MHF4U **Factoring Sum or Difference of Cubes** Sep 28, 2014

Recall: Perfect Squares and Difference of Squares

When factoring, there are some distinctive pattens which may be used to move directly to an answer without going through the entire factoring process.

Difference of Squares	**Perfect Squares**
$a^2-b^2=(a-b)(a+b)$	$a^2+2ab+b^2=(a+b)^2$ $a^2-2ab+b^2=(a-b)^2$

For a cubic polynomial, there are two such patterns:

Sum of Cubes	**Difference of Cubes**
$a^3+b^3=(a+b)(a^2-ab+b^2)$	$a^3-b^3=(a-b)(a^2+ab+b^2)$

For both the sum and difference of cubes, the quadratic factor is <u>irreducible</u>, meaning it cannot be factored any further.

Ex.1 Factor $8x^3-27$ using two methods:
 (a) long division, assuming $(2x-3)$ is a factor;
 (b) a sum/difference of cubes pattern.

When performing any kind of factoring, it is important to **always** check for common factors first.

Ex.2 Factor $135x^4+320x$.

The difference of squares and sum/difference of cubes can be applied to situations with higher-order exponents by using the laws of exponents, specifically $x^{ab}=(x^a)^b$.

Ex.3 Express each of the following as the appropriate sum or difference of powers and factor. Note that some may allow multiple applications of patterns, so try to fully factor each expression.

(a) a^4-b^4 (b) a^6+b^6 (c) x^6-y^6 (2 paths to solution!)

Assigned Work: p.182 # 2adg, 3, 5, 7, 8