

To factor a trinomial of the form $ax^2 + bx + c$, using the ‘trial-and-error’ process.

Follow these steps:

1. Make your first terms have a product of ax^2 .
2. Make your last terms have a product of c .
3. Find the sum of the inner and outer terms and check if it equals bx . If not, go back to steps 1 and 2 and try a different combination, until step 3 checks.

Other students like to use grouping to factor a trinomial. Here are the steps for grouping. I sometimes call this the product/sum method.

Follow these steps if the leading coefficient is not a 1:

1. If the trinomial is in the form $ax^2 + bx + c$, find a pair of numbers whose product is ac and whose sum is b . Call these numbers r and s .
2. Write the polynomial of the form $ax^2 + rx + sx + c$. Use the ‘grouping’ method to factor.
 - a) Group the first two terms together and factor out a GCF.
 - b) Group the last two terms together and factor out a GCF.
 - c) Now factor out the GCF of the polynomial.

Use whichever method is best for you! The textbook exclusively uses the trial-and-error method. Most students have greater success if they sometimes use the product/sum method.

Ex 1: Factor each completely.

a) $9y^2 - 68y - 32 =$

b) $10x^2 - 17xy + 6y^2 =$

c) $-6m^2 + 47mn - 35n^2 =$

d) $6w^4 - 11w^3 - 35w^2 =$

e) $81r^2 + 72r + 16$

When given a polynomial to factor, this is the order you should follow.

1. Always look for a GCF first.
2. If the polynomial has two terms (binomial), see if it is a difference of squares.
3. If the polynomial has 4 terms, try the grouping method.
4. If the polynomial has 3 terms (trinomial), see if it is a perfect square trinomial.
5. If a trinomial is not a perfect square, try 'trial-and-error' or the 'grouping' method.

Ex 3: Factor each polynomial completely, if possible.

a) $a^3 + 3a^2 - 4a - 12$

b) $3n^5 - 48n$

c) $4r^3 - 32r^2 + 64r$

d) $n^6 - 4n^4 - 12n^2$

e) $x^3 - 2x^2 + 32 - 16x$

g) $g^3 - 5g^2 - 6g$

h) $12x^4 - 9x^3 - 30x^2$