Graphic Calculator Resources for Years 9 and 10

Activity	*Graphing Straight Lines*
Strand	Algebra
Sub-Strand	Co-ordinate Geometry
Year Group	Years 9, 10
Level	1, 2
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Calculators	Texas Instruments TI-83/83+
Description	Using the graphics calculator to explore the $y = mx + b$ form of a straight line.

Graphing Straight Lines

Worksheet 1

1. Clear all current graphs from your calculator:
   [Y=] [CLEAR]; down arrow and **[CLEAR]** as required.

2. Press **[ZOOM] [6]**, then **[ZOOM] [5]** for suitable axes.

3. To graph $y = x$
   press: **[Y=] [X,T,θ,*n*] [GRAPH]**

   To graph $y = x + 4$
   press: **[Y=] [▼] [X,T,θ,*n*] [+] [4] [GRAPH]**

   To graph $y = x - 4$
   press: **[Y=] [▼]** (twice) **[X,T,θ,*n*] [–] [4] [GRAPH]**

4. What can you say about the three lines from (3)?

5. Clear the three graphs and now draw the graphs of

   $y = 2x + 4$
   $y = 3x + 4$
   $y = -x + 4$

What can you say about these lines?

6. Clear the three graphs in (5) and draw the lines

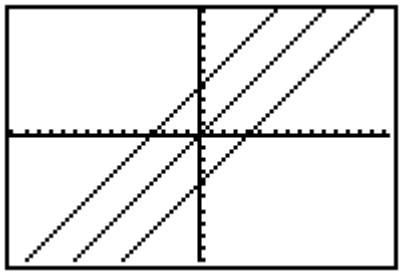
   $y = -2x$
   $y = -2x + 4$
   $y = -2x - 4$

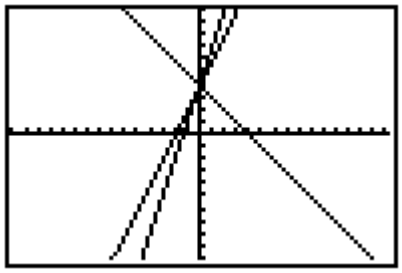
7. Clear the three graphs in (6) and draw the lines

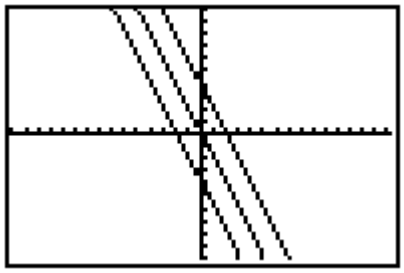
   $y = 2x - 6$
   $y = 3x - 6$
   $y = -x - 6$

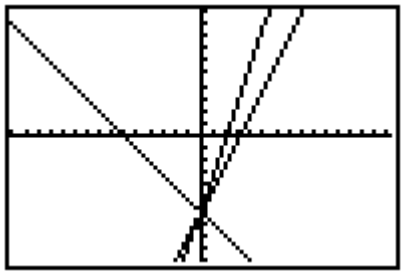
8. Clear the three graphs in (7) and draw the lines
   $y = 4$
   $y = -6$

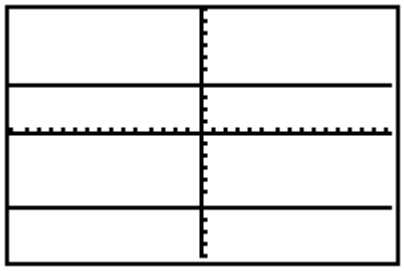
The graphs should appear like this:







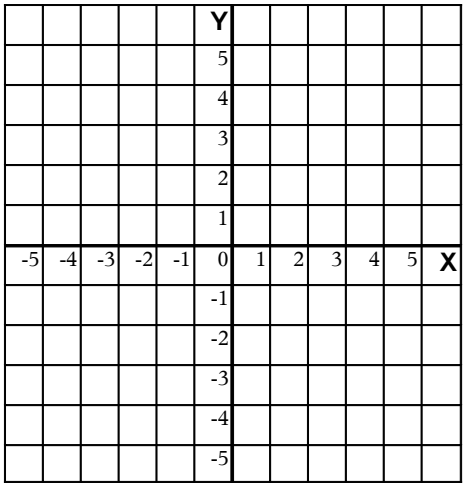




Graphing Straight Lines — Worksheet 2

Clear all current graphs from your calculator.	**[Y=] [CLEAR]**
Obtain a new set of "decimal" axes.	**[ZOOM] [4]**

1. Use the **[Y=]** editor to enter the function $y = x$. Press **[GRAPH]** .
   Draw a sketch on the number plane below. **Y_1**



2. Now draw the graph of $y = x + 1$ on your calculator. **Y_2**
   (i) What is the Y–intercept for $y = x + 1$? …….
   (ii) Draw a sketch of $y = x + 1$ on the number plane above.

3. Now draw the graph of $y = x + 2$ on your calculator. **Y_3**
   (i) What is the Y–intercept for $y = x + 2$? …….
   (ii) Draw a sketch of $y = x + 2$ on the number plane above.

4. Now draw the graph of $y = x - 1$ on your calculator. **Y_4**
   (i) What is the Y–intercept for $y = x - 1$? …….
   (ii) Draw a sketch of $y = x - 1$ on the number plane above.

5. Can you predict the Y–intercepts for the following curves?

$y = x + 7$		***Check these using your calculator***
$y = x - 2$		
$y = x + 2.7$		
$y = x - 3.5$		

6. Try to generalise your results, i.e. what is the intercept of $y = x + b$, where b is any number? Test your conjecture with some more graphs.

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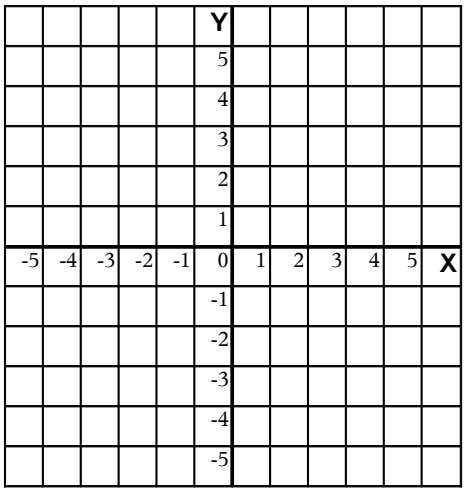
Graphing Straight Lines — Worksheet 3

Clear all current graphs from your calculator. Change the window of your calculator so that $-5 < x < 5$ and $-5 < y < 5$.	**[Y=] [CLEAR]** **[WINDOW]**

1. Use the **[Y=]** editor on your calculator to graph the curve $y = \frac{2}{3}x$.

   Draw a sketch on the number plane below. **Y_1**



2. Imagine you are a trace dot. Starting at the origin, move in a positive horizontal (x) direction for 3 boxes ('run') and then in a positive vertical (y) direction ('rise') for 2 boxes. Where do you end up?

   Coordinates: $x =$ ….. $y =$ …..

3. Draw the triangle on the grid that you have traced by this move. What sort of triangle is it?

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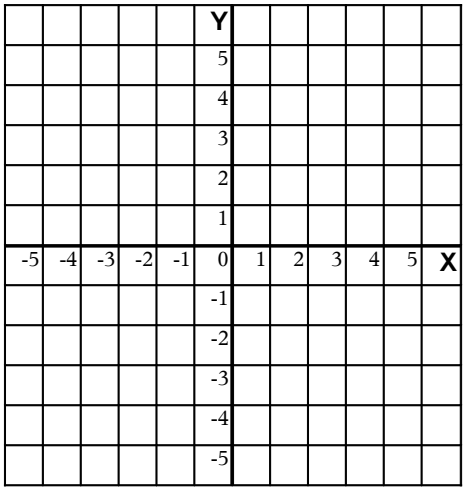
4. Graph the curve $y = \frac{1}{4}x$. Draw a sketch in the number plane below. **Y_2**



5. Move in a positive x direction for 4 boxes and then in a positive y direction for 1 box. Is the triangle produced the same type as in Question 3?

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6. Do you notice a pattern between the x coefficient in the equations and the 'rise' and "run" of your triangles?

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7. Graph the following and see if the results are consistent with your previous findings.

$y = \frac{2}{5}x$

$y = \frac{1}{3}x$

$y = 2x$

$y = 3x$

8. Complete the tables below for each equation, putting the equations in order from the smallest x coefficient to the largest.
Choose three x values and calculate the corresponding y values for each equation. Use these to draw each graph on the number plane below.

$y =$

x			
y			

$y =$

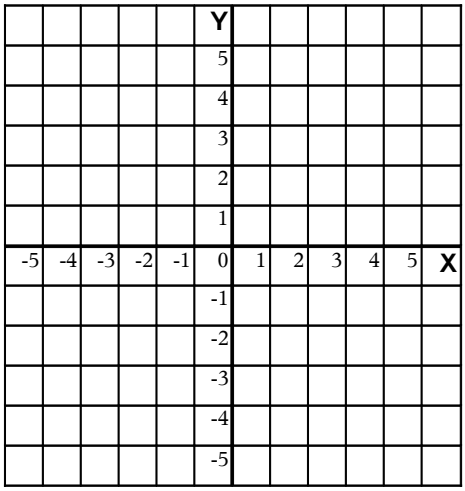
x			
y			

$y =$

x			
y			

$y =$

x			
y			



9. Is there a relationship between the size of the coefficient and the steepness (or slope) of the line?

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10. Having completed Worksheets 1, 2 and now 3, can you generalise your results, i.e. say what happens to the graph of $y = mx + b$ when m and b are changed?

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