

CHAPTER 6 Analyse Linear Relations
6.7 Linear Systems
Solving Linear Systems Graphically

Example:

a) Consider the linear system $y = 2x - 5$ and $y = -3x + 5$. Solve the system graphically. Check your solution.

b) Consider the linear system $y = \frac{1}{3}x + 3$ and $y = -\frac{2}{3}x$. Solve the system by graphing using a graphing calculator.

Solution:

a) Use the slope and the y -intercept to graph each line. The point of intersection is $(2, -1)$.

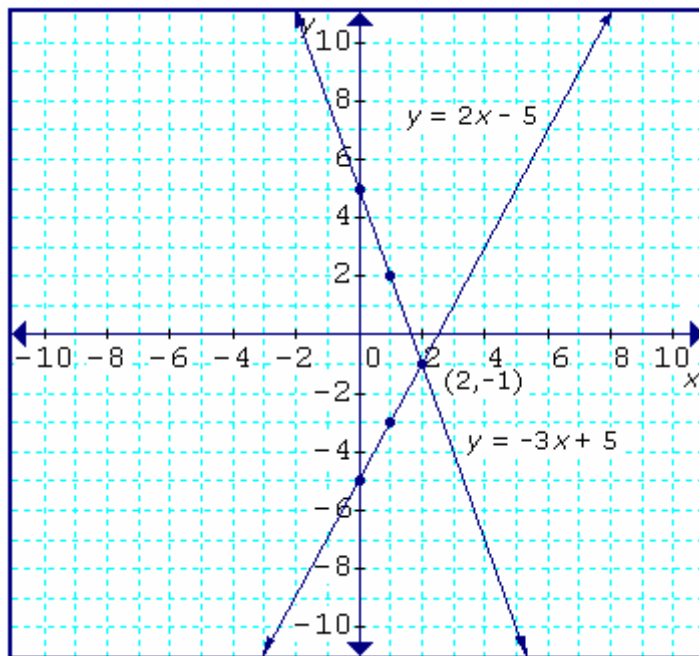
Check:

$$\begin{array}{l} \text{L.S.} = y \\ = -1 \end{array} \quad \begin{array}{l} \text{R.S.} = 2x - 5 \\ = 2(2) - 5 \\ = 4 - 5 \\ = -1 \end{array}$$

$$\text{L.S.} = \text{R.S.}$$

$$\begin{array}{l} \text{L.S.} = y \\ = -1 \end{array} \quad \begin{array}{l} \text{R.S.} = -3x + 5 \\ = -3(2) + 5 \\ = -6 + 5 \\ = -1 \end{array}$$

$$\text{L.S.} = \text{R.S.}$$



The point $(2, -1)$ satisfies both equations. It is the correct solution to the linear system.

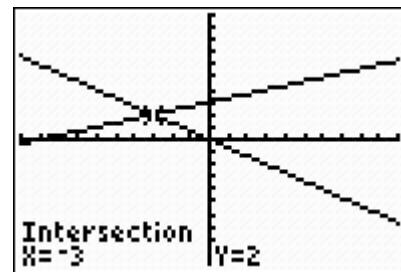
b) Press the **Y=** key and enter the two equations.

```
Plot1 Plot2 Plot3
Y1=(1/3)*X+3
Y2=-(2/3)*X
Y3=
Y4=
Y5=
Y6=
Y7=
```

Set the standard screen parameters from the **ZOOM** menu.

```
ZOOM MEMORY
2↑Zoom In
3:Zoom Out
4:ZDecimal
5:ZSquare
8ZStandard
7:ZTrig
8↓ZInteger
```

Use the **intersect** function from the **CALC** menu to find the point of intersection. The point of intersection is $(-3, 2)$.



Practice:

1. a) Consider the linear system $y = x - 3$ and $y = -\frac{1}{4}x + 2$. Solve the system graphically. Check your solution.

b) Consider the linear system $y = \frac{2}{3}x - 5$ and $y = -\frac{1}{3}x - 2$. Solve the system by graphing using a graphing calculator.

Answers:

1. a) $(4, 1)$ b) $(3, -3)$