

Activity 5: Y=MX+C

Teacher's notes

KS 3 Framework ref: Pages 165-7

Strand: Algebra
Topic: Graphs and Functions
Pupils should be taught to: Generate points and plot graphs of functions
Year group: 8
Objectives: Plot the graphs of linear functions. Recognise that equations of the form $y=mx+c$ correspond to straight line graphs
Key Vocabulary: Linear, function, graph
Resources required: Class set of calculators plus Viewscreenor TI-SmartView emulator

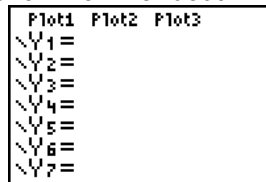
Summary

In this activity students are asked to engage with different functions of the form $y = mx + c$ and to look for the variability generated with changes in m and c . Also, a link is made to the characteristics of the table of values for each function.

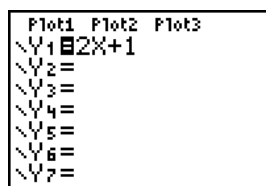
Instructions for the teacher

First reset the demo calculator and enter the friendly window settings shown on Handout 1.

To enter the function $Y=2X + 1$, press $\boxed{Y=}$ to see this screen.



Press $2 \boxed{X,T,\theta,n} \boxed{+} \boxed{1}$



Now look at the table of values:

Press $\boxed{2nd} \boxed{TABLE}$

X	Y1
0	1
1	3
2	5
3	7
4	9
5	11
6	13

You can display the function by moving the cursor by highlighting the header row for Y1:

Press $\boxed{\rightarrow}$ (right cursor)

Press $\boxed{\uparrow}$ (up cursor)

X	Y1
0	1
1	3
2	5
3	7
4	9
5	11
6	13

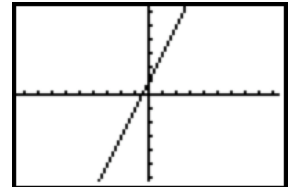
Ask questions such as:

“What are the numbers in the function?”
 “What do the 2 and the 1 represent in the table?”

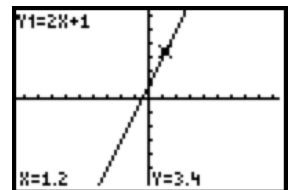
Take some suggestions, but do not formalise them; students will be able to formalise their ideas in the class activity.

Now look at the graph:

Press \boxed{GRAPH}



To display the name of the function and show values of points on the line, press \boxed{TRACE}



Use the left $\boxed{\leftarrow}$ and right $\boxed{\rightarrow}$ cursor keys to move along the line.

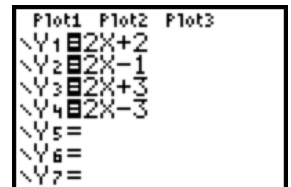
Ask questions such as:

“What are the numbers in the function?”
 “What do the 2 and the 1 represent in the graph?”

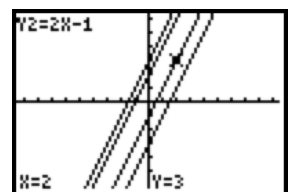
Take suggestions as before.

Comments on handouts

In questions 5-7 students can enter four functions together. All four functions can be viewed on the table or the graph. Then use all four cursor keys as below.



X	Y3	Y4
0	3	1
1	5	3
2	7	5
3	9	7
4	11	9
5	13	11
6	15	13



(If you are using TI-Smartview, the use of the View³ function is really helpful here.)

A function of the form $Y= MX+C$ represents a straight line. In the table of values the M means the step or difference between the Y values and the C means the value for $X=0$. In the graph, the M means the steepness or gradient and the C means the value of Y where the line crosses the axis,

First:

Reset your calculator...

- Press $\boxed{2nd}$ \boxed{MEM} to get the **MEMORY** menu
- Choose **7 (Reset...)**
- Choose **1 (All RAM...)**
- Choose **2 (Reset)**

Set up a window with friendly coordinates...

- Press \boxed{WINDOW}
- Type in the settings shown below (be sure to use the negative $\boxed{-}$ key).

```

WINDOW
Xmin=-9.4
Xmax=9.4
Xsc1=1
Ymin=-6.2
Ymax=6.2
Vsc1=1
Xres=1
    
```

Make sure that you can draw a graph, and look at its table of values:

To enter the function $Y = 2X + 1$

press $\boxed{Y=}$

and press $\boxed{2}$ $\boxed{X,T,\theta,n}$ $\boxed{+}$ $\boxed{1}$

```

Plot1 Plot2 Plot3
Y1=2X+1
Y2=
Y3=
Y4=
Y5=
Y6=
Y7=
    
```

Now to look at the table of values

press $\boxed{2nd}$ \boxed{TABLE}

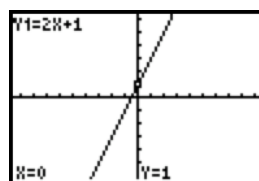
X	Y1
0	1
1	3
2	5
3	7
4	9
5	11
6	13

X=0

And to explore the graph

Press \boxed{GRAPH}

And then \boxed{TRACE}



Now try this

- (a) The function $Y = 2X + 1$ has the numbers 2 and 1 in it. Look at the table of values. What effect do you think these two numbers have in the table of values?
 - (b) Look at the graph. What effect do you think these two numbers have in the graph?

In Question 1 you should have written down your first ideas about what effect the numbers in the function have on the table and the graph.

Now check your ideas as you look at some more functions.

Some more functions

2. Start again and look at the table and graph for $Y = 3X + 1$
 [Note: use the **CLEAR** key to get rid of the $2X + 1$]

3. Start again and look at the table and graph for $Y = X + 1$

4. Start again and look at the table and graph for $Y = 3X - 1$

5. Now look at these four functions together:

$$Y = 2X + 2$$

$$Y = 2X - 1$$

$$Y = 2X + 3$$

$$Y = 2X - 3$$

Four together

You don't need to **CLEAR** each one of these.

Use the down cursor \downarrow and use Y1, Y2, Y3 and Y4

6. Now look at these functions together:

$$Y = X - 1$$

$$Y = 3X - 1$$

$$Y = 4X - 1$$

$$Y = -X - 1$$

Key care

Use \ominus to enter a negative and \square for subtract.

So to enter $-X - 1$ you must press

$$\ominus \quad X, T, \Theta, \eta \quad \square \quad 1$$

7. Now look at these functions:

$$Y = -2X + 2$$

$$Y = -3X + 2$$

$$Y = -X + 2$$

$$Y = 2X + 2$$

8. The letter M is normally used for number in front of the X .
 The letter C is normally used for number after the X .
 Update your report about the meaning of the M and the C .