

### Factores especiales:

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

$$x^3 - a^3 = (x - a)(x^2 + ax + a^2)$$

$$x^3 + a^3 = (x + a)(x^2 - ax + a^2)$$

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

$$x^4 + a^4 = (x^2 + \sqrt{2}ax + a^2)(x^2 - \sqrt{2}ax + a^2)$$

$$x^n - a^n = (x - a)(x^{n-1} + ax^{n-2} + \dots + a^{n-1}), \text{ para } n \text{ impar}$$

$$x^n + a^n = (x + a)(x^{n-1} - ax^{n-2} + \dots + a^{n-1}), \text{ para } n \text{ impar}$$

$$x^{2n} - a^{2n} = (x^n - a^n)(x^n + a^n)$$

$$(x + a)^2 = x^2 + 2ax + a^2$$

$$(x - a)^2 = x^2 - 2ax + a^2$$

$$(x + a)^3 = x^3 + 3ax^2 + 3a^2x + a^3$$

$$(x - a)^3 = x^3 - 3ax^2 + 3a^2x - a^3$$

$$(x + a)^4 = x^4 + 4ax^3 + 6a^2x^2 + 4a^3x + a^4$$

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

### Ejemplos

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

$$x^3 - 8 = (x - 2)(x^2 + 2x + 4)$$

$$x^3 + 4 = (x + \sqrt[3]{4})(x^2 - \sqrt[3]{4}x + \sqrt[3]{16})$$

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

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

$$x^5 - 1 = (x - 1)(x^4 + x^3 + x^2 + x + 1)$$

$$x^7 + 1 = (x + 1)(x^6 - x^5 + x^4 - x^3 + x^2 - x + 1)$$

$$x^6 - 1 = (x^3 - 1)(x^3 + 1)$$

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

$$(x^2 - 5)^2 = x^4 - 10x^2 + 25$$

$$(x + 2)^3 = x^3 + 6x^2 + 12x + 8$$

$$(x - 1)^3 = x^3 - 3x^2 + 3x - 1$$

$$(x + \sqrt{2})^4 = x^4 + 4\sqrt{2}x^3 + 12x^2 + 8\sqrt{2}x + 4$$

$$(x - 4)^4 = x^4 - 16x^3 + 96x^2 - 256x + 256$$

### Exponentes y radicales:

$$a^0 = 1, a \neq 0$$

$$a^{-x} = \frac{1}{a^x}$$

$$a^x a^y = a^{x+y}$$

$$\frac{a^x}{a^y} = a^{x-y}$$

$$(a^x)^y = a^{xy}$$

$$(ab)^x = a^x b^x$$

$$\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$$

$$\sqrt{a} = a^{1/2}$$

$$\sqrt[n]{a} = a^{1/n}$$

$$\sqrt[n]{a^m} = a^{m/n} = (\sqrt[n]{a})^m$$

$$\sqrt[n]{ab} = \sqrt[n]{a} \sqrt[n]{b}$$

$$\sqrt[n]{\left(\frac{a}{b}\right)} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$