



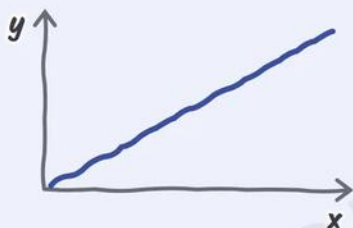
a first look at solving two equations together, and at the line a single equation draws



One equation, endlessly many answers



- an equation such as $2x + 3y = 12$ has two unknowns and the first power only, which is what makes it linear
- a **solution** is an ordered pair (x, y) making the equation true, and one equation has **infinitely many** of them
- to find some, choose a value for x and solve for y , then repeat. Choosing $x = 0$ and $y = 0$ gives the two axis crossings quickly
- plotting those pairs on the plane gives points that all lie on **one straight line**
- so a single linear equation **describes a whole line**, and every point of that line is a solution
- two such equations taken together are called **simultaneous**, and solving them means finding the pair that satisfies both at once



the solutions of one equation plotted on the plane: they do not scatter, they fall exactly on a straight line. Every point of that line is a solution, which is why one equation on its own can never pin down a single pair

The methods, and when each is easiest

Elimination

make one variable have the same coefficient in both equations, then add or subtract to remove it. The default choice, and usually the quickest

Substitution

make one variable the subject of one equation and put that expression into the other. Best when a coefficient is already 1 or -1

Graphical

draw both lines and read off where they cross. Asked for by name, and it needs at least two points per line, three being safer

Equating

make the same variable the subject of both equations, then set the two expressions equal. A tidy variant of substitution

unless a method is named in the question, choose elimination first. It involves the least rearranging and so the fewest opportunities for a sign error

