

Equation of a Line - $y = mx + c$



Key idea



A straight line can be written as $y = mx + c$.

m is the **gradient**, c is the **y-intercept** (where it crosses the y-axis).

How to form it



1. Read c off the y-axis.
2. Count rise and run: $m = \frac{\text{rise}}{\text{run}}$.
3. Put both into $y = mx + c$.

Example



The line crosses at 1, so $c = 1$.
It goes up 1 for every 1 across, so $m = 1$.
Equation: $y = x + 1$.

Common mistake

Do not swap the gradient and the intercept.
In $y = 3x - 2$: gradient is 3, y-intercept is -2 .



Fraction and Negative Gradients



Key idea



The gradient can be a fraction or negative.

Up to the right is **positive**; down to the right is **negative**.

Fraction gradient



Up 1, across 2: $m = \frac{1}{2}$.

Crosses at 1, so $c = 1$.

Equation: $y = \frac{1}{2}x + 1$.

Negative gradient



Down 1, across 2: $m = -\frac{1}{2}$.

Crosses at 2, so $c = 2$.

Equation: $y = -\frac{1}{2}x + 2$.

Common mistake

Read c off the **y-axis**, not the x-axis.

The wrong intercept makes the whole equation wrong.