Factoring Quadratic Trinomials (a=1)

Level 1 - Factor simple quadratic trinomials
Level 2 - Factor quadratic trinomials by first removing a GCF
Level 3 - Expand, collect like terms and then factor

Reminder:
As we have previously discussed, factoring is like "undoing" multiplication.

Quadratics are polynomials of the form $ax^2 + bx + c$ and when the leading coefficient, ***a,*** is 1, the method to factor is quite simple.

To factor a quadratic with a leading coefficient of 1:

1. Find two numbers that multiply to give ***c*** and add to give ***b***.
2. Using those numbers, write the product of two binomials written in the form:

$$(x + \textit{first number})(x + \textit{second number})$$

- Always factor out a **GCF** first if possible
- If ***c*** is ***positive***, both factors will have the same sign (both + or both -).
- If ***c*** is ***negative***, the two factors will have opposite signs (one +, one -).
- The sign of ***b*** tells you which one is positive and which is negative.

Example #1 $x^2 + 7x + 12$	Example #2 $x^2 - 8x + 15$	Example #3 $3x^2 - 6x - 24$
$c = +12$ $b = +7$ *factor pairs of* 12 : (1, 12) *or* (−1, −12) (2, 6) *or* (−2, −6) (3, 4) *or* (−3, −4) $3 + 4 = 7$ *so,* $(x + 3)(x + 4)$	$c = +15$ $b = -8$ *factor pairs of* 15 : (1, 15) *or* (−1, −15) (3, 5) *or* (−3, −5) $(-3) + (-5) = -8$ *so,* $(x - 3)(x - 5)$	*factor out a gcf* : $3(x^2 - 2x - 8)$ *inside brackets* : $c = -8$ $b = -2$ *factor pairs of* −8 : (1, −8) *or* (−1, 8) (2, −4) *or* (−2, 4) $2 + (-4) = -2$ *so,* $(x + 2)(x - 4)$ *apply the factored out GCF* $3(x + 2)(x - 4)$

Remember:
- Once again, always check for a GCF before trying any other factoring method.
- Look for difference of squares and perfect squares for a possible shortcut (next topic).