

FIRST DIFFERENCE REFERENCE SHEET

The **first difference** is a technique which identifies whether a table of values is **linear**. If the first difference calculation, reveals a **constant** value (a recurring value), then we can say that the information in the table of values is **linear**. This technique helps us because it could potentially prevent us from having to graph the information.

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

x	y	First Difference
0	4	
2	8	
4	12	
6	16	

The first row of the First Difference will always yield n/a because there is no initial value to compare too.

The second and all other rows will yield a calculation as follows:

2nd Row Calculations:

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

X	y	First Difference
0 is x_1	4 is y_1	n/a
2 is x_2	8 is y_2	2
4	12	
6	16	

$$FD = \frac{8 - 4}{2 - 0}$$

$$FD = \frac{4}{2}$$

$$FD = 2$$

3rd Row Calculations:

$$\text{FD} = \frac{y_2 - y_1}{x_2 - x_1}$$

X	y	First Difference
0	4	n/a
2 is x_1	8 is y_1	2
4 is x_2	12 is y_2	2
6	16	

$$\text{FD} = \frac{12 - 8}{4 - 2}$$

$$\text{FD} = \frac{4}{2}$$

$$\text{FD} = 2$$

Notice that the first difference calculation is always yielding the constant value 2. This is a good indication that the relationship is **linear**.

4th Row Calculations:

$$\text{FD} = \frac{y_2 - y_1}{x_2 - x_1}$$

X	y	First Difference
0	4	n/a
2	8	2
4 is x_1	12 is y_1	2
6 is x_2	16 is y_2	2

$$\text{FD} = \frac{16 - 12}{6 - 4}$$

$$\text{FD} = \frac{4}{2}$$

$$\text{FD} = 2$$

This confirms that the relationship between x and y is **linear**. Even better, we can say that as x increases, y increases at a rate of 2.