

## SPECIAL FACTORING

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

Ex 1

$$\begin{aligned} & x^2 - 16 \\ &= x^2 - 4^2 \\ &= (x-4)(x+4) \end{aligned}$$

Ex 2

$$\begin{aligned} & x^2 - 100 \\ &= x^2 - 10^2 \\ &= (x-10)(x+10) \end{aligned}$$

Ex 3

$$\begin{aligned} & 81x^2 - 49 \\ &= (9x)^2 - (7)^2 \\ &= (9x-7)(9x+7) \end{aligned}$$

Ex 4

$$\begin{aligned} & 25 - 36x^2 \\ &= (5)^2 - (6x)^2 \\ &= (5-6x)(5+6x) \end{aligned}$$

$$\begin{aligned}
 \underline{\text{Ex 5}} & \quad x^2 - 1 \\
 & = x^2 - 1^2 \\
 & = (x-1)(x+1)
 \end{aligned}$$

$$\begin{aligned}
 \underline{\text{Ex 6}} & \quad x^4 - 1 \\
 & = (x^2)^2 - 1^2 \\
 & = (x^2 - 1)(x^2 + 1) \\
 & = (x^2 - 1^2)(x^2 + 1) \\
 & = \underline{\underline{(x-1)(x+1)(x^2+1)}}
 \end{aligned}$$

$$\begin{aligned}
 \underline{\text{Ex 7}} & \quad x^4 - 81 \\
 & = (x^2)^2 - (9)^2 \\
 & = (x^2 - 9)(x^2 + 9) \\
 & = (x^2 - 3^2)(x^2 + 9) \\
 & = (x-3)(x+3)(x^2+9)
 \end{aligned}$$

$$\begin{aligned}
 & (x^2+9) \cdot (x^2-9) \\
 & (x^2+9)(x^2-3^2) \\
 & (x^2+9)(x-3)(x+3)
 \end{aligned}$$

Ex 8  $4x^4 - 16x^2$   
 $= 4x^2(x^2 - 4)$   
 $= 4x^2(x^2 - 2^2)$   
 $= 4x^2(x-2)(x+2)$

Ex 9  $3x^3 + 27x$   
 $= 3x(x^2 + 9)$

↳ NONFACTORABLE

Remark:  $a^2 + b^2 \rightarrow$  NO FORMULA

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