

LESSON 3.1 Prep A

Factoring $x^2 + bx + c$

What process are you using here? FOIL

Compare the bottom row (with p and q) with the other problems...

How do p and q relate to the FOIL steps?

Put the following into standard form:

$$(x + 1)(x + 1)$$

$$x^2 + 2x + 1$$

$$(x + 1)(x - 1)$$

$$x^2 - 1$$

$$(x - 1)(x - 1)$$

$$x^2 - 2x + 1$$

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

$$x^2 + 5x + 6$$

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

$$x^2 - x - 6$$

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

$$x^2 - 5x + 6$$

$$(x + p)(x + q)$$

$$x^2 + (p + q)x + pq$$

$$(x + p)(x - q)$$

$$x^2 + (p + (-q))x - pq$$

$$(x - p)(x - q)$$

$$x^2 - (p + q)x + pq$$

p is the I (inside)

q is the O (outside)

Looking at the red equations, can you see how the middle term relates to p and q ? $b = p + q$

, can you see how the last term relates to p and q ? $c = pq$

Do you see patterns here?

Can you come up with a set of rules, procedure or generalized steps to follow for factoring?

Something like given $x^2 + bx + c$ find p and q such that ... (relating p and q to b and c)

Factor the following:

$$x^2 + 3x + 2$$

$$(x + 1)(x + 2)$$

$$x^2 - x - 2$$

$$(x + 1)(x - 2)$$

$$x^2 - 3x + 2$$

$$(x - 1)(x - 2)$$

$$x^2 + 7x + 12$$

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

$$x^2 + x - 12$$

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

$$x^2 - 7x + 12$$

$$(x - 3)(x - 4)$$

$$x^2 + 8x + 15$$

$$(x + 5)(x + 3)$$

$$x^2 + 2x - 15$$

$$(x + 5)(x - 3)$$

$$x^2 - 8x + 15$$

$$(x - 5)(x - 3)$$

$$x^2 + 11x + 18$$

$$(x + 2)(x + 9)$$

$$x^2 + 7x - 18$$

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

$$x^2 - 11x + 18$$

$$(x - 2)(x - 9)$$

$$x^2 + 13x + 42$$

$$(x + 6)(x + 7)$$

$$x^2 - x - 42$$

$$(x + 6)(x - 7)$$

$$x^2 - 13x + 42$$

$$(x - 6)(x - 7)$$

Factoring rules:

To factor $x^2 + bx + c$ into $(x + p)(x + q)$, find p and q such that:

- $p + q = b$

and

- $pq = c$... when c is positive, p and q will have the same sign as b

Simple steps:

1. Find the factors pairs of c ... the factor pairs will be the candidates for p and q
2. Play with them to find the combo that has $p + q = b$

Homework

Problems found online, #3-24