FACTORING SPECIAL PRODUCTS

Difference of two squares

Rule:	$a^2 - b^2$	$=$	$(a + b)(a - b)$
Example:	$9x^2 - 25$		*In this example, a is 3x and b is 5*
	$(3x)^2 - (5)^2$	$=$	$(3x + 5)(3x - 5)$

Sum of two squares

Rule:	$a^2 + b^2$	$=$	**NOT FACTORABLE**

Square of a binomial sum

Rule:	$a^2 + 2ab + b^2$	$=$	$(a + b)^2$
Example:	$9y^2 + 12y + 4$		*In this example, a is 3y and b is 2*
	$(3y)^2 + 2(3y)(2) + (2)^2$	$=$	$[(3y) + (2)]^2$
		$=$	$(3y + 2)^2$
Use FOIL to Check:	$(3y + 2)(3y + 2)$	$=$	$9y^2 + 6y + 6y + 4$

Square of a binomial difference

Rule:	$a^2 - 2ab + b^2$	$=$	$(a - b)^2$
Example:	$16x^2 - 40x + 25$		*In this example, a is 4x and b is 5*
	$(4x)^2 - 2(4x)(5) + (5)^2$	$=$	$[(4x) - (5)]^2$
		$=$	$(4x - 5)^2$
Use FOIL to Check:	$(4x - 5)(4x - 5)$	$=$	$16x^2 - 20x - 20x + 25$

Sum of two cubes

Rule: $a^3 + b^3$ = $(a - b)(a^2 - ab + b^2)$

Example: $64x^3 + 27y^3$ *In this example, a is 4x and b is 3y*

$(4x)^3 + (3y)^3$ = $[(4x) + 3y][(4x)^2 - (4x)(3y) + 3y)^2]$

= $(4x + 3y)(16x^2 - 12xy + 9y)^2$

Difference of two cubes

Rule: $a^3 - b^3$ = $(a - b)(a^2 - ab + b^2)$

Example: $x^3 - 125$ *In this example, a is x and b is 5*

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

$(x-5)(x^2 + 5x + 25)$

Difference of two squares with a GCF

Rule: $ca^2 - cb^2$ = $c(a + b)(a - b)$

Example: $75x^2 - 48$ *In this example, a is 5x, b is 4, and c is 3*

$3(5x)^2 - 3(4)^2$ = $3[(5x)^2 - (4)^2]$

$3(25x^2 - 16)$ = $3(5x + 4)(5x - 4)$