



Teacher guidance

Forming equations of a given straight-line graph using $y = mx + c$

Key focus

A straight-line equation in the form $y = mx + c$ describes all the points on a line. Here m is the **gradient** (slope) and c is the **y-intercept** (where the line crosses the y-axis).

How to form the equation

1. Find where the line crosses the y-axis. That gives c .
2. Choose two clear points on the line.
3. Count the rise and run to find the gradient m .
4. Substitute both into $y = mx + c$.

Key points to remember

- Positive gradient: line goes up to the right
- Negative gradient: line goes down to the right
- $m = 0$: horizontal line
- c is the y-value when $x = 0$
- Gradient can be an integer or fraction
- The gradient is *rise over run*

Example 1: integer gradient

The line crosses the y-axis at 1, so $c = 1$. It goes up 1 for every 1 across, so $m = 1$. The equation is $y = x + 1$.

Example 2: larger integer gradient

The line crosses the y-axis at -2 , so $c = -2$. It goes up 2 for every 1 across, so $m = 2$. The equation is $y = 2x - 2$.

Example 3: fractional gradient

If the line goes up 1 and across 2, the gradient is $\frac{1}{2}$. If it crosses the y-axis at 1, the equation is $y = \frac{1}{2}x + 1$.

Example 4: negative fractional gradient

If the line goes down 1 and across 2, the gradient is $-\frac{1}{2}$. If it crosses the y-axis at 2, the equation is $y = -\frac{1}{2}x + 2$.

Try these

1. A line crosses the y-axis at 3 and has gradient 2. Write the equation.
2. A line crosses the y-axis at -1 and has gradient -1 . Write the equation.
3. A line crosses the y-axis at 0 and has gradient $\frac{1}{2}$. Write the equation.
4. A line crosses the y-axis at 5 and has gradient -2 . Write the equation.

Watch for

The most common mistake is confusing which value is m and which is c . Remember: m is the gradient (rise/run), and c is where the line crosses the y-axis.