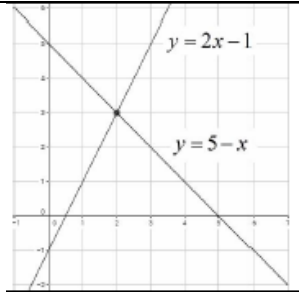


Algebra 2		
Simultaneous Equations	A set of two or more equations, each involving two or more variables (letters). The solutions to simultaneous equations satisfy both/all of the equations.	$\begin{aligned} 2x + y &= 7 \\ 3x - y &= 8 \end{aligned}$ $\begin{aligned} x &= 3 \\ y &= 1 \end{aligned}$
Solving Simultaneous Equations (by Elimination)	1. Balance the coefficients of one of the variables. 2. Eliminate this variable by adding or subtracting the equations (Same Sign Subtract, Different Sign Add) 3. Solve the linear equation you get using the other variable. 4. Substitute the value you found back into one of the previous equations. 5. Solve the equation you get. 6. Check that the two values you get satisfy both of the original equations.	$\begin{aligned} 5x + 2y &= 9 \\ 10x + 3y &= 16 \end{aligned}$ Multiply the first equation by 2. $\begin{aligned} 10x + 4y &= 18 \\ 10x + 3y &= 16 \end{aligned}$ Same Sign Subtract (+10x on both) $y = 2$ Substitute $y = 2$ in to equation. $\begin{aligned} 5x + 2 \times 2 &= 9 \\ 5x + 4 &= 9 \\ 5x &= 5 \\ x &= 1 \end{aligned}$ Solution: $x = 1, y = 2$
Solving Simultaneous Equations (Graphically)	Draw the graphs of the two equations. The solutions will be where the lines meet. The solution can be written as a coordinate.	 $y = 5 - x$ and $y = 2x - 1$. They meet at the point with coordinates (2,3) so the answer is $x = 2$ and $y = 3$
Quadratic	A quadratic expression is of the form $ax^2 + bx + c$ where a, b and c are numbers, $a \neq 0$	Examples of quadratic expressions: x^2 $8x^2 - 3x + 7$ Examples of non-quadratic expressions: $2x^3 - 5x^2$ $9x - 1$
Product of two linear expressions	When multiplying two linear expressions, every term in the first expression has to be multiplied by every term in the second expression.	$(y + 2)(y + 3)$ F: $y \times y = y^2$ O: $y \times 3 = 3y$ I: $2 \times y = 2y$

		$L: 2 \times 3 = 6$ $y^2 + 3y + 2y + 6 = y^2 + 5y + 6$
Factorising Quadratics	When a quadratic expression is in the form $x^2 + bx + c$ find the two numbers that add to give b and multiply to give c .	$x^2 + 7x + 10 = (x + 5)(x + 2)$ (because 5 and 2 add to give 7 and multiply to give 10) $x^2 + 2x - 8 = (x + 4)(x - 2)$ (because +4 and -2 add to give +2 and multiply to give -8)
Difference of Two Squares	An expression of the form $a^2 - b^2$ can be factorised to give $(a + b)(a - b)$	$x^2 - 25 = (x + 5)(x - 5)$ $16x^2 - 81 = (4x + 9)(4x - 9)$
Solving Quadratics ($ax^2 + bx = 0$)	Factorise and then solve = 0 .	$x^2 - 3x = 0$ $x(x - 3) = 0$ $x = 0$ or $x = 3$
Solving Quadratics by Factorising ($a = 1$)	Factorise the quadratic in the usual way. Solve = 0 Make sure the equation = 0 before factorising.	Solve $x^2 + 3x - 10 = 0$ Factorise: $(x + 5)(x - 2) = 0$ $x = -5$ or $x = 2$
Factorising Quadratics when $a \neq 1$	When a quadratic is in the form $ax^2 + bx + c$ 1. Multiply a by c = ac 2. Find two numbers that add to give b and multiply to give ac. 3. Re-write the quadratic, replacing bx with the two numbers you found. 4. Factorise in pairs – you should get the same bracket twice 5. Write your two brackets – one will be the repeated bracket, the other will be made of the factors outside each of the two brackets.	Factorise $6x^2 + 5x - 4$ 1. $6 \times -4 = -24$ 2. Two numbers that add to give +5 and multiply to give -24 are +8 and -3 3. $6x^2 + 8x - 3x - 4$ 4. Factorise in pairs: $2x(3x + 4) - 1(3x + 4)$ 5. Answer = $(3x + 4)(2x - 1)$