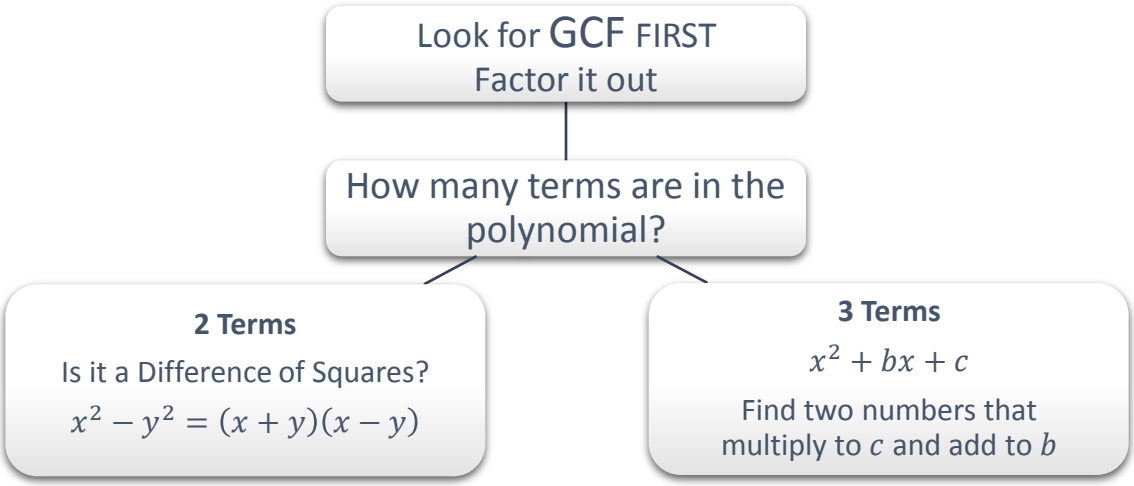
# Factoring a Polynomial in Two Steps, First by GCF and Second as a Difference of Squares or Trinomial Factoring in the form $x^2 + bx + c$




**Example One**

Factor $27x^3 - 12x$

- ✧ Look for a GCF FIRST. Does the polynomial have a GCF? **Yes**
- ✧ Determine the GCF and factor it out. The GCF is $3x$.
  $3x(9x^2 - 4)$
- ✧ Look inside the parentheses and determine the number of terms. **2 terms**
- ✧ Is it a difference of squares? **Yes**

**Answer:** $3x(3x + 2)(3x - 2)$

**Example Two**

Factor $2x^4y + 16x^3y + 32x^2y$

- ✧ Look for a GCF FIRST. Does the polynomial have a GCF? **Yes**
- ✧ Determine the GCF and factor it out. The GCF is $2x^2y$.
  $2x^2y(x^2 + 8x + 16)$
- ✧ Look inside the parentheses and determine the number of terms. **3 terms**
- ✧ Use trinomial factoring. Find two numbers that multiply to $16$ and add to $8$.
  The numbers are $4$ and $4$.

**Answer:** $2x^2y(x + 4)^2$

**Factor the following.**

1. $2x^2 - 8xy + 8y^2$
2. $5x^2 - 20$
3. $x^3 + 6x^2 - 27x$
4. $x^3y - 100xy$
5. $3x^4 - 3x^3 - 90x^2$
6. $36y^4 - 49y^2x^2$
7. $4x^2 - 64x + 256$
8. $x^4y^2 - 25x^2y^2$
9. $2x^3 - 6x^2 - 56x$
10. $5x^2 - 20x^4$
11. $x^2y^3 + 7xy^3 - 98y^3$
12. $8x^3y^4 - 72xy^2$
13. $6x^2 + 36xy + 30y^2$
14. $3x^2y - 36xy^2 + 81y^3$
15. $81x^2 - 9y^2$
16. $2x^3y + 14x^2y - 240xy$