

Chapter 3 / Example 2

Intersections of lines

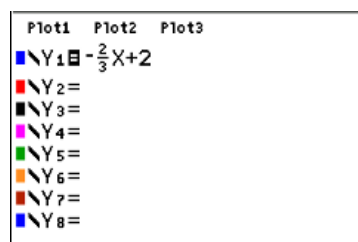
- Find the coordinates of the x and y intercepts for the graph of $2x + 3y - 6 = 0$.
- Write the following equation in general form, $y = x - \frac{1}{2}$
- Find the point of intersection of the two lines i analytically ii using an appropriate application on your technology.

In order to graph the function $2x + 3y - 6 = 0$ you must first rearrange it in the form $y = -\frac{2}{3}x + 2$.

Press $[F1]$ $[Y=]$ to display the equation entry screen.

Type $-\frac{2}{3}x + 2$ and press $[ENTER]$ to enter the first equation as Y_1 .

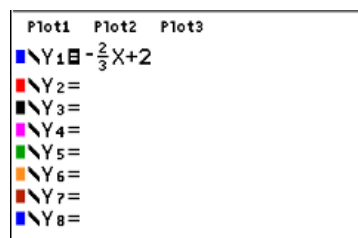
Press $[2nd]$ $[SIN^{-1}]$ then press $[ALPHA]$ $[F1]$ 1:n/d to use a fraction template.



Press $[F5]$ $[GRAPH]$ to display the graph screen.

The GDC now displays the straight-line graph $Y_1 = -\frac{2}{3}x + 2$.

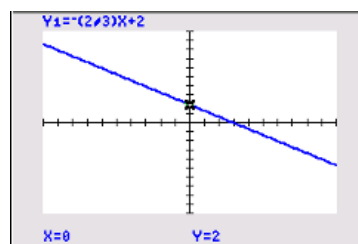
The default axes are $-10 \leq x \leq 10$ and $-10 \leq y \leq 10$.



To find the y -intercept press $[2nd]$ $[F4]$ $[CALC]$ 1:value

Press $[0]$ $[ENTER]$ to change the x -coordinate to 0.

The GDC displays the coordinates of the y -intercept, $(0, 2)$

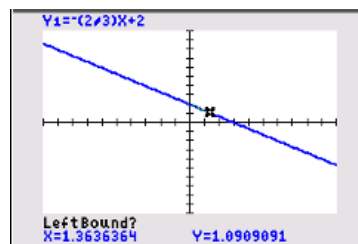


The x -intercept is a zero of the function. To find the zero press $[2nd]$ $[F4]$ $[CALC]$ 2:zero

You will need to give the left and right bounds of the region that includes the zero.

The GDC shows a point on the curve and asks you to set the left bound. Move the point using $[right arrow]$ $[left arrow]$ and choose a position to the left of the zero.

Press $[ENTER]$.



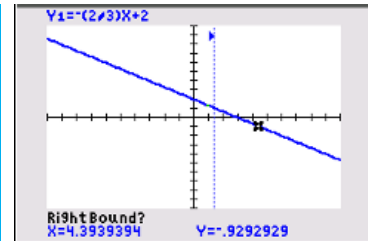
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The GDC shows a line where you have set the left bound and a point on the curve.

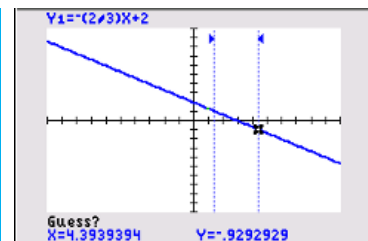
Move the point using \blacktriangleright \blacktriangleleft and choose a position to the right of the zero.

When the region contains the zero, Press $\boxed{\text{ENTER}}$.

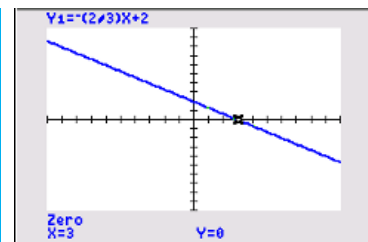


The GDC requires an initial guess for the position of the zero. Choose the default position.

Press $\boxed{\text{ENTER}}$.



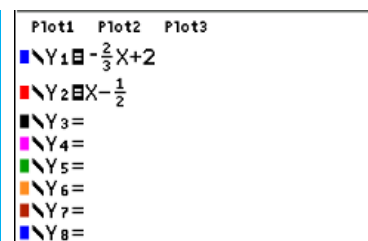
The GDC displays a zero at $(3,0)$.



To draw the line $y = x - \frac{1}{2}$ press $\boxed{\text{F1}}$ $\boxed{\text{Y=}}$ to display the equation entry screen.

Type $x - \frac{1}{2}$ and press $\boxed{\text{ENTER}}$ to enter the second equation as Y_2 .

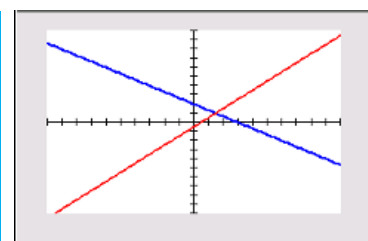
Press $\boxed{\text{ALPHA}}$ $\boxed{\text{F1}}$ 1:n/d to select the fraction template to enter the fractions.



Press $\boxed{\text{F5}}$ $\boxed{\text{GRAPH}}$ to display the graph screen.

The GDC now displays the straight-line graphs $Y_1 = -\frac{2}{3}x + 2$

and $Y_2 = x - \frac{1}{2}$ with the default axes, $-10 \leq x \leq 10$ and $-10 \leq y \leq 10$.



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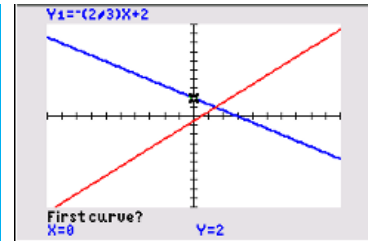
Intersections of lines

Press **2nd** **[F4]** **[CALC]** 5:intersect

To find the intersection you need to choose the two lines that intersect.

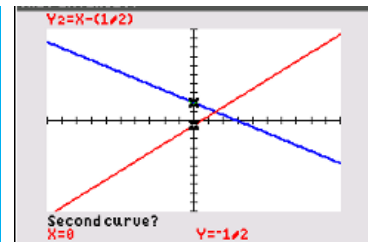
The GDC shows a cross on one of the lines and 'First curve?'.

Press **[ENTER]**.



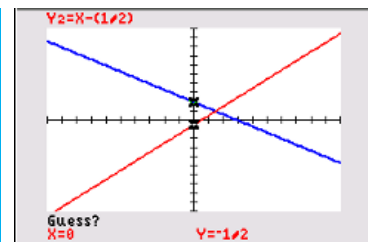
The GDC shows a cross on the other line and 'Second curve?'.

Press **[ENTER]**.

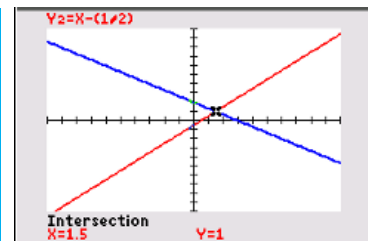


The GDC requires an initial guess for the position of the intersection. Choose the default position.

Press **[ENTER]**.



The GDC displays the intersection of the two straight lines at the point (1.5, 1).



Rearrange the equations as $2x + 3y = 6$ and $2x - 2y = 1$.

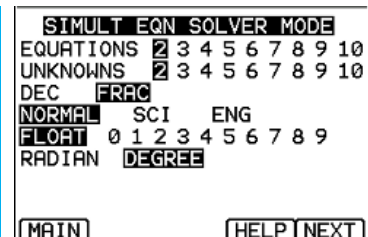
Solve these simultaneous equations to find x and y .

Press **[APPS]** :PlySmlt2

Press **[ENTER]** and select 2:SIMULTANEOUS EQN SOLVER

You are solving 2 equations with 2 unknowns

Press **[F5]** NEXT.

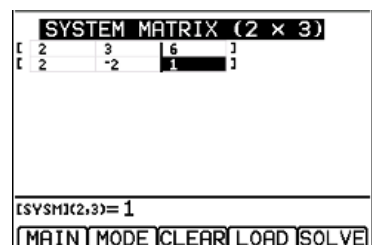


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Enter to coefficients into the system matrix.

Press [F5] SOLVE.



The GDC shows the solution is (1.5,1) as before.

