

# Boletín Ecuaciones III - Matemáticas 4º E.S.O.

Ejemplo

$$x^4 - 13x^2 + 36 = 0 \xrightarrow{x^2 \rightarrow z} \begin{cases} x^2 = z \\ x^4 = z^2 \end{cases} \rightarrow z^2 - 13z + 36 = 0$$

$$z = \frac{+13 \pm \sqrt{13^2 - 4 \cdot 1 \cdot 36}}{2 \cdot 1} = \frac{+13 \pm \sqrt{25}}{2} = \frac{+13 \pm 5}{2} \rightarrow \begin{cases} z_1 = \frac{13+5}{2} = \frac{18}{2} = 9 \\ z_2 = \frac{13-5}{2} = \frac{8}{2} = 4 \end{cases}$$

$$\begin{cases} z_1 = \frac{13+5}{2} = \frac{18}{2} = 9 \\ z_2 = \frac{13-5}{2} = \frac{8}{2} = 4 \end{cases} \xrightarrow{x = \pm\sqrt{z}} \begin{cases} x = \pm\sqrt{z_1} = \pm\sqrt{9} \rightarrow \begin{cases} x_1 = 3 \\ x_2 = -3 \end{cases} \\ x = \pm\sqrt{z_2} = \pm\sqrt{4} \rightarrow \begin{cases} x_3 = 2 \\ x_4 = -2 \end{cases} \end{cases}$$

1. Resuelve las siguientes ecuaciones de **bicuatras**.

- |                           |                            |                           |
|---------------------------|----------------------------|---------------------------|
| a. $x^4 - 10x^2 + 9 = 0$  | e. $3x^4 + 27 = 0$         | i. $9x^4 + 16 = 40x^2$    |
| b. $2x^4 - x^2 - 1 = 0$   | f. $3x^4 + x^2 - 4 = 0$    | j. $x^4 - 25x^2 = 0$      |
| c. $4x^4 - 13x^2 + 9 = 0$ | g. $x^4 - 9x^2 = 0$        | k. $4x^4 - 5x^2 + 1 = 0$  |
| d. $x^4 - 7x^2 + 12 = 0$  | h. $36x^4 - 13x^2 + 1 = 0$ | l. $9x^4 - 10x^2 + 9 = 0$ |

2. Resuelve las siguientes ecuaciones de **bicuatras**.

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|--|---|
| a. $x^4 + x^2 + 1 = 0$<br>Sol : No tiene   | e. $x^4 - 16 = 0$<br>Sol : $x_1 = 2$ ; $x_2 = -2$                                   |
| b. $5x^4 - 6x^2 - 351 = 0$<br>Sol : $x_1 = 3$ ; $x_2 = -3$                       | f. $x^4 + 49x^2 = 0$<br>Sol : $x_1 = 0$ ; $x_2 = -7$ ; $x_3 = 7$                    |
| c. $3x^4 + x^2 - 4 = 0$<br>Sol : $x_1 = 1$ ; $x_2 = -1$                          | g. $x^4 - 4x^2 - 12 = 0$<br>Sol : $x_1 = \sqrt{6}$ ; $x_2 = -\sqrt{6}$              |
| d. $x^4 - 5x^2 + 4 = 0$<br>Sol : $x_1 = 2$ ; $x_2 = -2$ ; $x_3 = 1$ ; $x_4 = -1$ | h. $-x^4 + 13x^2 - 36 = 0$<br>Sol : $x_1 = 2$ ; $x_2 = -2$ ; $x_3 = 3$ ; $x_4 = -3$ |