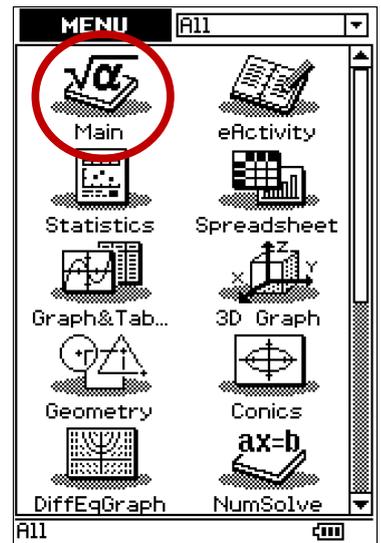# Simultaneous equations

*This resource was written by Derek Smith with the support of CASIO New Zealand. It may be freely distributed but remains the intellectual property of the author and CASIO.*

There are a number of ways of finding where two lines intersect (or 3 planes).
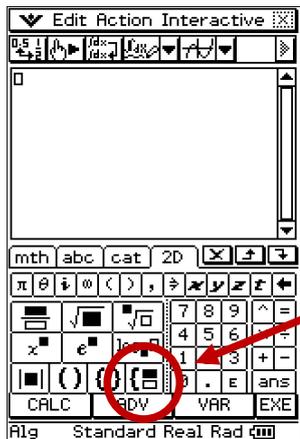
**Example (in 2-D):** Where do the equations $y = x + 7$ and $y = -2x + 9$ intersect?
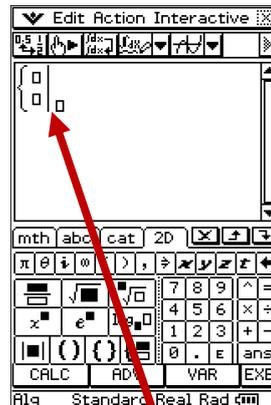Firstly open and clear the **Main** window.
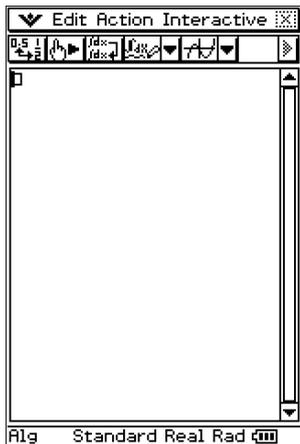


If you do not have a clear working area then select '**Clear All**' from the **Edit** dropdown and follow the onscreen instructions.

Press the blue Keyboard button to bring up the soft keyboard, now elect the 2D tab.
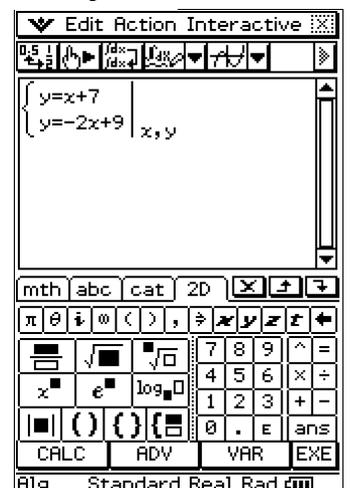
You should see a button with a bracket, '{', and two small boxes (circled in red on the left). Press it once.
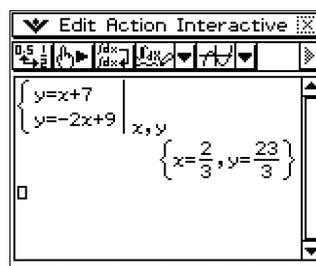
**This is the simultaneous equation template.**

Click on the top left box and type in the equation: $y = x + 7$
Click on the box below and type in the equation: $y = -2x + 9$
In the third box on the bottom right of the vertical line type x,y (the variables to be solve for).

Tap the [**EXE**] button to solve these equations.

$$\left\{ x = \frac{2}{3}, y = \frac{23}{3} \right\}$$

To see the two graphs intersecting, enter the two equations separately in the **Main** window (or Highlight, then Drag and Drop from the simultaneous equation template.
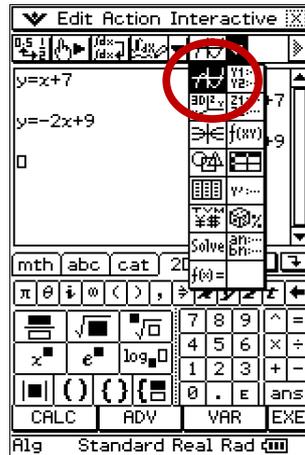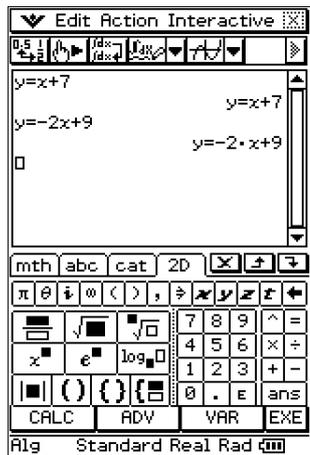
Now, open the **Graphing** window by tapping on the dropdown icon (circled in red above). The **Graphing** window will appear below the **Main**.
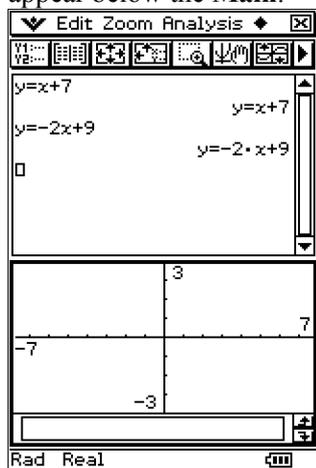
Highlight, then drag and drop each of the equations, one at a time from the Main to the Graphing window.
If you cannot see the intersection point the select '**Zoom**' then '**Auto**'.
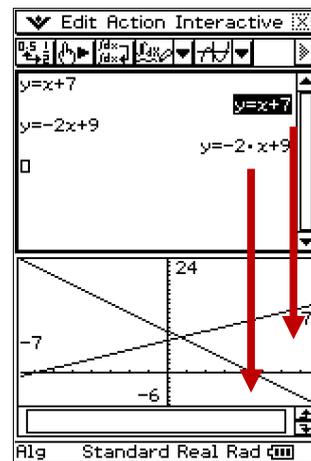
Similarly for 3 equations…
**Example (in 3-D):** Solve the equations: $x + y + z = 3$; $x - y + z = 1$; $x + y - z = 1$
Select '**Edit**' then '**Clear All**' to start with a clear working area. Press the blue Keyboard button to bring up the soft keyboard. Select the 2D tab. Enter the three equations into the simultaneous equation template, then [**EXE**] to solve.

Using the button with a bracket, '{', and two small boxes (circled in red). **BUT, this time press it twice**!