

2. Realizar las siguientes operaciones:

a)  $(\sqrt{3}-1)(\sqrt{2}-\sqrt{3})^2$     b)  $(1-\sqrt{18})\left(\sqrt{2}+\frac{1}{\sqrt{2}}\right)$     c)  $\sqrt[3]{5^4}+3\sqrt[3]{40}$     d)  $\sqrt[3]{16ab^2}+\sqrt[3]{250ab^2}+\sqrt[6]{4a^2b^4}$

**Solución**

$$\begin{aligned} \text{a)} \quad (\sqrt{3}-1)(\sqrt{2}-\sqrt{3})^2 &= (\sqrt{3}-1)(2+3-2\sqrt{2}\sqrt{3}) = (\sqrt{3}-1)(5-2\sqrt{6}) = 5\sqrt{3}-2\sqrt{3}\sqrt{6}-5+2\sqrt{6} = \\ &= 5\sqrt{3}-2\sqrt{3^2 \cdot 2}-5+2\sqrt{6} = 5\sqrt{3}-6\sqrt{2}-5+2\sqrt{6} \end{aligned}$$

$$\begin{aligned} \text{b)} \quad (1-\sqrt{18})\left(\sqrt{2}+\frac{1}{\sqrt{2}}\right) &= \sqrt{2}+\frac{1}{\sqrt{2}}-\sqrt{18}\sqrt{2}-\frac{\sqrt{18}}{\sqrt{2}} = \sqrt{2}+\frac{1}{\sqrt{2}}-\sqrt{36}-\sqrt{\frac{18}{2}} = \sqrt{2}+\frac{1}{\sqrt{2}}-6-\sqrt{9} = \\ &= \sqrt{2}+\frac{1}{\sqrt{2}}-6-3 = \sqrt{2}+\frac{1}{\sqrt{2}}-9 = \frac{2+1-9\sqrt{2}}{\sqrt{2}} = \frac{3-9\sqrt{2}}{\sqrt{2}} \end{aligned}$$

$$\text{c)} \quad \sqrt[3]{5^4}+3\sqrt[3]{40} = 5\sqrt[3]{5}+3\sqrt[3]{2^3 \cdot 5} = 5\sqrt[3]{5}+6\sqrt[3]{5} = 11\sqrt[3]{5}$$

$$\begin{aligned} \text{d)} \quad \sqrt[3]{16ab^2}+\sqrt[3]{250ab^2}+\sqrt[6]{4a^2b^4} &= \sqrt[3]{2^4 ab^2}+\sqrt[3]{2 \cdot 5^3 ab^2}+\sqrt[6]{2^2 a^2 b^4} = 2\sqrt[3]{2ab^2}+5\sqrt[3]{2ab^2}+\sqrt[3]{2ab^2} = \\ &= 8\sqrt[3]{2ab^2} \end{aligned}$$

Observar en la segunda igualdad que en la raíz  $\sqrt[6]{2^2 a^2 b^4}$  se han dividido el índice y los exponentes entre 2.