LINE EQUATIONS

A DEFINITION

Discover: Consider the equation $y = 2x - 1$, which describes the relationship between two variables x and y.
For any given value of x, we can use the equation to find the corresponding value of y. These values give coordinates (x, y) of points on the graph.

- For $x = 1$:

$$\begin{aligned} y &= 2 \times 1 - 1 \\ &= 1 \end{aligned}$$

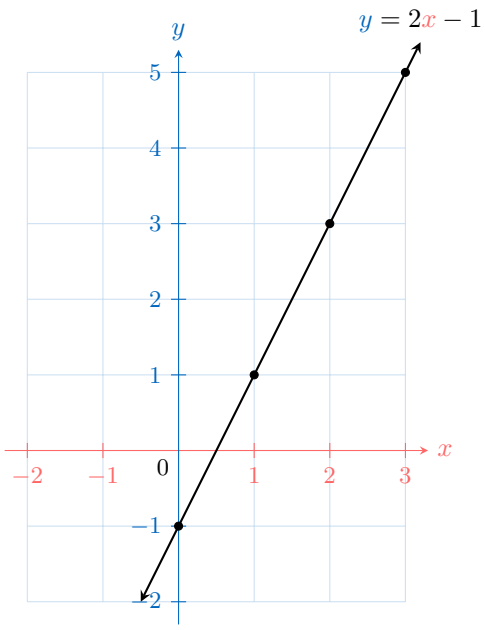
- For $x = 2$:

$$\begin{aligned} y &= 2 \times 2 - 1 \\ &= 3 \end{aligned}$$

From calculations like these, we can construct a table of values:

x	0	1	2	3
y	-1	1	3	5

So, the points $(0, -1)$, $(1, 1)$, $(2, 3)$, and $(3, 5)$ all lie on the graph.
In fact, there are infinitely many points that satisfy $y = 2x - 1$, forming a continuous line extending indefinitely in both directions (indicated with arrowheads).



$y = 2x - 1$ is an equation that relates x and y for all points on the line.

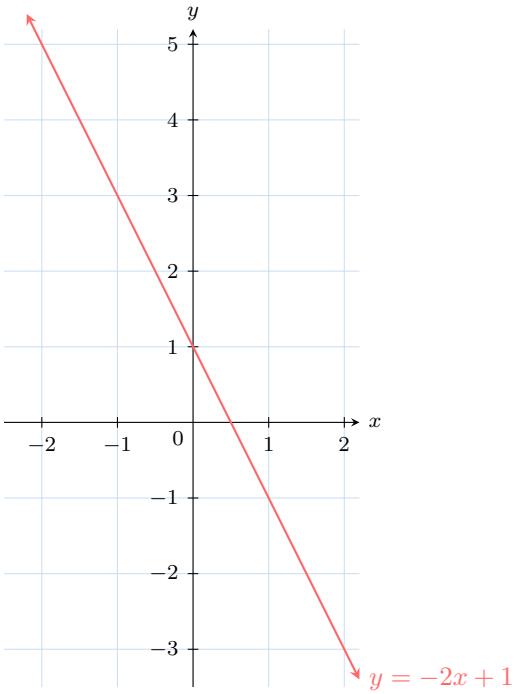
Definition **Equation of a line**

The **equation of a line** can be written as:

$$y = mx + c$$

where m is the **slope** and c is the **y-intercept**.

Ex:


y
x
5
4
3
2
1
0
−1
−2
−3
−2
−1
1
2
$y = -2x + 1$