

Ex. Factor $x^8 + x^4 + 1$

$$x^8 + x^4 + 1$$

We add here one x^4 & subtract one x^4

so it becomes a difference of 2 squares.

$$x^8 + x^4 + 1 + x^4 - x^4 = x^8 + 2x^4 + 1 - x^4$$

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

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

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

$$= \boxed{(x^4 - x^2 + 1)(x^2 + 1 - x)(x^2 + 1 + x)}$$

Ex 1 $16x^6y + 250y^{10} = 2y(8x^6 + 125y^9)$

$\sqrt{\quad}$
powers of 3

$$= 2y((2x^2)^3 + (5y^3)^3) = 2y(2x^2 + 5y^3)(4x^4 + 10x^2y^3 + 25y^6)$$

Ex Factor $a^2 - 2ab - 48b^2 - 3a - 18b$

$$= (a + 6b)(a - 8b) - 3(a + 6b)$$

$$= (a + 6b)[a - 8b - 3]$$