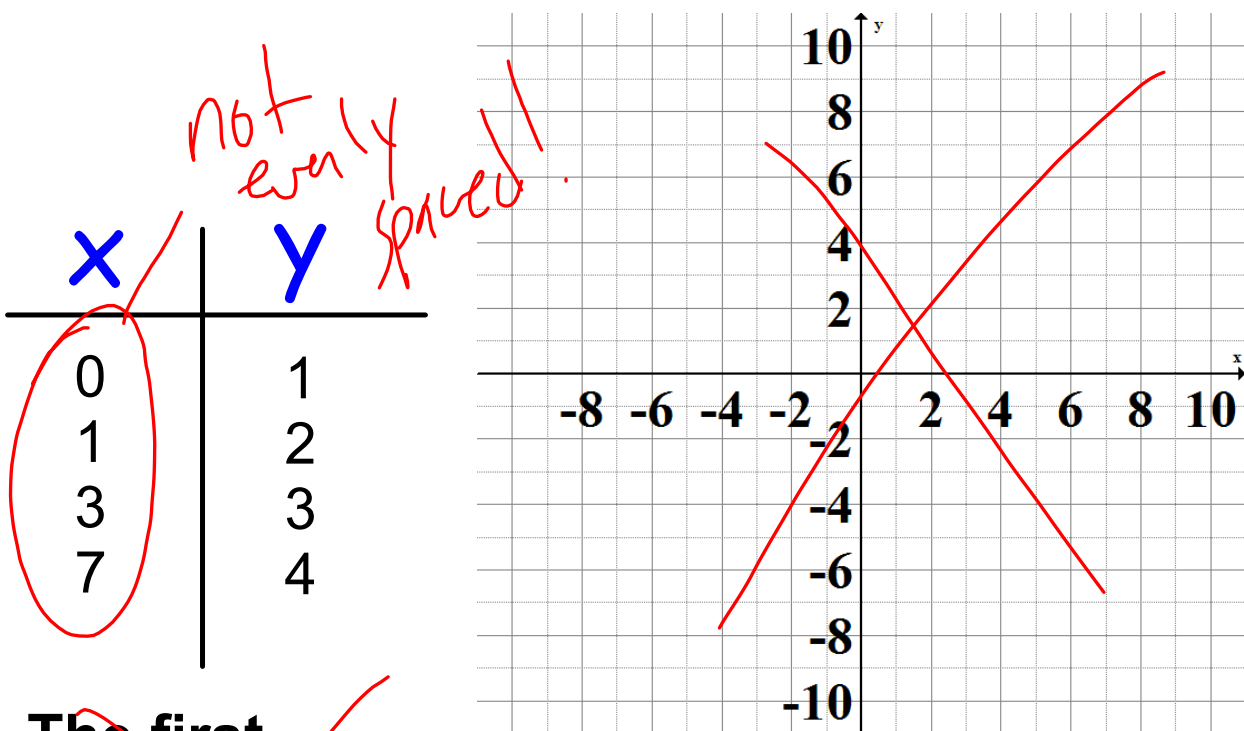
The first differences are:

we can't talk about them

Consolidation

What do the First Differences Tell Us?

If the first differences of a relation

are ___*Constant*___ the relation is

linear.

all the same

Consolidation

What do the First Differences Tell Us?

If the first differences of a relation

are not ___Constant___ the relation is

not linear.

not all the same