

**Homework: Factoring Polynomials****Directions:** Complete the following rules.

1.) Difference of Squares:  $a^2 - b^2 = \frac{(a+b)(a-b)}{\quad}$

2.) Sum of Cubes:  $a^3 + b^3 = \frac{(a+b)(a^2 - ab + b^2)}{\quad}$

3.) Difference of Cubes:  $a^3 - b^3 = \frac{(a-b)(a^2 + ab + b^2)}{\quad}$

4.) How can you tell if you have completely factored a polynomial? Check to make sure each factor is completely factored.**Directions:** Factor each polynomial completely. Make sure to check for a GCF first.

5.)  $x^2 - 36$  Difference of Squares  
 $a = x$   $b = 6$

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

6.)  $3x^2 - 75$  Difference of Squares  
 $a = x$   $b = 5$

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

7.)  $c^3 + 64$  Sum of Cubes  
 $a = c$   $b = 4$

$$(c+4)(c^2 - (c)(4) + (4)^2)$$
$$(c+4)(c^2 - 4c + 16)$$

8.)  $8k^3 + 1$  Sum of Cubes

$$(2k+1)((2k)^2 - (2k)(1) + (1)^2)$$
$$(2k+1)(4k^2 - 2k + 1)$$

9.)  $m^3 - 27$  Difference of Cubes  
 $a = m$   $b = 3$

$$(m-3)((m)^2 + (m)(3) + (3)^2)$$
$$(m-3)(m^2 + 3m + 9)$$

10.)  $216x^3 - 125y^3$  Difference of Cubes  
 $a = 6x$   $b = 5y$

$$(6x-5y)((6x)^2 + (6x)(5y) + (5y)^2)$$
$$(6x-5y)(36x^2 + 30xy + 25y^2)$$

11.)  $x^2 - 12x + 36$

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

$$\begin{array}{ccc} & 36 & \\ -6 & \times & -6 \\ & -12 & \end{array}$$

12.)  $w^4 - 14w^2 - 32$

$$(w^2 - 16)(w^2 + 2)$$
$$(w+4)(w-4)(w^2 + 2)$$

$$\begin{array}{ccc} & -32 & \\ -16 & \times & +2 \\ & -14 & \end{array}$$

13.)  $(3p^3 + 5p^2 - 12p - 20)$

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

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

14.)  $(4r^3 - 3r^2 - 4r + 3)$

$$r^2(4r-3) - 1(4r-3)$$
$$(r^2 - 1)(4r-3)$$

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