

Factoring $ax^2 + bx + c$ Notes

Factoring $ax^2 + bx + c$:

let: $ax^2 + bx + c = (ex + f)(gx + h)$

where bx is the sum of $(f)(gx)$ and $(ex)(h)$; ax^2 is the product of ex and gx ; and c is a product of f and h .

Step 1: split ax^2 into its factor, ex and gx ;

Step 2: Split the last term c , into two factors f and h whose product is c ;

Step 3: make sure that the sum of the product $(f)(gx)$ and $(ex)(h)$ is equal to the middle term bx .

Step 3: Write the usual binomial factor such as $ax^2 + bx + c = (ex + f)(gx + h)$ where bx is the sum of the middle term (inner and outer term).

Sample problem 1: Factor the following polynomials in $ax^2 + bx + c$ form.

1. $2a^2 + 7a + 6$

Answer:

$$2a^2 = (2a)(a)$$

$$6 = (3)(2)$$

Then

$$(2a + 3)(a + 2)$$

Where

$$7a = 3a + 4a$$

3. $4b^2 - 16b + 16$

Answer:

$$4b^2 = (2b)(2b)$$

$$16 = (-4)(-4)$$

Then

$$(2b - 4)(2b - 4)$$

Where

$$-16b = -8b + (-8b)$$

5. $2x^2 - 10x - 300$

Answer:

$$2x^2 = (2x)(x)$$

$$-300 = (-30)(10)$$

Then

$$(2x - 30)(x + 10)$$

Where

$$-10x = -30x + 20x$$

2. $6x^2 - 10x + 4$

Answer:

$$6x^2 = (3x)(2x)$$

$$4 = (-2)(-2)$$

Then

$$(3x - 2)(2x - 2)$$

Where

$$-10x = -4x + (-6x)$$

4. $8y^2 + 44y + 56$

Answer:

$$8y^2 = (4y)(2y)$$

$$56 = (8)(7)$$

Then

$$(4y + 8)(2y + 7)$$

Where

$$44y = 16y + 28y$$