

Algebra I  
Notes 11.6 Trinomial Factoring

Objective: Factor a trinomial into two binomials using sum and product rules.

For trinomials of the form  $x^2 + ax + b$ , you can try factoring using algebra tiles, the “guess and check” method, or the sum and product rule.

The sum and product rule only applies to factorable trinomials in the form  $x^2 + ax + b$ .  
Not all trinomials can be factored.

If a second degree trinomial is in standard form, you can try to factor by finding two integers that MULTIPLY to be the constant and ADD to be the middle coefficient.

Example 1

$x^2 + 6x + 8$  Find two integers that multiply to be \_\_\_\_ and add to be \_\_\_\_.

Those integers are \_\_\_\_ and \_\_\_\_.

$x^2 + 6x + 8 = (x + \quad)(x + \quad)$  Verify by FOILING.

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Example 2

$x^2 + 10x + 24$  Find two integers that multiply to be \_\_\_\_ and add to be \_\_\_\_.

Those integers are \_\_\_\_ and \_\_\_\_.

$x^2 + 10x + 24 = (x + \quad)(x + \quad)$  Verify by FOILING.

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Example 3

$a^2 + 5a + 4$  Find two integers that multiply to be \_\_\_\_ and add to be \_\_\_\_.

Those integers are \_\_\_\_ and \_\_\_\_.

$a^2 + 5a + 4 = (a + \quad)(a + \quad)$  Verify by FOILING.

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#### Example 4

$x^2 + 2x - 8$  Find two integers that multiply to be \_\_\_\_ and add to be \_\_\_\_.

Those integers are \_\_\_\_ and \_\_\_\_.

$$x^2 + 2x - 8 = (x + \quad)(x + \quad) \quad \text{Verify by FOILing.}$$

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#### Example 5

$b^2 - 2b - 8$  Find two integers that multiply to be \_\_\_\_ and add to be \_\_\_\_.

Those integers are \_\_\_\_ and \_\_\_\_.

$$b^2 - 2b - 8 = (b + \quad)(b + \quad) \quad \text{Verify by FOILing.}$$

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#### Example 6

$x^2 - 6x + 8$  Find two integers that multiply to be \_\_\_\_ and add to be \_\_\_\_.

Those integers are \_\_\_\_ and \_\_\_\_.

$$x^2 - 6x + 8 = (x + \quad)(x + \quad) \quad \text{Verify by FOILing.}$$

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#### Example 7

$c^2 - c - 12$  Find two integers that multiply to be \_\_\_\_ and add to be \_\_\_\_.

Those integers are \_\_\_\_ and \_\_\_\_.

$$c^2 - c - 12 = (c + \quad)(c + \quad) \quad \text{Verify by FOILing.}$$

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#### The Sum and Product Rule:

If a trinomial of the form  $x^2 + ax + b$  can be factored into two binomials, there are two integers that will add to be “ $a$ ” and will multiply to be “ $b$ ”. Those two integers ( $c$  and  $d$ ) will complete the following:

$$x^2 + ax + b = (x + c)(x + d)$$