Sec 6.4 A General Approach to Factoring

A polynomial is completely factored when both of the following are satisfied

1. It has to be written as a product of prime polynomials with integer coefficients

   Ex: $x^4 - 81$

   $(x^2+9)(x^2-9)$ ← Not finished

   $(x^2+9)(x-3)(x+3)$ ✓

2. None of the polynomial factors can be factored further

   $2x^2 + 14x + 24$

   $(2x+6)(x+4)$

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

Factoring a Polynomial

1st Factor out any common factor

2nd What type do I have?

Binomial?

- Check if it's difference of Squares, difference of cubes, or a sum of cubes.

Trinomial?

- Check to see if it's a perfect square trinomial

  Ex: $x^2 + 14x + 49 = (x+7)^2$

  x^2: $x \cdot x$; $14x$: $2 \cdot x \cdot 7$; 49: 7^2 ✓

- factor using methods from 6.2

Does it have more than 3 terms?

- try factoring by grouping

$2x^3 + 10x^2 - 4x$

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

$4t^2 + 1$

prime

#68 $16x^3 + 32x^2 - 9x - 18$

$16x^2(x+2) - 9(x+2)$

$(x+2)(16x^2 - 9)$

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