

Graph of the functions

The graph of a function is a collection of points $(x, f(x))$, where x is an input value and $f(x)$ is the corresponding output value.

Remark:

Let $f: A \rightarrow B$ be a function, the graph of the function f is the set

$$G = \{(x, y) : f(x) = y\}$$

For example, if we have the function $f(x) = x^2$, the graph will consist of points.

To plot a graph of a function

$$\text{For } x = -2, f(-2) = (-2)^2 = 4$$

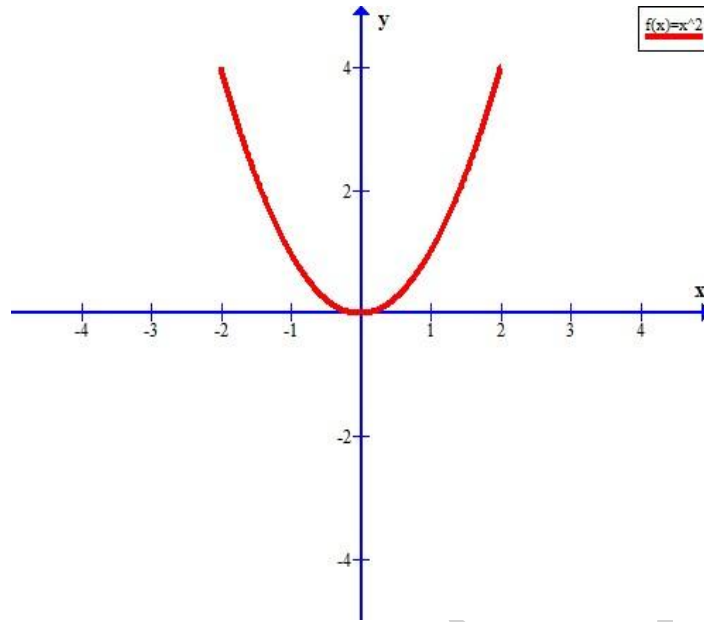
$$x = -1, f(-1) = (-1)^2 = 1$$

$$x = 0, f(0) = (0)^2 = 0$$

$$x = 1, f(1) = (1)^2 = 1$$

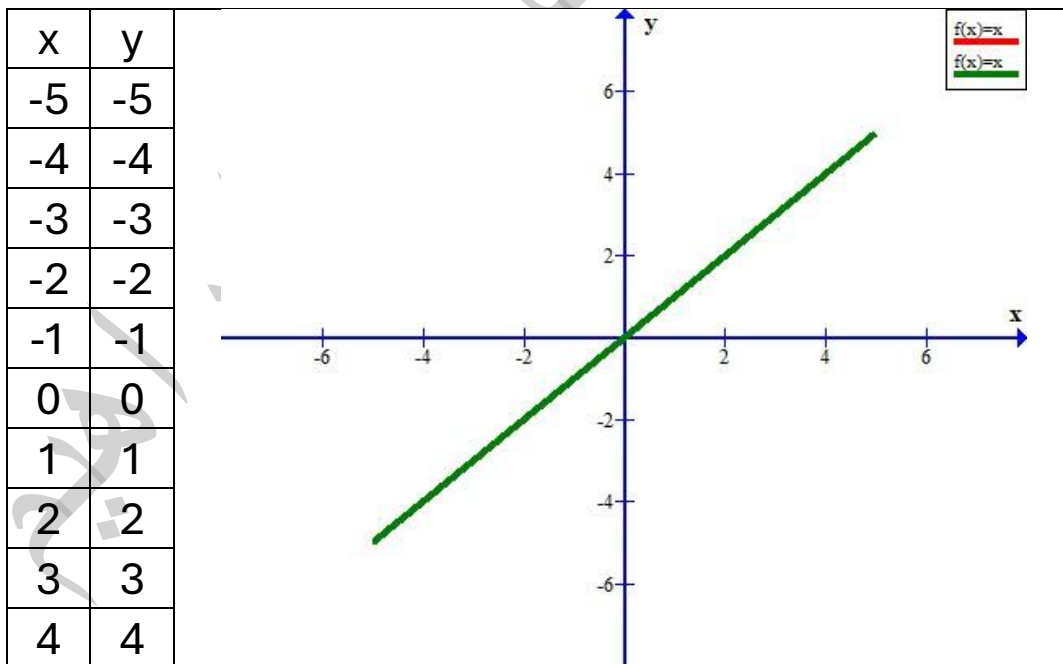
$$x = 2, f(2) = (2)^2 = 4$$

Then you plot these points $(-2, 4)$, $(-1, 1)$, $(0, 0)$, $(1, 1)$, $(2, 4)$



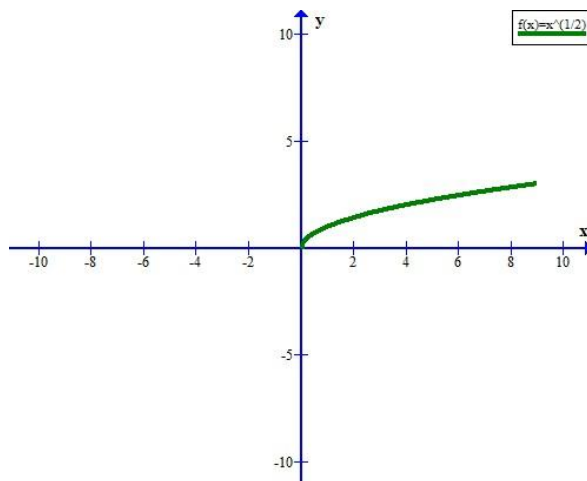
Example:

Let $f(x) = x$, find the graph of f where $-5 \leq x \leq 5$



Example:

Let $f(x) = \sqrt{x}$, find the graph f where $x \geq 0$.



H.W

Graph the function

1- $f(x) = x^2 + 4$

2- $f(x) = x^3 + 1$

3- $f(x) = x^4 + 2x + 1$

4- $f(x) = -x^2 + 3$

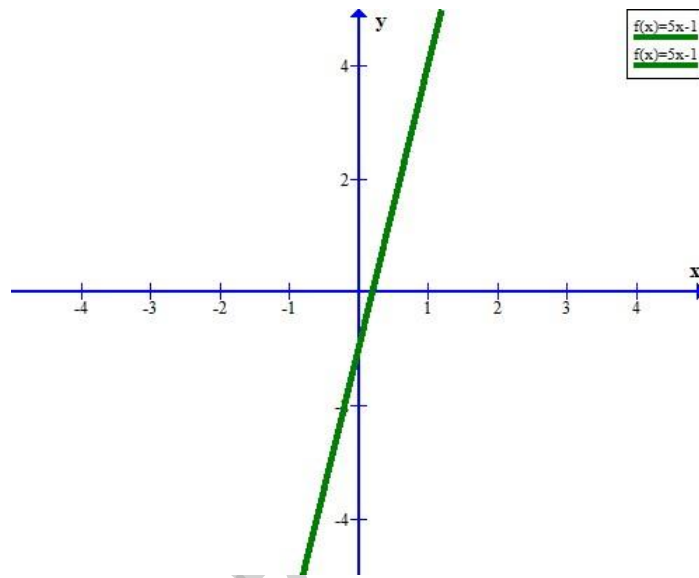
5- $f(x) = \frac{2x}{x+3}$

6- $f(x) = |x| + 3$

Some kinds of function.

- **Linear function**

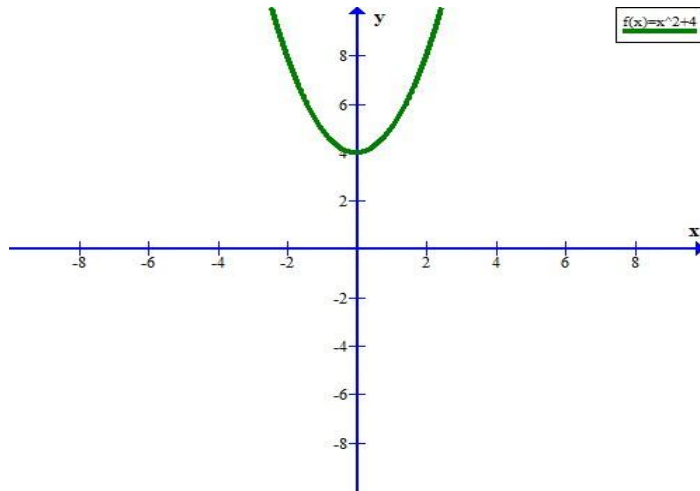
A linear function has the form: $f(x) = mx + b$, where m is the slope and b is the y-intercept. It represents a straight line when graphed. For example, $f(x) = 5x - 1$



- **Quadratic Function**

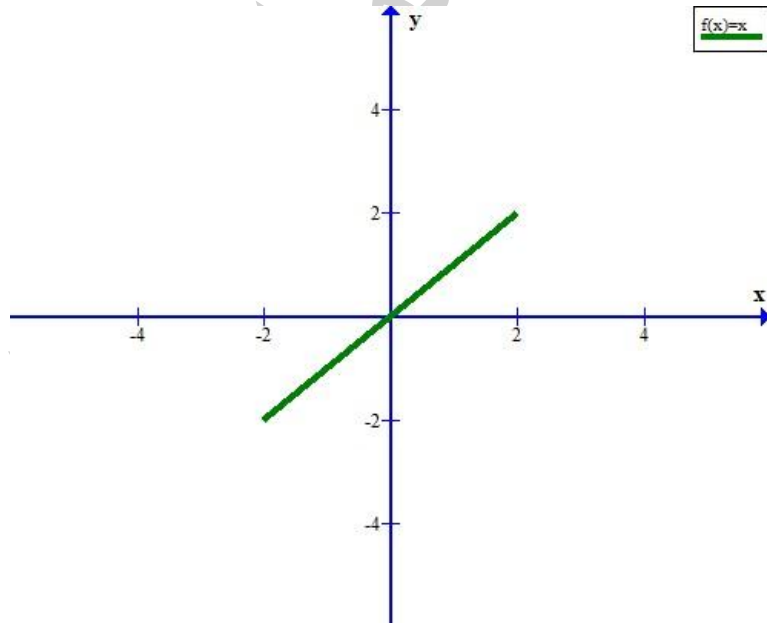
A quadratic function has the form: $f(x) = ax^2 + bx + c$ where a , b , and c are constants. It forms a parabola when graphed.

For example, $f(x) = x^2 + 4$



- **Identity Function**

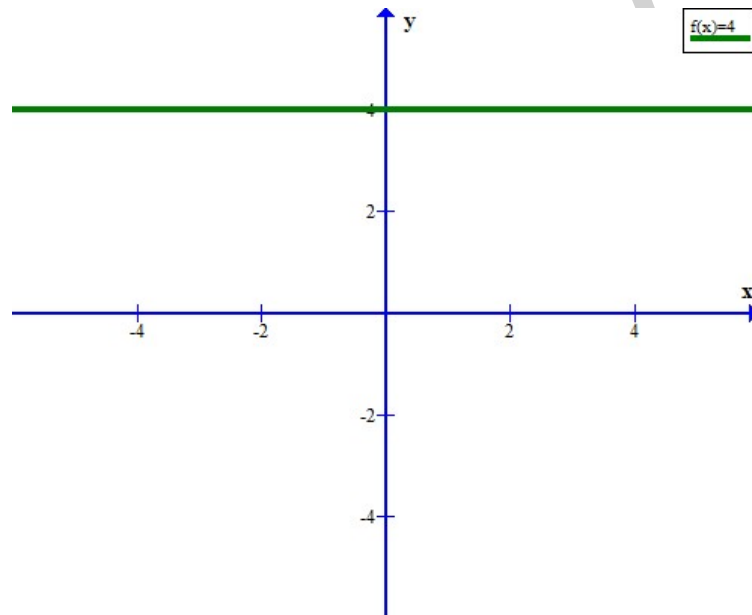
The identity function is the simplest type of function $f(x) = x$, It simply returns the input as the output.



- **Constant Function**

A constant function returns the same value no matter what the input is: $f(x) = c$ where c is a constant.

For example, $f(x) = 4$.



- **Polynomial Function**

A polynomial function is a sum of terms, each consisting of a constant multiplied by a variable raised to a non-negative integer power.

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0$$

where n is a non-negative integer and a non-negative integer and $a_n \neq 0$. For example, $f(x) = x^4 + 2x + 1$.

