Factoring Strategies

① * **Always remove the GCF (Greatest Common Factor) if possible!!!

Count the number of terms…this will help determine which factoring strategy to use.

IF **Two terms:** Look for special cases! (If not one of these… then cannot factor any further!)

Difference of Squares $a^2 - b^2$ $= (a-b)(a+b)$	$16x^2 - 25$ $(4x)^2 - (5)^2$ $(4x+5)(4x-5)$	$x^4 - 49$ $(x^2)^2 - (7)^2$ $(x^2-7)(x^2+7)$
Difference of Cubes $a^3 - b^3$ $= (a-b)(a^2+ab+b^2)$	$27x^3 - 64$ $(3x)^3 - (4)^3$ $(3x-4)((3x)^2+12x+(4)^2)$ $(3x-4)(9x^2+12x+16)$	$x^6 - 64$ $(x^2)^3 - (4)^3$ $(x^2-4)((x^2)^2+4x^2+(4)^2)$ $(x-2)(x+2)(x^4+4x^2+16)$
Sum of Cubes $a^3 + b^3$ $= (a+b)(a^2-ab+b^2)$	$8x^3 + 125$ $(2x)^3 + (5)^3$ $(2x+5)((2x)^2-10x+(5)^2)$ $(2x+5)(4x^2-10x+25)$	$x^3 + 27$ $(x)^3 + (3)^3$ $(x+3)((x)^2-3x+(3)^2)$ $(x+3)(x^2-3x+9)$

IF **Three terms:** Quadratics in standard form or higher order trinomials that can be rewritten in quadratic form.

Leading coefficient = 1 $x^2 + bx + c$ factors of c that sum to b (may use diamond problem)	$x^2 + 10x + 21$ $(x+7)(x+3)$ 21 7 3 10	$x^4 + 4x^2 - 32$ $(x^2)^2 + 4x^2 - 32$ $(x^2-4)(x^2+8)$ $(x-2)(x+2)(x^2+8)$ -32 -4 8 4
Leading coefficient ≠ 1 $ax^2 + bx + c$ (may use area model with a diamond problem)	$6x^2 - 11x - 10$ $(3x+2)(2x-5)$ 2x -5 3x: $6x^2$ $-15x$ +2: $4x$ -10 a·c -60 -15 4 -11 b	$10x^3 - 68x^2 - 14x$ $2x(5x^2 - 34x - 7)$ $2x(5x+1)(x-7)$ x -7 5x: $5x^2$ $-35x$ +1: $+x$ -7 -35 -35 1 -34

IF **Four terms:** Factor by Grouping pairs of terms together

$ax^3 + bx^2 + cx + d$	$(4x^3 + 20x^2) + (-3x - 15)$ $4x^2(x+5) - 3(x+5)$ $(x+5)(4x^2-3)$	$3x^4 - 6x^3 + 15x^2 - 30x$ $3x((x^3 - 2x^2) + (5x - 10))$ $3x(x^2(x-2) + 5(x-2))$ $3x(x-2)(x^2+5)$

* ONCE factored, be sure to check higher order factors to see if they can be factored