Title: Factoring Trinomials Using the Grouping Method.
Class: Math 100
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Instructions to tutor: Read instructions under “Activity” and follow all steps for each problem exactly as given.
Keywords/Tags: Factor, factoring trinomials, grouping method, ac method, splitting middle term.

Objective: Factoring trinomials using the grouping ("ac") method.

Activity: You should know how to factor a polynomial that has 4 terms by grouping. We are now going to apply the method to a trinomial (3 terms) but first we figure out how to break up one of the terms into two so that we have 4 terms to work with.

Example 1. Factor the trinomial $2x^2 + 7x + 5$ by the grouping ("ac") method.

Is this polynomial of the form $ax^2 + bx + c$? If so, determine the values of a, b, and c.

a = _____ b = _____ c = _____

Steps to factor by grouping:

1. Find "ac": _____

2. Find two integers whose product is "ac" and whose sum is "b".
So, we want to find two numbers that:
when we multiply we get _____ and when we add we get _____.

The two integers are _____ and _____.

3. Rewrite the middle term *bx* as the sum of the two terms whose coefficients are integers found in step 2.

Rewrite $2x^2 + 7x + 5$ as
$2x^2 +$_____ + _____ + 5

4. Factor by grouping.

Split the above expression down the middle and follow the steps for factoring by grouping:

$2x^2 +$_____ | | + _____ + 5

= _____ ( ) + _____ ( )

= ( ) ( )

Write the factored form here: _____

Check with a tutor to make sure you did this correctly before you proceed.

Example 2. Factor the trinomial $6x^2 - 13x + 6$ by the grouping ("ac") method.

Is this polynomial of the form $ax^2 + bx + c$? If so, determine the values of a, b, and c.

a = _____ b = _____ c = _____

Steps to factor by grouping:

1. Find "ac": _____

2. Find two integers whose product is "ac" and whose sum is "b".
So, we want to find two numbers that:
when we multiply we get _____ and when we add we get _____.

The two integers are _____ and _____.

3. Rewrite the middle term *bx* as the sum of the two terms whose coefficients are integers found in step 2.

Rewrite **$6x^2 - 13x + 6$** as

$6x^2 -$_____ **–** _____ + 6

4. Factor by grouping.

Split the above expression down the middle and follow the steps for factoring by grouping:

$6x^2 -$_____ | **–**_____ + 6

= _____ ( ) **–** _____ ( )

= ( ) ( )

Write the factored form here: _____

Example 3. Factor the trinomial $2x^2 - x - 6$ by the grouping ("ac") method.

Is this polynomial of the form $ax^2 + bx + c$? If so, determine the values of a, b, and c.

a = _____ b = _____ c = _____

Steps to factor by grouping:

1. Find "ac": _____

2. Find two integers whose product is "ac" and whose sum is "b".
So, we want to find two numbers that:
when we multiply we get _____ and when we add we get _____.

The two integers are _____ and _____.

3. Rewrite the middle term *bx* as the sum of the two terms whose coefficients are integers found in step 2.

Rewrite **$2x^2 - x - 6$** as

$2x^2 -$_____ $+$ _____ $- 6$

4. Factor by grouping.

Split the above expression down the middle and follow the steps for factoring by grouping:

$2x^2 -$ _____ | $+$ _____ $- 6$
|

= _____ ( ) + _____ ( )

= ( ) ( )

Write the factored form here: _____

After you go over the previous problems with a tutor, try the following, then check with a tutor to make sure you did them correctly.

Factor each trinomial by the grouping ("ac") method.

1. $x^2 + 11x + 30$

2. $5x^2 + 7x + 2$

3. $x^2 - 11x + 30$

4. $3x^2 - 8x + 4$

5. $x^2 - x - 20$

6. $3x^2 + 4x - 4$

7. $x^2 + x - 12$

8. $6x^2 + x - 2$

9. $x^2 - 2x - 15$

10. $3x^2 - 2x - 5$

For tutor use: Please check the appropriate box.

- ☐ Student has completed worksheet but may need further assistance. Recommend a follow-up with instructor.
- ☐ Student has mastered topic.