

# Difference of Two Squares

$$\begin{aligned}\text{Consider } & (a+b)(a-b) \\ & = a^2 + \cancel{ab} - \cancel{ab} - b^2 \\ & = a^2 - b^2\end{aligned}$$

∴ the factorisation of  $a^2 - b^2$  is given by

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

## Examples

$$1) \quad x^2 - 16 = x^2 - 4^2 = (x+4)(x-4)$$

$$2) \quad x^2 - 1 = x^2 - 1^2 = (x+1)(x-1)$$

$$3) \quad 9x^2 - 25 = (3x)^2 - 5^2 = (3x+5)(3x-5)$$

$$4) \quad 4h^2 - 9k^2 = (2h)^2 - (3k)^2 = (2h+3k)(2h-3k)$$

## Exercise

$$1) \quad x^2 - 81 = x^2 - 9^2 = (x+9)(x-9)$$

$$2) \quad y^2 - 49 = x^2 - 7^2 = (x+7)(x-7)$$

$$3) \quad 25x^2 - 36 = (5x)^2 - 6^2 = (5x+6)(5x-6)$$

$$4) 100y^2 - 9x^2 = (10y)^2 - (3x)^2 = (10y + 3x)(10y - 3x)$$

$$5) 16x^2 - y^2 = (4x)^2 - y^2 = (4x + y)(4x - y)$$

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Solve

$$\begin{aligned} i) \quad x^2 - 81 &= 0 \\ x^2 - 9^2 &= 0 \\ (x + 9)(x - 9) &= 0 \end{aligned}$$

$$\begin{aligned} \text{Either } x + 9 &= 0 \\ x &= -9 \end{aligned}$$

$$\begin{aligned} \text{or } x - 9 &= 0 \\ x &= 9 \end{aligned}$$

$$x^2 - 81 = 0$$

$$x^2 = 81$$

$$x = \pm\sqrt{81}$$

$$x = \pm 9$$

Exercise Question      Solve

$$\begin{aligned} 4x^2 - 9 &= 0 \\ (2x)^2 - 3^2 &= 0 \\ (2x + 3)(2x - 3) &= 0 \end{aligned}$$

$$\begin{aligned} \text{Either } 2x + 3 &= 0 \\ 2x &= -3 \\ x &= -\frac{3}{2} \end{aligned}$$

$$\text{or } 2x - 3 = 0$$

$$4x^2 = 9$$

$$x^2 = \frac{9}{4}$$

$$x = \pm\sqrt{\frac{9}{4}}$$

$$x = \pm\frac{3}{2}$$

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$$2x = 3$$

$$x = \frac{3}{2}$$

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