

**Learning Activity 4 : To use the Classpad300 as a tool to assist in an exploration into the topic of graphing linear equations.**

**Learning Behaviours: Watch attentively a demonstration, Follow written instructions, Discovering patterns, Generalising.**

**Teacher: RNP**

**DATE: 28/4/06**

**Class: 10 Maths Methods**

**Learning Activity Description**

Here we will be using the CAS calculator essentially as a graphical calculator. Students are given a number of linear equations to graph. Students make a hard copy of the graphs and collect data on the gradients and intercepts of the graphs.

This data is then summarised in a table and students are asked to see if they can discover any patterns, any connections between the equations of the straight lines and the gradients and intercepts of those straight lines.

**Discussion Tool:**

The discussion that followed attempted to elicit from students any patterns or connections they could discover between the data they had collected. What is the same about all of the equations you have sketched? Summarising the data in a table assisted this discussion.

**Student Comments:**

Not recorded.

**Teacher Journal:**

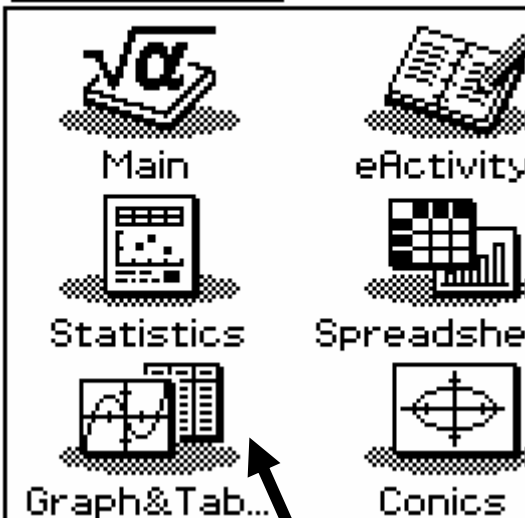
This lesson went well with students fully engaged in sketching the graphs on the CAS calculator, transferring those sketches to hard copy manually, calculating the gradient from their sketches and using the CAS calculator to calculate the x and y intercepts. Students were also asked to use features of the CAS calculator to determine a y-value for a given x-value, thus having the coordinates of a number of points to use in making an accurate hard copy of their graph and calculating its gradient.

If this task had been done without the aid of the CAS calculator it would have taken far longer to graph all of the straight lines and collect the data on gradients and intercepts. The CAS calculator frees the student from the grind of drawing the graphs and calculating intercepts by manual means.

Students can focus on the big picture, which is finding the connection between the equation and gradient and y-intercept.

# GRAPHING WITH THE CLASSPAD300

**MENU** All



Choose  
Graph&Table  
from the

▼ Edit Type GMem ◆

Sheet1 | Sheet2 | Sheet3

$y_1 = x^2$  [—] ▲

$y_2 = x + 5$  [—] ▲

$y_3 = 0$

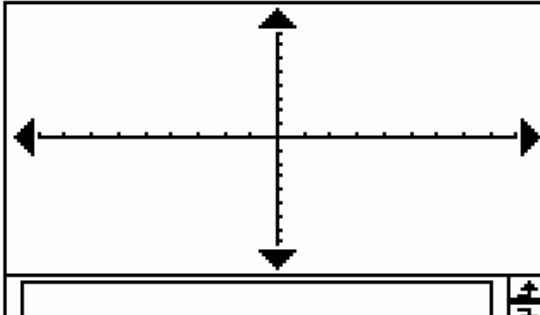
$y_4 = 0$

$y_5 = 0$


$y_6 = 0$

$y_7 = 0$

$y_8 = 0$



Rad Real ☰



**This is the button to press to set the DOMAIN (the x axis values) and the RANGE (the y axis values)**

**View Window** X

Memory

x-log  y-log

xmin : -8  
max : 8  
scale : 1  
dot : 0.10389610389

ymin : -5  
max : 5  
scale : 1

OK Cancel

Type in the equation to be graphed

$$y=2x-3$$

▼ Edit Type GMem ◆

Sheet1 | Sheet2 | Sheet3 | ◀ ▶

y1=2·x-3 [——] ▲  
 y2: □  
 y3: □  
 y4: □  
 y5: □  
 y6: □  
 y7: □  
 y8: □

Click on this button to graph it

▼ Edit Zoom Analysis ◆

Sheet1 | Sheet2 | Sheet3 | ◀ ▶

y1=2·x-3 [——] ▲  
 y2: □  
 y3: □  
 y4: □  
 y5: □  
 y6: □  
 y7: □  
 y8: □

Click on this button to resize

▼ Edit Zoom Analysis ◆

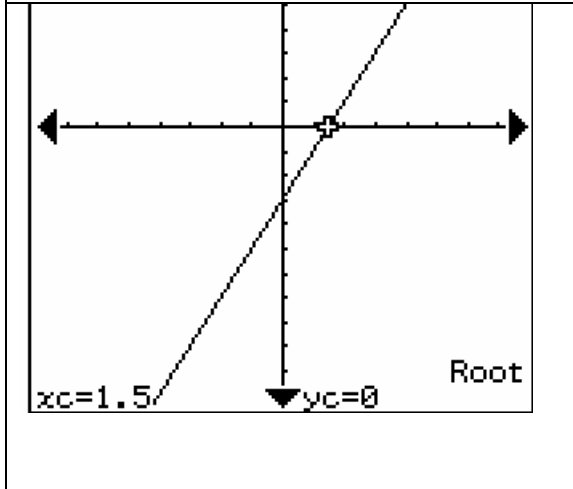
**X INTERCEPT**

**Choose Analysis > G-Solve > Root to calculate the x-intercept**

Root  
Max  
Min  
y-Intercept  
Intersect  
y-Cal  
x-Cal  
∫dx  
Inflection  
Distance  
 $\pi \int f(x)^2 dx$

**Analysis** ♦

Trace  
Sketch ▶  
G-Solve ▶  
Modify



**The Classpad300 has calculated the x-intercept to be**

**x = 1.5**  
**y = 0**

**x-intercept is (1.5,0)**

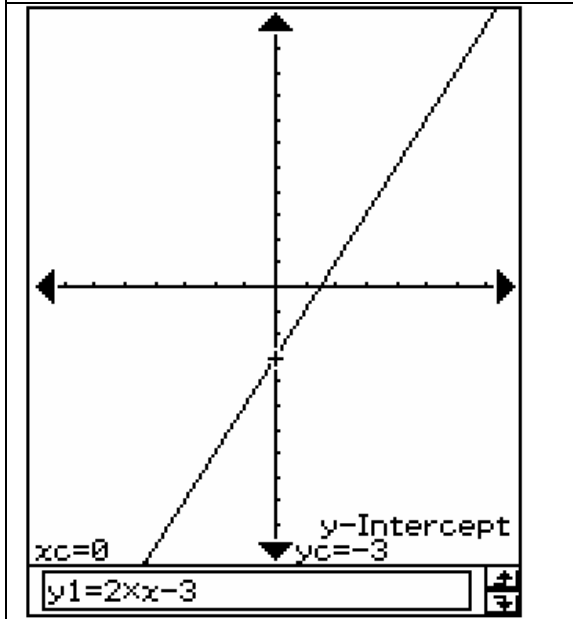
**Y INTERCEPT**

**Choose Analysis > G-Solve > y-intercept to calculate the y-intercept**

Root  
Max  
Min  
y-Intercept  
Intersect  
y-Cal  
x-Cal  
∫dx  
Inflection  
Distance  
 $\pi \int f(x)^2 dx$

**Analysis** ♦

Trace  
Sketch ▶  
G-Solve ▶  
Modify



**The Classpad300 has calculated the y-intercept to be**

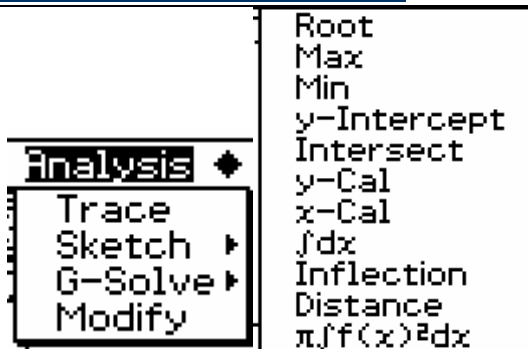
**x = 0**  
**y = 3**

**y-intercept is (0,3)**

## CALCULATE Y-VALUE FOR ANY X-VALUE

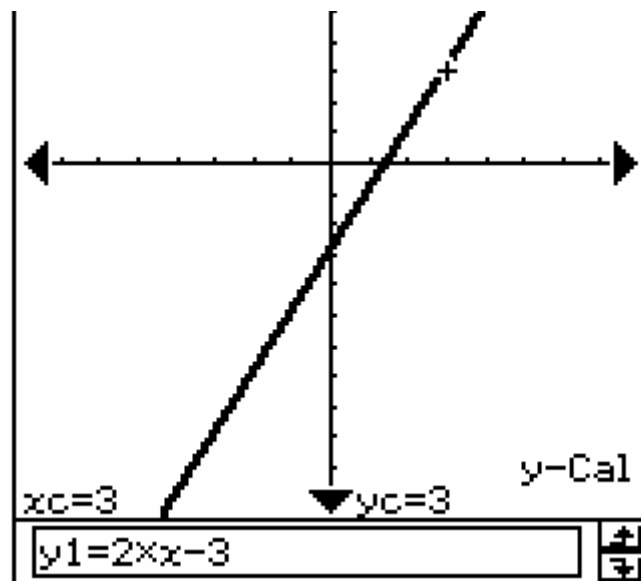
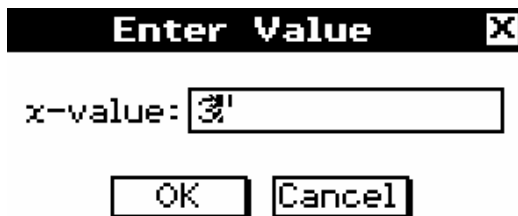
**Choose  
Analysis > G-Solve >  
y-Cal  
to calculate a y-value.**

**(You will be prompted  
for the x-value.)**



**Let's say we want to  
know the value of y  
when x=3**

**We are prompted for  
the value of x and we  
type in 3**



**The input value of  $x = 3$  and the  
calculated value of  $y = 3$  are  
displayed on the screen.**

# INVESTIGATIVE PROJECT: LINEAR GRAPHS

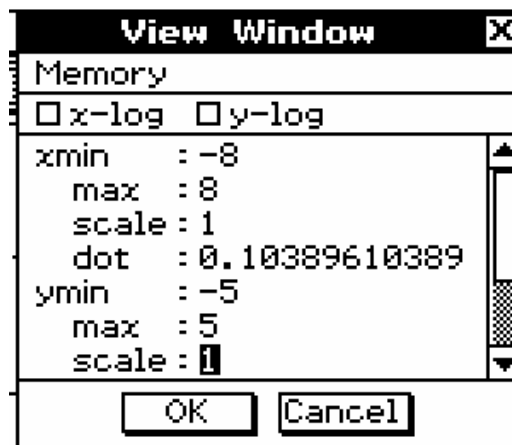
NAME: .....

## AIM:

The aim of this project is to gain some understanding of straight line graphs and the equations which describe them. to assist you in your investigation you should use a computer graphing package such as Graphmatica, or a graphical calculator such as the ClassPad300.



**This is the button to press to set the DOMAIN (the x axis values) and the RANGE (the y axis values)**

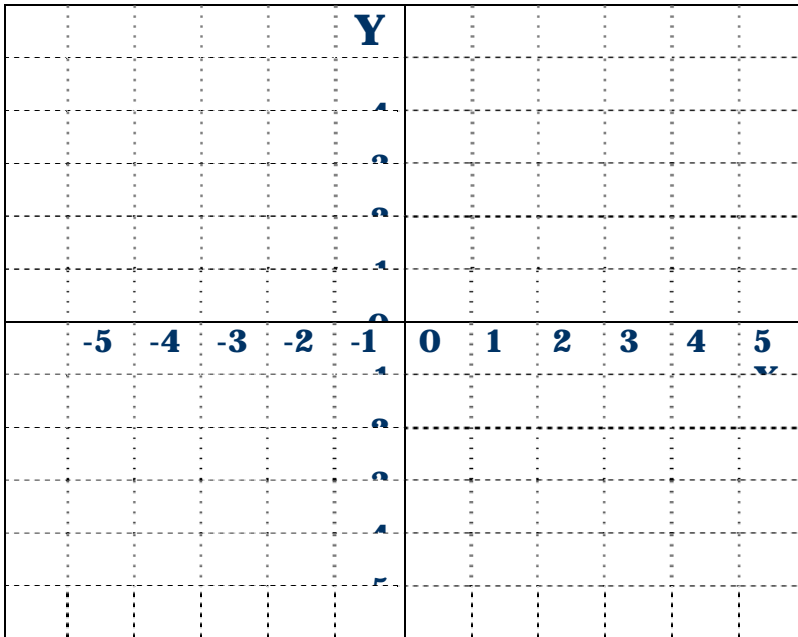


Change the scale on the axes to:

- Domain min = -5**
- Domain max = +5**
- Range min = -5**
- Range max = +5**

Using the CAS calculator sketch the graph of  $y=2x-3$

- Use CAS calculator to calculate when  $x= 3$  the value of  $y =$  \_\_\_\_\_
- Use CAS calculator to calculate when  $x= -1$  the value of  $y =$  \_\_\_\_\_
- Make a neat sketch of the graph from the calculator screen onto the axes below.
- Label the graph with its formula (rule).



- Write down the value of the  $x -$  intercept

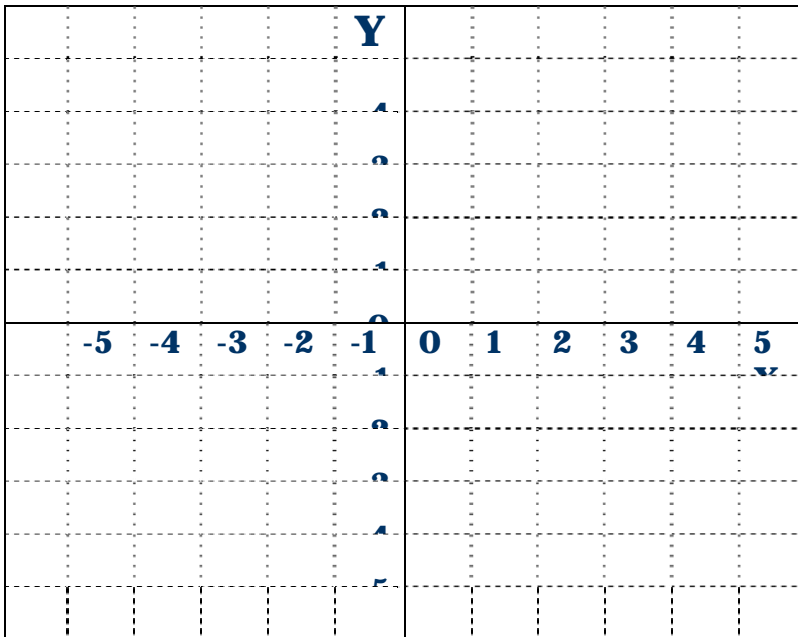
- Write down the value of the  $y -$  intercept

- Calculate the gradient of the straight line.



Using the CAS calculator sketch the graph of  $y = -2x + 3$

- Use CAS calculator to calculate when  $x = 1$  the value of  $y =$  \_\_\_\_\_
- Use CAS calculator to calculate when  $x = -1$  the value of  $y =$  \_\_\_\_\_
- Make a neat sketch of the graph from the calculator screen onto the axes below.
- Label the graph with its formula (rule).



- Write down the value of the  $x$  – intercept

\_\_\_\_\_

- Write down the value of the  $y$  – intercept

\_\_\_\_\_

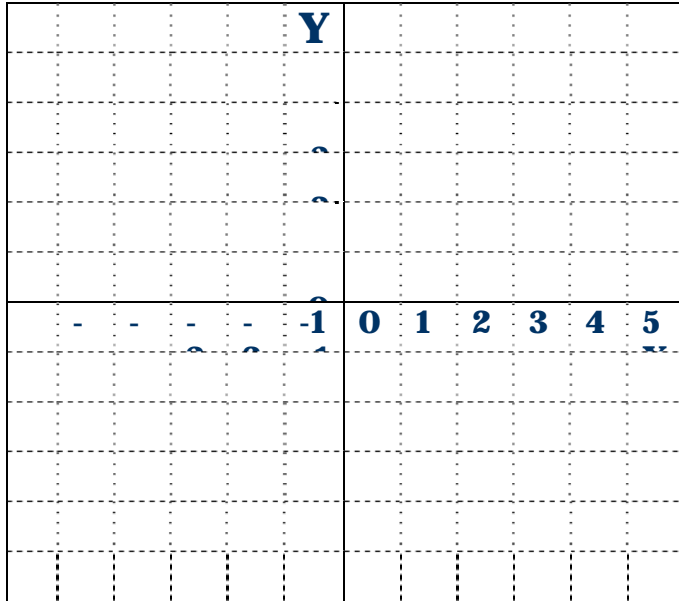
- Calculate the gradient of the straight line.

\_\_\_\_\_



Using the CAS calculator sketch the graph of  $y=2x$

- Use CAS calculator to calculate when  $x= 2$  the value of  $y =$  \_\_\_\_\_
- Use CAS calculator to calculate when  $x= -1$  the value of  $y =$  \_\_\_\_\_
- Make a neat sketch of the graph from the calculator screen onto the axes below.
- Label the graph with its formula (rule).



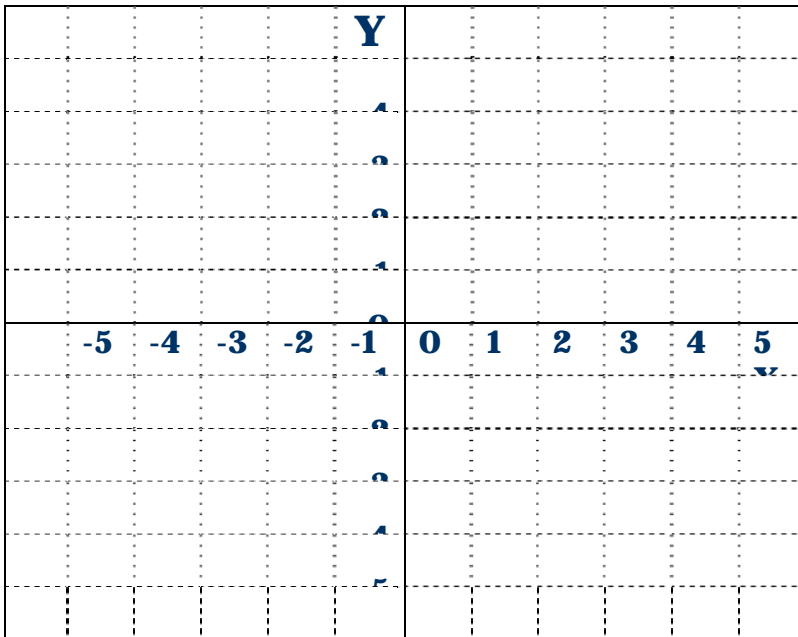
- Write down the value of the  $x -$  intercept

- Write down the value of the  $y -$  intercept

- Calculate the gradient of the straight line.

Using the CAS calculator sketch the graph of  $y=3x-2$

- Use CAS calculator to calculate when  $x= 1$  the value of  $y =$  \_\_\_\_\_
- Use CAS calculator to calculate when  $x= -1$  the value of  $y =$  \_\_\_\_\_
- Make a neat sketch of the graph from the calculator screen onto the axes below.
- Label the graph with its formula (rule).



- Write down the value of the  $x -$  intercept

- Write down the value of the  $y -$  intercept

- Calculate the gradient of the straight line.

**Summarise the data you have gathered into the table below.**

<b>Equation of straight line graph</b>	<b>Gradient of line</b>	<b>Y-intercept</b>	<b>X-intercept</b>
$y=2x-3$			

**Can you see a pattern in the equations of the straight lines?  
(Hint:What is the same about each equation?)**

**Can you see a connection between the equations of the straight lines and the gradients and intercepts of those lines?**