

Wk 10 block AA2 Factor sum and Difference of cubes  
Factoring the sum and difference of cubes:

Name KEY

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

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

Example:

Factor  $27x^3 - 64y^3$

first re-write the problem as the difference of two cubes  $(3x)^3 - (4y)^3$  use the difference formula:

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

$a = 3x$   $b = 4y$  now substitute the values into the formula

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

Now simplify:

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

Factor each sum or difference of cubes completely. Don't forget to factor out GCF if necessary

1.  $8x^3 - 27$   
 $(2x)^3 - (3)^3$

$$(2x - 3)(4x^2 + 6x + 9)$$

5.  $x^3 + 64$   
 $(x)^3 + (4)^3$

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

2.  $2x^3 + 54$   
 $2(x^3 + 27) = 2(x^3 + (3)^3)$

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

6.  $2x^3 - 250y^6$   
 $2(x^3 - 125y^6) = 2(x^3 - (5y^2)^3)$

$$2(x - 5y^2)(x^2 + 5xy^2 + 25y^4)$$

3.  $4x^3 - 32y^9$   
 $4(x^3 - 8y^9) = 4(x^3 - (2y^3)^3)$

$$4(x - 2y^3)(x^2 + 2xy^3 + 4y^6)$$

7.  $27x^3 + 64$   
 $(3x)^3 + (4)^3$

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

4.  $64x^3 - 1$   
 $(4x)^3 - 1^3$

$$(4x - 1)(16x^2 + 4x + 1)$$

8.  $x^3 - 27c^3y^6$   
 $x^3 - (3cy^2)^3$

$$(x - 3cy^2)(x^2 + 3cxy^2 + 9c^2y^4)$$