

## Sum &amp; Difference of Cubes

**Factor each completely.**

1)  $-81x^5 + 24x^2$

2)  $27x^5 + 125x^2$

3)  $125x^3 - 1$

4)  $-64a^5 - 125a^2$

5)  $81x^4 + 375x$

6)  $27a^5 + 64a^2$

7)  $x^3 - 8$

8)  $64a^3 - 27$

9)  $648x^4 - 375x$

10)  $648u - 3u^4$

## Sum of Cubes

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

### Example 1

Factor completely:  $x^3 + 64$

What times itself 3 times is  $x^3$ ?  $\rightarrow x$ , so  $x$  is your  $a$ -term

What times itself 3 times is 64?  $\rightarrow 4$ , so 4 is your  $b$ -term

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

## Difference of Cubes

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

### Example 2

Factor completely:  $8x^3 - 27$

What times itself 3 times is  $8x^3$ ?  $\rightarrow 2x$ , so  $2x$  is your  $a$ -term

What times itself 3 times is 27?  $\rightarrow 3$ , so 3 is your  $b$ -term

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

Remember S.O.A.P. for the signs

Same . Opposite . Always Positive