

# MULTIPLICACIÓN DE RADICALES

Usamos las reglas del álgebra:

$$\begin{aligned}a(b+c) &= ab+ac \\(a+b)(c+d) &= ac+ad+bc+bd \\(a+b)^2 &= a^2+2ab+b^2 \\(a-b)^2 &= a^2-2ab+b^2 \\(a+b)(a-b) &= a^2-b^2\end{aligned}$$

## EJEMPLO 1:

Simplifica:

a  $\sqrt{2}(\sqrt{2} + \sqrt{3})$

b  $\sqrt{3}(6 - 2\sqrt{3})$

$$\begin{aligned}a &= \sqrt{2}(\sqrt{2} + \sqrt{3}) \\&= \cancel{\sqrt{2}} \times \sqrt{2} + \cancel{\sqrt{2}} \times \sqrt{3} \\&= 2 + \sqrt{6}\end{aligned}$$

$$\begin{aligned}b &= \sqrt{3}(6 - 2\sqrt{3}) \\&= (\sqrt{3})(6 + -2\sqrt{3}) \\&= (\cancel{\sqrt{3}})(6) + (\cancel{\sqrt{3}})(-2\sqrt{3}) \\&= 6\sqrt{3} + -6 \\&= 6\sqrt{3} - 6\end{aligned}$$

1. Simplifica en tu cuaderno y selecciona la opción correcta:

a  $\sqrt{2}(\sqrt{5} + \sqrt{2})$

b  $\sqrt{2}(3 - \sqrt{2})$

c  $\sqrt{3}(\sqrt{3} + 1)$

d  $-\sqrt{3}(1 + \sqrt{3})$

e  $-\sqrt{3}(\sqrt{3} + 2)$

f  $-\sqrt{5}(2 + \sqrt{5})$

g  $\sqrt{11}(2\sqrt{11} - 1)$

h  $\sqrt{6}(1 - 2\sqrt{6})$

i  $\sqrt{3}(\sqrt{3} + \sqrt{2} - 1)$

j  $-\sqrt{11}(2 - \sqrt{11})$

k  $-(\sqrt{3} - \sqrt{7})$

l  $-2\sqrt{2}(1 - \sqrt{2})$

**EJEMPLO 2:**

Simplifica:

$$(3 - \sqrt{2})(4 + 2\sqrt{2})$$

$$\begin{aligned}(3 - \sqrt{2})(4 + 2\sqrt{2}) \\ = (3 - \sqrt{2})(4) + (3 - \sqrt{2})(2\sqrt{2}) \\ = 12 - 4\sqrt{2} + 6\sqrt{2} - 4 \\ = 8 + 2\sqrt{2}\end{aligned}$$

2. Simplifica en tu cuaderno y selecciona la opción correcta:

a  $(1 + \sqrt{2})(2 + \sqrt{2})$

b  $(2 + \sqrt{3})(2 + \sqrt{3})$

c  $(\sqrt{3} + 2)(\sqrt{3} - 1)$

d  $(4 - \sqrt{2})(3 + \sqrt{2})$

e  $(1 + \sqrt{3})(1 - \sqrt{3})$

f  $(5 + \sqrt{7})(2 - \sqrt{7})$

**EJEMPLO 3:**

Simplifica:

a  $(\sqrt{3} + 2)^2$

b  $(\sqrt{3} - \sqrt{7})^2$

a  $(\sqrt{3} + 2)^2$

$$\begin{aligned} &= (\sqrt{3})^2 + 2 \times \sqrt{3} \times 2 + 2^2 \\ &= 3 + 4\sqrt{3} + 4 \\ &= 7 + 4\sqrt{3} \end{aligned}$$

b  $(\sqrt{3} - \sqrt{7})^2$

$$\begin{aligned} &= (\sqrt{3})^2 - 2 \times \sqrt{3} \times \sqrt{7} + (\sqrt{7})^2 \\ &= 3 - 2\sqrt{21} + 7 \\ &= 10 - 2\sqrt{21} \end{aligned}$$

**3.** Simplifica en tu cuaderno y selecciona la opción correcta:

a  $(1 + \sqrt{2})^2$

b  $(2 - \sqrt{3})^2$

c  $(\sqrt{3} + 2)^2$

d  $(1 + \sqrt{5})^2$

e  $(\sqrt{2} - \sqrt{3})^2$

f  $(5 - \sqrt{2})^2$

g  $(\sqrt{2} + \sqrt{7})^2$

h  $(4 - \sqrt{6})^2$

i  $(\sqrt{6} - \sqrt{2})^2$

**EJEMPLO 4:**

Simplifica:

a  $(3 + \sqrt{2})(3 - \sqrt{2})$

b  $(2\sqrt{3} - 5)(2\sqrt{3} + 5)$

$$\begin{aligned}a & (3 + \sqrt{2})(3 - \sqrt{2}) \\& = 3^2 - (\sqrt{2})^2 \\& = 9 - 2 \\& = 7\end{aligned}$$

$$\begin{aligned}b & (2\sqrt{3} - 5)(2\sqrt{3} + 5) \\& = (2\sqrt{3})^2 - 5^2 \\& = (4 \times 3) - 25 \\& = 12 - 25 \\& = -13\end{aligned}$$

4. Simplifica en tu cuaderno y selecciona la opción correcta:

a  $(4 + \sqrt{3})(4 - \sqrt{3})$

b  $(5 - \sqrt{2})(5 + \sqrt{2})$

c  $(\sqrt{5} - 2)(\sqrt{5} + 2)$

d  $(\sqrt{7} + 4)(\sqrt{7} - 4)$

e  $(3\sqrt{2} + 2)(3\sqrt{2} - 2)$

f  $(2\sqrt{5} - 1)(2\sqrt{5} + 1)$

5. Simplifica en tu cuaderno y selecciona la opción correcta:

a  $(\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2})$  b  $(\sqrt{7} + \sqrt{11})(\sqrt{7} - \sqrt{11})$  c  $(\sqrt{x} - \sqrt{y})(\sqrt{y} + \sqrt{x})$