Completely Factor Polynomials

factored completely → written as product of unfactorable polynomials with integer exponents

Just like factoring out the GCF→ except you may be able to factor out a common binomial first.

EX: $2x(x+4) - 3(x+4)$

$(x+4)(2x-3)$

EX: $3y^2(y-2) + 5(2-y)$ factor out -1 first→get common binomial

$3y^2(y-2) - 5(-2+y)$

$3y^2(y-2) - 5(y-2)$

$(y-2)(3y^2-5)$

EX: $x^3 + 3x^2 + 5x + 15$ factor by grouping terms first & then factor each group

$x^2(x+3) + 5(x+3)$

$(x+3)(x^2+5)$

standard form 1st

EX: $y^2 + y + xy + x$

$y(y+1) + x(y+1)$

$(y+1)(y+x)$

EX: $x^3 - 6 + 2x - 3x^2$

$(x^3 - 3x^2) + (2x - 6)$

$x^2(x-3) + 2(x-3)$

$(x-3)(x^2+2)$

Rules to factoring completely:

1) factor out the GCF (if there is one) → the GCF could be −1

2) look for a difference of 2 squares or a perfect square trinomial (special products)

3) factor a trinomial of the form $ax^2 + bx + c$ into a product of binomial factors

4) factor a polynomial with four terms by grouping terms with common factors (put in standard form 1st)