

### 3.7 Factoring a Sum or Difference of Cubes



#### Math Learning Target:

"I can factor fully a Sum **or** Difference of Cubes."

$$\triangle^3 \pm \square^3$$

*Sum of Cubes:*

*Difference of Cubes:*

Ex.1 Apply the Factor Theorem to factor completely:

a)  $y^3 + 8$

b)  $8x^3 - 27$

Hint:

c)  $a^3 - b^3$

Factor Formula for a Difference of Cubes:

Factor Formula for a Sum of Cubes:

*Let's verify the result by expanding:*

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

Ex.2 Use the appropriate "new" formula to factor completely:

a)  $8x^3 - 27$  (from the previous slide)

b)  $27x^3 + 125y^3$

The Factor Theorem can be applied to any expression.  
However, it may be more difficult to use than if one recognizes the expression as a sum/difference of cubes.  
Hence, the following algorithm is suggested, from now on, when required to factor:



Is the expression a sum/difference of cubes?  
If so, use the appropriate formula.  
Otherwise, apply the Factor Theorem directly.

Entertainment: p.182 #2acegi, 3, 4acegi, 5ac, 6  
Are you factoring fully?