

Name: _____

Date: _____

FACTORING TRINOMIALS COMMON CORE ALGEBRA I



So far we have two factoring techniques: (1) Factoring out a g.c.f. and (2) Factoring based on conjugate pairs (factoring the difference of perfect squares). Today we will tackle the most difficult of the factoring techniques, and that is of factoring trinomials. First, let's make sure we can multiply binomials.

Exercise #1: Write each of the following products in equivalent trinomial form.

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

(b) $(x-2)(x+7)$

(c) $(x-5)(x-10)$

Try a few that are a bit more difficult. It is critical that you are **fluent** with this type of multiplication before we try to reverse the process.

Exercise #2: Write each of the following products in equivalent trinomial form.

(a) $(2x-3)(5x+1)$

(b) $(6x+7)(x+2)$

(c) $(4x-1)(2x-5)$

Now, we need to reverse this process to take a trinomial and write it as the product of the binomials. There is truly only one fail proof method for this type of factoring and that is **GUESS AND CHECK**. This method often frustrates students, but look at it as a puzzle and **make "smart" guesses and quick checks**.

Exercise #3: Consider the trinomial $2x^2 + 13x + 20$. We want to write it as the product of two binomials, in other words, reverse what we did in Exercises #1 and #2.

(a) Fill in the missing blanks with the only pair that makes sense (that is a smart guess).

$$(\text{_____} + \text{_____})(\text{_____} + \text{_____}).$$

(b) Why does it make sense that both of the binomials will be addition (as shown in (a))?

(c) List pairs of factors that can produce a 20.

(d) Try various pairs from (c), checking only that the linear terms will sum to $13x$ until you find the correct factorization.



There is absolutely no substitution for rote practice with factoring trinomials. To be able to do this **critical skill**, you must be **smart with your guesses** and **patient with your checks**. You will find the correct answer, but you must be willing to guess incorrectly multiple times.

Exercise #4: Write each of the following trinomials in equivalent factored form. Show your checks and don't worry if your first guess isn't correct. You will get better at these! Note for yourself which ones seemed easier and which were harder.

(a) $3x^2 + 11x - 4$

(b) $x^2 - 7x + 10$

(c) $x^2 + 10x + 21$

(d) $10x^2 + 9x + 2$

(e) $8x^2 - 18x + 9$

(f) $2x^2 + 5x - 33$

(g) $x^2 - 8x + 12$

(h) $7x^2 - 26x - 8$



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FACTORING TRINOMIALS
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. Which of the following products is equivalent to the trinomial $x^2 - 5x - 24$?

(1) $(x-12)(x+2)$ (3) $(x-8)(x+3)$

(2) $(x+12)(x-2)$ (4) $(x+8)(x-3)$

2. Written in factored form, the trinomial $2x^2 + 15x + 28$ can be expressed equivalently as

(1) $(2x+7)(x+4)$ (3) $(2x+2)(x+14)$

(2) $(2x+4)(x+7)$ (4) $(2x+14)(x+2)$

3. (Easier) Write each of the following trinomials in equivalent factored form. Keep at it!!! Use extra scrap paper for extra guesses.

(a) $x^2 + 10x + 16$

(b) $x^2 + 12x + 35$

(c) $x^2 + 12x + 36$

(d) $x^2 - 5x + 6$

(e) $x^2 - 11x + 28$

(f) $x^2 - 12x + 20$

(g) $x^2 - 3x - 18$

(h) $x^2 + 3x - 40$

(i) $x^2 - 10x - 24$

(j) $x^2 - 8x + 15$

(k) $x^2 + 30x + 200$

(l) $x^2 + 8x - 9$



4. (Medium) Write each of the following trinomials in equivalent factored form. Keep at it!!! Use extra scrap paper for extra guesses.

(a) $2x^2 + 13x + 21$

(b) $5x^2 - 21x + 4$

(c) $3x^2 + 16x - 12$

(d) $7x^2 + 11x - 6$

(e) $2x^2 - x - 10$

(f) $11x^2 - 10x - 1$

5. (Hardest) Write each of the following trinomials in equivalent factored form. Keep at it!!! These might require quite a few tries. You will get better at them as you practice. Use extra scrap paper for extra guesses.

(a) $4x^2 + 27x + 18$

(b) $6x^2 + 5x - 4$

(c) $12x^2 - 31x + 20$

APPLICATIONS

6. A rectangle has dimensions as shown below in terms of an unknown variable, x .

(a) Find a binomial expression for the width of the rectangle in terms of x . Justify your answer based on the expressions for the rectangle's length and area.

Length = $x + 4$

Area = $2x^2 + 9x + 4$

Width = ?

(b) If the width of the rectangle is 21 inches, what is the length and the area? Use appropriate units and explain how you found your answer.

