

Common factoring techniques

1. The AC Test—To factor the trinomial $Ax^2 + Bx + C$...

(a) Identify the integer coefficients A , B , and C .

(b) Find two integers P and Q such that

$$P \cdot Q = A \cdot C \quad \text{and} \quad P + Q = B$$

(c) Rewrite the original trinomial in the form

$$(Ax^2 + Px) + (Qx + C) \quad \text{or} \quad (Ax^2 + Qx) + (Px + C).$$

(d) These new polynomials are grouped so that they are easy to factor.

2. A special case of the AC test—To factor $x^2 + Bx + C$...

(a) Identify the integer coefficients B and C .

(b) Find two integers P and Q such that

$$P \cdot Q = C \quad \text{and} \quad P + Q = B$$

(c) The factorization is $x^2 + Bx + C = (x + P)(x + Q)$.

3. Slide and divide—To factor $Ax^2 + Bx + C$...

(a) Identify the integer coefficients A , B , and C .

(b) Find two integers P and Q such that

$$P \cdot Q = A \cdot C \quad \text{and} \quad P + Q = B$$

(c) The factorization is $Ax^2 + Bx + C = \frac{(Ax + P)(Ax + Q)}{A}$, which can be simplified.

4. Factoring differences of squares...

- $A^2 - B^2$

(a) Identify A and B .

(b) $A^2 - B^2 = (A + B)(A - B)$

5. Factoring sums and differences of cubes...

- $A^3 - B^3$

(a) Identify A and B .

(b) $A^3 - B^3 = (A - B)(A^2 + AB + B^2)$

- $A^3 + B^3$

(a) Identify A and B .

(b) $A^3 + B^3 = (A + B)(A^2 - AB + B^2)$