SIMULTANEOUS EQUATIONS

We can solve simultaneous equations graphically or algebraically.

GRAPHICALLY

Find the point of intersection between the lines $y = x + 1$ and $y = -2x + 7$.
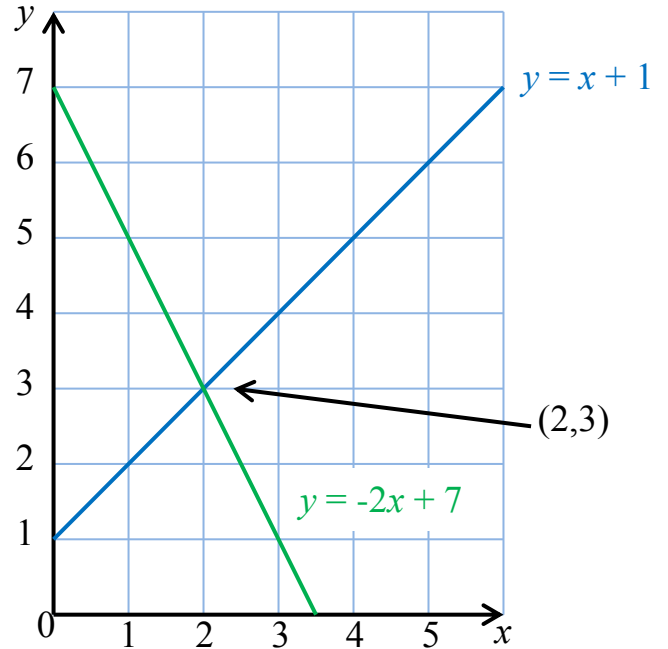
Use a table of values to find points on each line:

$y = x + 1$

X	0	1	2	3
y	1	2	3	4

$y = -2x + 7$

X	0	1	2	3
y	7	5	3	1

Draw the lines and find the point of intersection.

The point of intersection in this example is (2,3).

ALGEBRAICALLY BY SUBSTITUTION

Solve the equations $y = 3x$ and $y = 2x + 2$ by substitution.

The 1st equation, y = 3x , is used to make a substitution into the 2nd equation.

$y = 2x + 2$ Replace the y with $3x$ from the 1st equation.

$3x = 2x + 2$ Solve to find x.

$x = 2$ Use either of the original equations to find y.

$y = 3x = 3 \times 2 = 6$

The point of intersection is $x = 2$, $y = 3$

ALGEBRAICALLY BY ELIMINATION

Solve the equations $x + y = 9$ and $x - y = 1$ by elimination.

To solve by elimination we add or subtract the equations to eliminate one of the variables.

$x + y = 9$
$\underline{x - y = 1}$ ADD
$2x \quad = 10$

So $\quad x = 5$

Substitute into either equation to find y.

$x + y = 9$
$5 + y = 9$
$\quad y = 4$

Solve the equations 5x + 2y = 9 and 2x + 3y = 8 by elimination.

In this case a variable is not eliminated by adding or subtracting. We must first multiple the equations to give either the same number of x or y terms.

$5x + 2y = 9$ multiply by 3 $15x + 6y = 27$
$2x + 3y = 8$ multiply by 2 $\underline{4x + 6y = 16}$ SUBTRACT
                                        $11x \quad = 11$
                                            $x = 1$

Substitute into either equation to find y.

$5x + 2y = 9$
$5×1 + 2y = 9$
$2y = 4$
$y = 2$

Simultaneous Equations Practice

Revise Simultaneous Equations.

Revise Simultaneous Equations.

Ask your teacher for the login details.

Select ALGEBRA from the menu. Select SIMULTANEOUS EQUATIONS. Try on EASY, MEDIUM and HARD level.