MBF 3C1 Name: ________________________

Common Factoring and Difference of Squares

The opposite of expanding is Factoring.

A common factor is an expression that can be divided into each term in a polynomial.

For example, $3x$ is a common factor for the polynomial $9x^3 - 15x^2 + 3x$, because $3x$ divides evenly into each of the three terms.

TO COMMON FACTOR:

1. Determine what the greatest common factor is for all the terms in the polynomial.	$9x^3 - 15x^2 + 3x$ *Choose the greatest number and the most variables that will divide evenly into each term:* G.C.F. = $3x$
2. Divide each term in the polynomial by the common factor.	$3x\left(\frac{9x^3}{3x} - \frac{15x^2}{3x} + \frac{3x}{3x}\right)$
3. Write the answer in proper form: GCF ("left overs").	$= 3x(3x^2 - 5x + 1)$

Example 1

a. $4x^2\left(\frac{8x^4}{4x^2} - \frac{4x^3}{4x^2} + \frac{20x^2}{4x^2}\right)$

$= 4x^2(2x^2 - 1x + 5)$

b. $25\left(\frac{25x^2}{25} - \frac{100}{25}\right)$

$= 25(x^2 - 4)$

c. $-27\left(\frac{-54x^4}{-27x} + \frac{135x}{-27x}\right)$

$= -27(2x^3 - 5)$

* if negative is 1st pull it out by dividing.

MBF 3C1 Name: ___________________________

A number is a perfect square if when square rooted the result is a whole number. For example, 9, 16, 25, 81 and 100 are all perfect squares because when square rooted the answers are whole numbers → $\sqrt{9}=3$, $\sqrt{16}=4$, $\sqrt{25}=5$, $\sqrt{81}=9$ and $\sqrt{100}=10$.

If a variable has an **even** exponent then it is considered a perfect square.

To determine the square root of a variable, keep the base and divide the exponent by 2.

For example, x^8 is a perfect square, its square root is x^4.

A **difference of squares** is a **binomial** with **two perfect square terms being subtracted**.

TO FACTOR USING DIFFERENCE OF SQUARES:

1. Check to ensure that difference of squares factoring is possible.	$9x^2-16$ ☐ both terms perfect squares ☐ subtraction
2. Create two sets of brackets. 3. Square root the first term of the polynomial and place one in each bracket in first position. $\sqrt{9x^2}=3x$ 4. Square root the second term of the polynomial and place one in each bracket in second position. $\sqrt{16}=4$ 5. Separate the terms in one bracket with + and in the other with −.	$(\;+\;)(\;-\;)$ $(3x+4)(3x-4)$

Example 2

a. $\sqrt{x^2}-\sqrt{25}$

$x \quad 5$

$=(x+5)(x-5)$

b. $\sqrt{16x^2}-\sqrt{1y^2}$

$4x \quad 1y$

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

c. $\sqrt{81x^2}-\sqrt{4y^4}$

$9x \quad 2y^2$

$(9x+2y^2)(9x-2y^2)$