

Advanced Algebra II Honors: Factoring Review

Let's review some different ways of factoring!

GCF

Factor each polynomial.

1. $20x^2 - 15x$

$5x(4x - 3)$

2. $44a^2 + 11a$

$11a(4a + 1)$

3. $24y - 36x$

$12(2y - 3x)$

4. $5x(x + 7) + 2(x + 7)$

$(5x + 2)(x + 7)$

5. $3a(a + 4) - 2(a + 4)$

$(3a - 2)(a + 4)$

6. $4y(4y + 1) + (4y + 1)$

$(4y + 1)^2$

Factor by Grouping!

7. $(4d^2 + 8d) + (9d + 18)$

$4d(d + 2) + 9(d + 2)$

$(4d + 9)(d + 2)$

8. $(12x - 60) + (7x^2 - 35x)$

$12(x - 5) + 7x(x - 5)$

$(12 + 7x)(x - 5)$

9. $(21x^2 + 12x) + (14x + 8)$

$3x^2(7x + 4) + 2(7x + 4)$

$(3x^2 + 2)(7x + 4)$

Note: When middle sign is "-"
 $3x^2 - 2x - 27x + 18$
 $(3x - 2)(x - 9)$

Remember Trinomials??

That's when things really started getting fun!

* Grouping method is too time consuming.

Trinomials with a = 1

1. $x^2 + 5x + 6$

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

2. $x^2 + 5x + 4$

$(x + 4)(x + 1)$

3. $x^2 + 9x + 20$

$(x + 4)(x + 5)$

4. $x^2 - 8x + 12$

$(x - 6)(x - 2)$

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

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

6. $x^2 - 17x + 16$

$(x - 16)(x - 1)$

Be careful with the



7. $x^2 + 6x - 40$

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

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

$(x + 3)(x - 1)$

9. $x^2 + 4x - 32$

$(x + 8)(x - 4)$

10. $x^2 - 2x - 15$

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

11. $x^2 - 8x - 20$

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

12. $x^2 - 2x - 48$

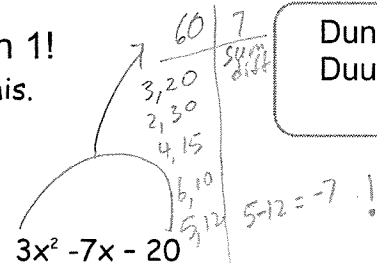
$(x - 8)(x + 6)$

Trinomials with a leading coefficient other than 1!
There are a few way you can do this.

Method 1: Split the Middle Term

$ax^2 + bx + c$

Example: $3x^2 - 7x - 20$



Dun Dun
Duuuuunnnn!!



Step 1: Multiply (ac)

$3x^2 - 12x + 5x - 20$

Step 2: Find two numbers that
Multiply to ac and add to b

$3x(x - 4) + 5(x - 4)$

Step 3: Split b into those two numbers

$(3x + 5)(x - 4)$

Go over checking
by FH, IO

Step 4: Factor by Grouping

Method 2: Criss Cross Apple Sauce!
(AKA organized Guess and check)

Example: $3x^2 + 5x - 28$
 $(\quad) (\quad)$

Pattern:

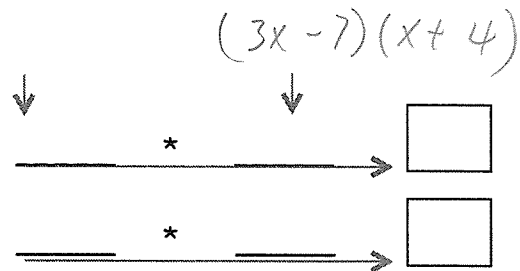
Find two numbers that multiply to "a"

Find two numbers that multiply to "c"

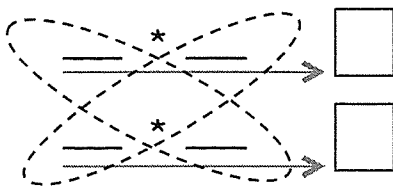
Multiply across

Do any combination of those two numbers
(added or subtracted) give you "b"?

If "yes", we are ready for the next step,
If "no", try again with different numbers.

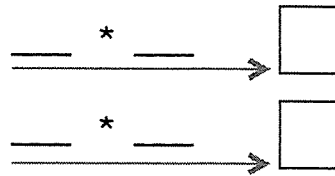
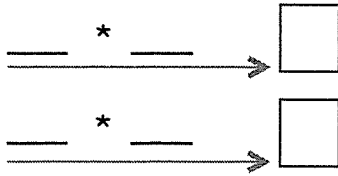


Ok once we have the right numbers, we think "Criss Cross Applesauce"



The numbers (terms) in your criss cross circles become the binomials in the parenthesis.

Try one! $3x^2 - 7x - 20$



If you do not guess correctly the first time, just try again. This work will eventually take up less and less space.

Let's try some! **Factor each trinomial.**

Do a few in each method so that you become comfortable with both.

1. $5x^2 + 17x + 6$

$(5x + 2)(x + 3)$

$(5x + 2)(x + 3)$

2. $4x^2 + 16x + 15$

$(2x + 3)(2x + 5)$

$(2x + 3)(2x + 5)$

3. $3x^2 + 17x + 20$

$(3x + 5)(x + 4)$

$(3x + 5)(x + 4)$

4. $4x^2 - 33x + 8$

$(4x - 1)(x - 8)$

$(4x - 1)(x - 8)$

5. $9x^2 - 27x + 14$

$(3x - 2)(3x - 7)$

$(3x - 2)(3x - 7)$

6. $6x^2 - 25x + 25$

$(3x - 5)(2x - 5)$

$(3x - 5)(2x - 5)$

7. $10x^2 + 13x - 9$

$(5x + 9)(2x - 1)$

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

$(3x + 4)(x - 1)$

9. $5x^2 + 7x - 6$

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

10. $5x^2 - 22x + 8$

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

11. $21x^2 - 22x + 5$

$(7x - 5)(3x - 1)$

12. $12x^2 - 25x + 12$

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

Advanced Algebra II Honors: Factoring Review HOMEWORK

Try some more! Factor each polynomial.

1. $x^2 + 5x$

$x(x+5)$

2. $5m^3 + 45$

$5(m^3 + 9)$

3. $15y^3 + 20y^5 - 10$

$5(3y^3 + 4y^5 - 2)$

4. $10y^2 + 12y^3$

$2y^2(5 + 6y)$

5. $-12t^5 + 6t$

$-6t(2t^4 - 1)$

6. $6x^4 + 15x^3 + 3x^2$

$3x^2(2x^2 + 5x + 1)$

Factor each polynomial by grouping.

7. $(n^3 + 3n^2) + (4n + 12)$

$n^2(n+3) + 4(n+3)$

$(n^2 + 4)(n + 3)$

8. $(2x^3 + 5x^2) + (2x + 5)$

$x^2(2x+5) + (2x+5)$

$(x^2 + 1)(2x + 5)$

9. $(40x^3 - 50x^2) + (12x - 15)$

$10x^2(4x-5) + 3(4x-5)$

$(10x^2 + 3)(4x - 5)$

Factor each Trinomial

10. $x^2 + 10x + 21$

$(x+7)(x+3)$

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

$(x+6)(x+5)$

12. $x^2 + 10x + 16$

$(x+8)(x+2)$

13. $x^2 - 12x + 27$

$(x-9)(x-3)$

14. $x^2 - 15x + 44$

$(x-11)(x-4)$

15. $x^2 - 13x + 40$

$(x-8)(x-5)$

16. $x^2 + 10x - 24$

$(x+12)(x-2)$

17. $x^2 + 12x - 28$

$(x+14)(x-2)$

18. $x^2 + 3x - 10$

$(x+5)(x-2)$

19. $x^2 - x - 12$

○ $(x-4)(x+3)$

20. $x^2 - 2x - 3$

$(x-3)(x+1)$

21. $x^2 - x - 2$

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

22. $6x^2 + 19x + 10$

$(3x+2)(2x+5)$
 $\begin{array}{c} \text{4x} \\ \text{15x} \end{array}$

$(3x+2)(2x+5)$

23. $8x^2 + 18x + 7$

$(4x+7)(2x+1)$
 $\begin{array}{c} 14x \\ 4x \end{array}$

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

24. $8x^2 + 14x + 3$

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

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

25. $4x^2 - 9x - 9$

100

○ $(4x+3)(x-3)$

$(2x+1)(2x-9)$

$(4x-9)(x+1)$

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

26. $4x^2 - 12x - 7$

$(2x+1)(2x-7)$

27. $6x^2 - 7x - 20$

$(3x+4)(2x-5)$

$\begin{array}{c} -15x \\ 8x \end{array} \checkmark$

○

