CHAPTER TWELVE

GRAPHS:

Some basic graphs:

Before a graph can be plotted, we must first construct a table with reference to the equation of the given graph.

- A few values of x are selected and for each, the corresponding y value is computed.
- These two corresponding values i.e. the x and the y values are then plotted on a graph paper.
- There are certain basic graphs which students must be familiar with and be capable of plotting.
- The way or manner of plotting some of these graphs will be illustrated in the following questions:

Q1). Using values of x from -2 to 2, plot the following graphs:

1) $y = 2x$.   2). $y + 4x = 0$.

3). $y = \frac{1x}{2}$.   4) $y = -x/2$.

5) $y = 2x + 1$.   6) $y + 4x + 2 = 0$.

Soln.

(1) $y = 2x$

X	- 2	- 1	0	1	2
Y	- 4	- 2	0	2	4

(a) If x = -2
    y = 2x
    => y = 2(-2) = -4
    =>y = -4

(b) If x = -1
    y = 2x
    => y = 2 (-1)
    => y = -2

© If x= 0
    y = 2x
    => y = 2(0) = 0
    => y = 0

(d) If x = 1
    y = 2x
    => y = 2(1) = 2
    => y = 2

(e) If x = 2
    y = 2x
    => y = 2(2)
    => y = 4
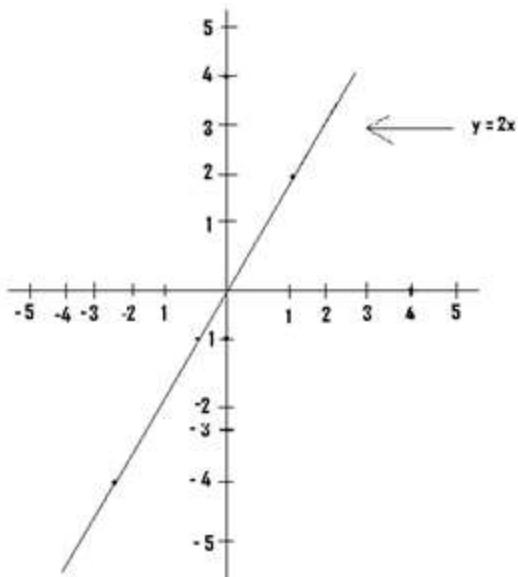
N/B: Before plotting any graph you, must first make sure y is the subject of the given equation. If not, then make y the subject.

(2) From y + 4x = 0, => y = 0-4x   => y = -4x

$$y = -4x$$

X	-2	-1	0	1	2
Y	8	4	0	s- 4	-8

(a) If x = -2

    y = - 4x

    => y = - 4 (-2)

    => y = 8

(b) If x = -1

    => y = - 4(-1)

    => y = 4

(c) If x = 0

    y = - 4x

    => y = - 4 (0)

    => y = 0

(d) If x = 1

    y = - 4x

    => y = - 4(1) = - 4

    => y = - 4

(e) If x = 2

    y = - 4x

    => y = - 4(2) = - 8

    => y = - 8

Y = -4X →

1. $y = \frac{1x}{2}$ { or $y = x/2$}

3) $, y = \frac{x}{2}$ or $y = \frac{1x}{2}$

X	-2	-1	0	1	2
Y	-1	-0.5	0	0.5	1

(a) If x = -2

   $y = \frac{1x}{2} = \frac{1}{2}(-2)$

=> y = -2/2

. .   => y = -1

(b) If x = -1

   $y = \frac{1x}{2} = \frac{1}{2}(-1)$

=> y = -1/2 = - 0.5

    => y = - 0.5

(c) If x = 0

   $y = \frac{1x}{2} = \frac{1}{2}(0)$

=> y = 0/2

=> y = 0

(d) If x = 1

   $y = \frac{1x}{2} = \frac{1}{2}(1)$

=> y = 1/2

=> y = 0.5

X	-2	-1	0	1	2
Y	1	0.5	0	- 0.5	-1
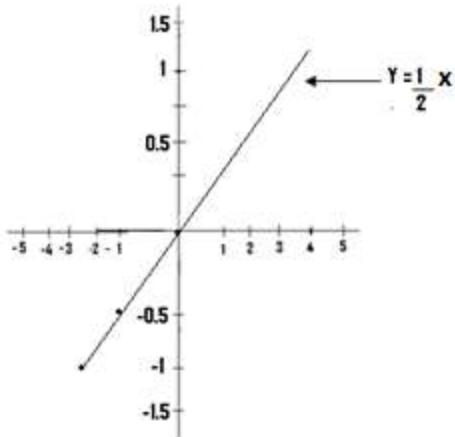
N/B: In the plotting of a graph, the interval used on one particular axis (i.e. the difference between one number and the next) must be the same.

- For a particular graph, the interval used on the x-axis must be the same.
- But the scale used on the x-axis can be different from that used on the y-axis.

4) $\quad y = -x/2.$ or $y = \frac{-x}{2}$

1) If x = -2

$y = -x/2 = - (-2)/2$

➔ $y = 2/2 = 1$

2) If x = -1

$y = -x/ 2 = - (-1)/2$

=> $y = \frac{1}{2} = 0.5$

3) If x = 0

4) If x = 1

$y = -x/2 = -(0)/2 = 0$ $y = -x/2 = -(1)/2$

$\Rightarrow y = 0.$ $\Rightarrow y = -1/2 = -0.5$

5) If x = 2

    $y = -x/2 = -(2)/2$

$\Rightarrow y = -1$
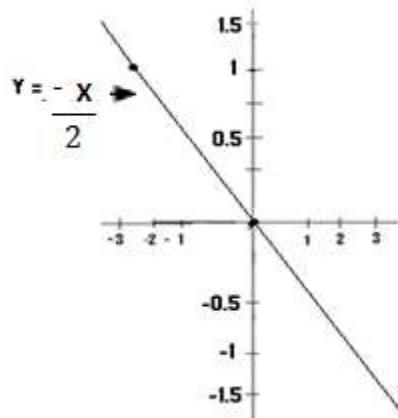
5)

$$y = 2x + 1$$

X	-2	-1	0	1	2
Y	-3	-1	1	3	5

1) If x = -2   2) If x = -1

    $y = 2x + 1$ $y = 2x + 1$

$\Rightarrow y = 2(-2) + 1$ $\Rightarrow y = 2(-1) + 1 = -2+1$

   $\Rightarrow y = -4 + 1 = -3.$ $\Rightarrow y = -1.$

3) If x = 0

    y = 2x + 1

=> y = 2(0) +1

=> y = 0+1 =1.

4) If x = 1

    y = 2x + 1

=> y = 2(1) + 1 = 2 + 1 = 3

   => y = 3.

5) If x = 2

y = 2x + 1

=> y = 2(2) + 1

=> y = 5.
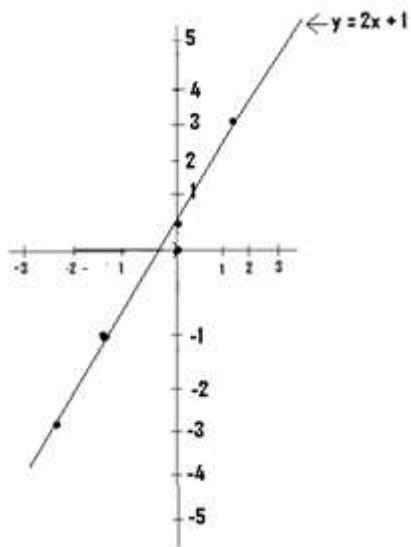
6) From y + 4x + 2 = 0

=> y + 2 = 0 – 4x

 => y + 2 = - 4x

=> y = - 4x – 2

              y = - 4x - 2

X	-2	-1	0	1	2
Y	6	2	-2	- 6	-10

a) If x = -2

  y = - 4x-2

  => y = - 4(-2)-2

=> y = 8 -2

=> y = 6

b) If x = -1

  y = - 4x -2

  => y = - 4(-1) -2

=> y = 4 -2

=> y = 2

c) If x = 0

y = - 4x -2

  => y = - 4(0) -2

==> y = 0 - 2 = - 2.

d) If x = 1

  y = - 4x -2

  => y = - 4(1) – 2

  => y = - 4 – 2= - 6.

If x = 2

y = - 4x -2

  => y = - 4(2) -2 = .

   - 8 – 2 = - 10.

←y = -4x -2
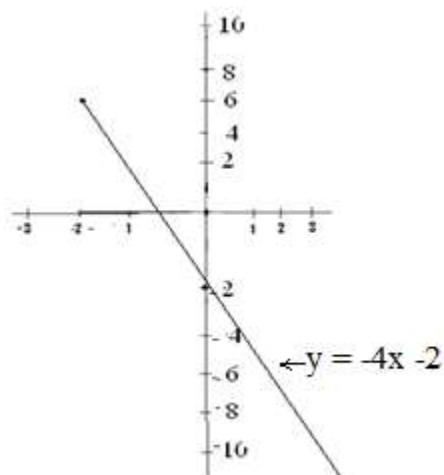
Q2) Using values of x from -3 to 3, plot the graphs of the relations: a) $y = x^2$.

b) $y = -x^2$

c) $y = 2x^2$

d) $y + 2x^2 = 0$

e) $y = \frac{1}{2}x^2$

Soln

a) $y = x^2$

$$y = x^2$$

X	-3	-2	-1	0	1	2	3
Y	9	4	1	0	1	4	9

(1) If x = -3

$y = x^2$

=> y = (-3)² = 9.

=> y = 9.

2) If x = -2

$y = x^2$

=> y = (-2)² = 4.

=>y = 4.