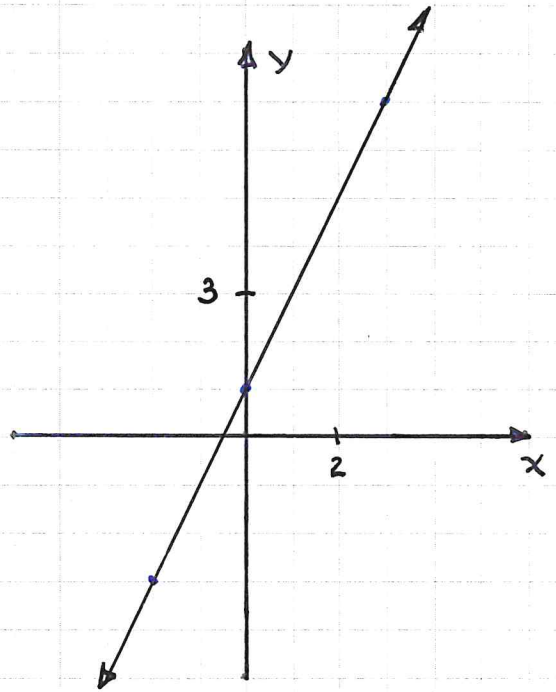
8.2 Graphs of Equations

DEFINITION: The set of all solution points of an equation is the graph of the equation.

METHOD I: Use Point Plotting $y = mx + b$

Ex. ① Graph the equation $\boxed{y = 2x + 1}$ by completing the table and plotting the points by hand.

x	y
-2	-3
0	1
3	7



Note: The equation is <u>linear</u>.

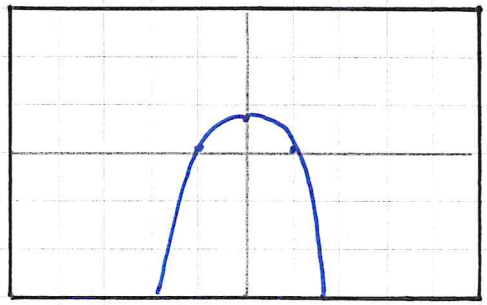
Its graph is a straight <u>line</u>.

METHOD 2: Use a Graphing Calculator

Demonstration: Graph the equation

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

in the Standard Viewing Window. $[-10, 10] \times [-10, 10]$

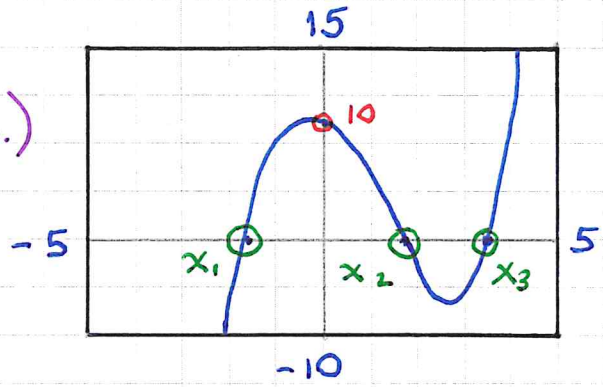


Ex. ③ Sketch the graph of

$$y = x^3 - 4x^2 - 2x + 10$$ (A cubic equation.)

in the window

$$\underbrace{[-5, 5]}_{x} \times \underbrace{[-10, 15]}_{y}$$

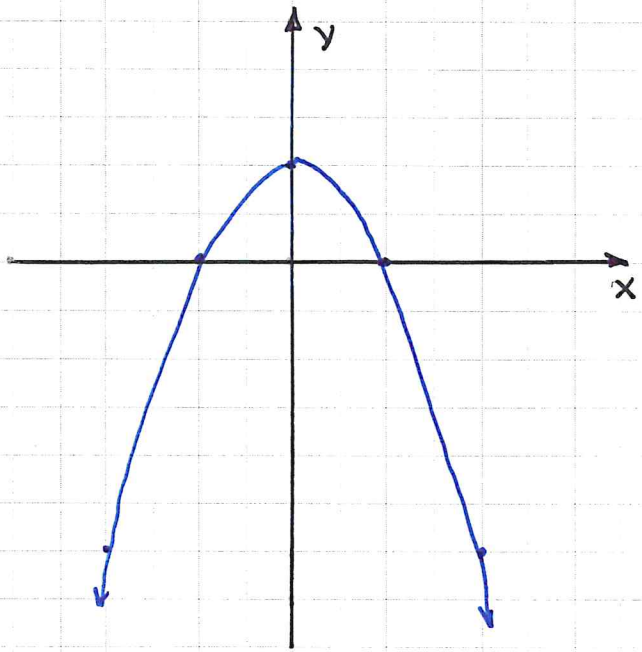


y-intercept $(x = 0)$: $y = 0^3 - 4 \cdot 0^2 - 2 \cdot 0 + 10 = 10$ $(0, 10)$

x-intercepts $(y = 0)$: $x_1 = -1.537$, $x_2 = 1.693$, $x_3 = 3.843$

Ex. ② Use point plotting to sketch the graph of the equation $y = \frac{-1}{2}x^2 + 2$

x	y
-4	-6
-2	0
0	2
2	0
4	-6



Note: The equation is quadratic.

It's graph is a parabola.

Ex. ④ Use a Graphing Calculator to sketch the graph of the circle

$$x^2 + y^2 = 25$$

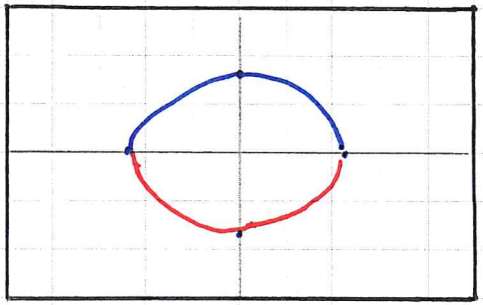
Solve for y:

$$y^2 = 25 - x^2$$

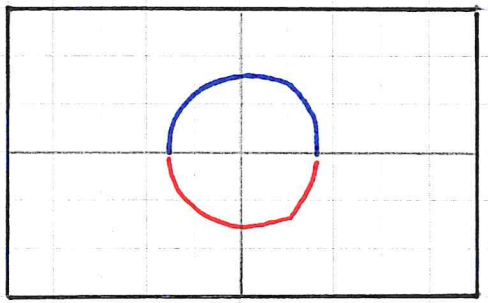
$$y = \pm\sqrt{25 - x^2}$$

$Y1 = \sqrt{25 - x^2}$

$Y2 = -\sqrt{25 - x^2}$



Standard Window



Zoom Square