

Factoring Notes

A quick review of sections 6-1 through 6-6

6-1	<p><u>FIND A COMMON FACTOR</u></p> $3x^2 + 3x = 3x(x+1)$ <ol style="list-style-type: none"> 1. Find what's common to each term. In this example, 3x is common. 2. Divide that common factor to each term: $\frac{3x^2 + 3x}{3x} = \frac{3x}{3x}$ 3. Put the common factor outside what's left of each term: $3x(x + 1)$
6-2	<p><u>DIFFERENCE OF TWO SQUARES</u></p> $A^2 - B^2 = (A + B)(A - B)$ $100x^2 - 25$ $(10x)^2 - (5)^2 = (10x + 5)(10x - 5)$ <p style="margin-left: 150px;">MEMORIZE this formula! $A^2 - B^2 = (A + B)(A - B)$</p> <p>You must also recognize that you have two perfect squares, and you're subtracting them. This ONLY works for subtraction. (So $A^2 + B^2$ is fully factored; can't do anything more to it.)</p>
6-3	<p><u>TRINOMIAL SQUARES</u></p> $16a^2 - 56ab + 49b^2 = (4a - 7b)^2$ $(4a)^2 \qquad (7b)^2$ <p>Again, you must also recognize that you have two perfect squares, but in this case there's a middle term. Set up the squares in parentheses (using the arithmetic operation of the middle term), and then multiply it out to see if you really get the correct middle term. , and = $(4a-7b)^2 = (4a-7b)(4a-7b) = 16a^2 - 28ab - 28ab + 49b^2 = 16a^2 - 56ab + 49b^2$</p>
6-4	<p><u>FACTORIZING $x^2 + bx + c$ (coefficient of x^2 is 1)</u></p> $x^2 + bx + c$ $x^2 - 7x + 10 = (x - 5)(x - 2)$ <p style="margin-left: 150px;">Note: the two end (last) numbers must:</p> <ol style="list-style-type: none"> 1. MULTIPLY to make c (+10) 2. ADD to make b (-7)
6-5	<p><u>FACTORIZING $ax^2 + bx + c$ (coefficient of x^2 is NOT 1)</u></p> $ax^2 + bx + c$ $18x^2 + 33x - 6$ <p style="margin-left: 150px;">Note: the factors of the a and the c must be combined to make the b.</p> <p>Your goal is to make (+)(+)</p> <ul style="list-style-type: none"> • First factor out the common factor, if there is one: $3(6x^2 + 11x - 2)$ • Factors of 6: 6 and 1, 3 and 2. One set of these must be the first terms. • Factors of -2: 1 and -2, -1 and 2. One set of these must be the last terms. • <u>So now try different combinations until you get +11 as the middle term.</u> • Hint: <i>First, just look at the numbers to see if you can guess a combination that will multiply and then add to get the b, which is +11.</i> <p>In this case, 6 times 2 equals 12, and 1 times -1 equals -1. $12 + -1 = 11$. Therefore, $3(6x - 1)(x + 2)$ is the answer. Multiply it out (FOIL) to check. Notice that the answer also includes the original 3 that was factored out at the beginning.</p>
6-6	<p><u>FACTORIZING BY GROUPING</u></p> $6x^3 - 9x^2 + 4x - 6$ $(6x^3 - 9x^2) + (4x - 6)$ $3x^2(2x - 3) + 2(2x - 3)$ $(3x^2 + 2)(2x - 3)$ <ul style="list-style-type: none"> • Group the first two terms, then the last two terms. • Now remove common factors. • Notice that the "left-inside" terms are the same! • Use the distributive property to put it together.