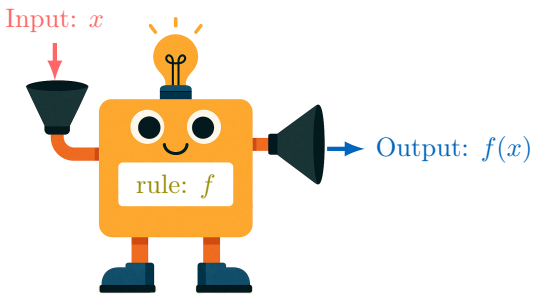
FUNCTIONS

A DEFINITIONS

Definition Function

From an input value x, a **function** f produces an output value $f(x)$.
$f(x)$ is read as "f of x".



Ex: For $f(x) = 2x - 1$ (the function that doubles the input and subtracts 1), find $f(5)$.

Answer: $f(5) = 2 \times (5) - 1$ (substituting x by (5))
$= 9$

B TABLES OF VALUES

Definition Table of Values

The **table of values** for a function f provides a listing of pairs $(x, f(x))$, where x is an input value and $f(x)$ is the corresponding output value produced by the function f.

Ex: For $f(x) = x^2$, complete the following table:

x	-2	-1	0	1	2
$f(x)$					

Answer:

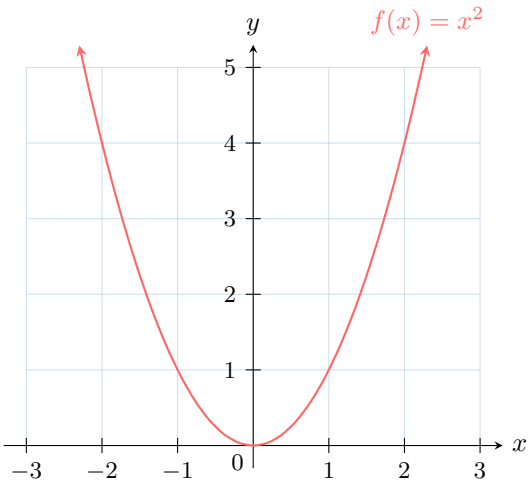
- $f(-2) = (-2)^2$ (substituting x by (-2))
  $= 4$
- $f(-1) = (-1)^2$ (substituting x by (-1))
  $= 1$
- $f(0) = (0)^2$ (substituting x by (0))
  $= 0$
- $f(1) = (1)^2$ (substituting x by (1))
  $= 1$
- $f(2) = (2)^2$ (substituting x by (2))
  $= 4$

So the completed table is:

x	-2	-1	0	1	2
$f(x)$	4	1	0	1	4

Definition **Graph**

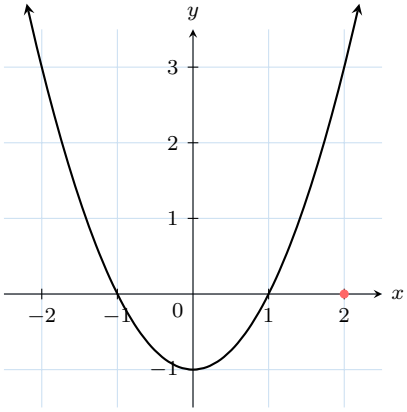
A **graph** of a function is the set of all points $(x, f(x))$ in the plane, where x is an input and $f(x)$ is its output.



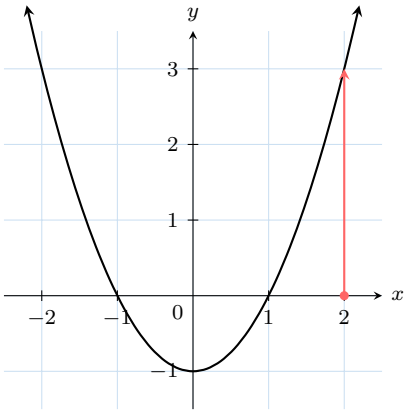
Method **Finding the value $f(x)$ using a graph**

To find $f(2)$ on a graph, follow these steps:

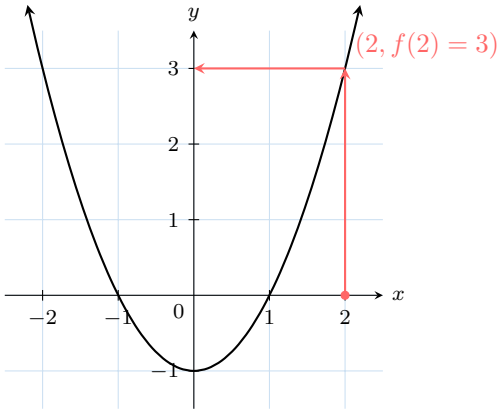
1. **Locate the x-value:** Find $x = 2$ on the x-axis.



2. **Move vertically to the curve:** From $x = 2$, draw a vertical line up to the graph.



3. **Read the y-value:** At the intersection with the curve, move horizontally to the y-axis to find the value $f(2)$.



Thus, $f(2) = 3$.

Method **Plotting a Line Graph from a Table**

To plot the graph of a function from a table of values, follow these steps:

- Plot each point $(x, f(x))$ from the table onto the coordinate plane.
- Connect the points with straight line segments.

Ex: Here is a table of values for the function $f(x) = x - 1$:

x	-2	-1	0	1	2	3
$f(x)$	-3	-2	-1	0	1	2

Plot the line graph of f.

Answer: Plot the points $(-2, -3)$, $(-1, -2)$, $(0, -1)$, $(1, 0)$, $(2, 1)$, and $(3, 2)$. Then, connect the points with straight segments to form the line graph.