

1.- Calcula:

$$\begin{aligned} \text{a)} \quad 10 + 2\sqrt{5} - 3\sqrt{3} - 4\sqrt{5} + 2\sqrt{5} + 4 - \sqrt{3} + \sqrt{16} &= \\ &= 10 + 4 + 4 + 2\sqrt{5} - 4\sqrt{5} + 2\sqrt{5} - 3\sqrt{3} - \sqrt{3} = 18 - 4\sqrt{3} \end{aligned}$$

$$\text{b)} \quad \frac{7}{2}\sqrt{2} + 4\sqrt{3} + \frac{3}{5}\sqrt{2} - \frac{1}{4}\sqrt{3} = \left(\frac{7}{2} + \frac{3}{5}\right)\sqrt{2} + \left(4 - \frac{1}{4}\right)\sqrt{3} = \frac{41}{10}\sqrt{2} + \frac{15}{4}\sqrt{3}$$

$$\begin{aligned} \text{c)} \quad \sqrt{12} &= \sqrt{2^2 \cdot 3} = 2\sqrt{3} \\ \sqrt{18} &= \sqrt{3^2 \cdot 2} = 3\sqrt{2} \\ \sqrt{75} &= \sqrt{5^2 \cdot 3} = 5\sqrt{3} \\ \sqrt{27} &= \sqrt{3^3} = 3\sqrt{3} \end{aligned}$$

$$\begin{aligned} 2\sqrt{12} + 2\sqrt{18} + \sqrt{75} + \sqrt{25} - 3\sqrt{2} - \sqrt{27} - 4 &= \\ 2 \cdot 2\sqrt{3} + 2 \cdot 3\sqrt{2} + 5\sqrt{3} + 5 - 3\sqrt{2} - 3\sqrt{3} - 4 &= 6\sqrt{3} + 3\sqrt{2} + 1 \end{aligned}$$

$$\text{d)} \quad 3\sqrt[3]{27} - 2\sqrt[3]{16} + \sqrt[3]{250} - \sqrt[3]{64} = 3 \cdot 3 - 2 \cdot 2\sqrt[3]{2} + 5\sqrt[3]{2} - 4 = 5 + \sqrt[3]{2}$$

2.- Calcula, utilizando las identidades notables:

$$\text{a)} \quad (\sqrt{2} + \sqrt{3})^2 = (\sqrt{2})^2 + 2\sqrt{2}\sqrt{3} + (\sqrt{3})^2 = 2 + 2\sqrt{6} + 3 = 5 + 2\sqrt{6}$$

$$\text{b)} \quad (\sqrt{3} - 2\sqrt{2})^2 = (\sqrt{3})^2 - 2\sqrt{3} \cdot 2\sqrt{2} + (2\sqrt{2})^2 = 3 - 4\sqrt{6} + 8 = 11 - 4\sqrt{6}$$

$$\text{c)} \quad (\sqrt{3} + \sqrt{2}) \cdot (\sqrt{3} - \sqrt{2}) = (\sqrt{3})^2 - (\sqrt{2})^2 = 3 - 2 = 1$$

3.- Indica si los siguientes radicales son semejantes:

$$\text{a)} \quad 3\sqrt{3} \text{ y } \sqrt{3} \quad \text{Sí} \quad \text{b)} \quad -2\sqrt{2} \text{ y } -2\sqrt{3} \quad \text{No}$$

$$\text{c)} \quad 3\sqrt{75} \text{ y } 4\sqrt{18} \Rightarrow 3 \cdot 5\sqrt{3} \text{ y } 4 \cdot 3\sqrt{2} \quad \text{No}$$

$$\text{d)} \quad \sqrt{63} \text{ y } \sqrt{28} \Rightarrow 3\sqrt{7} \text{ y } 2\sqrt{7} \quad \text{Sí}$$

$$\text{e)} \quad 2\sqrt{2} \text{ y } \sqrt{2x^2} \Rightarrow 2\sqrt{2} \text{ y } x\sqrt{2} \quad \text{Sí}$$

$$\text{f)} \quad 5\sqrt{5} \text{ y } \sqrt{25} \Rightarrow 5\sqrt{5} \text{ y } 5 \quad \text{No}$$

4.- Efectúa las siguientes operaciones, simplificando el resultado:

$$a) \frac{4\sqrt{6} \cdot 2\sqrt{3} \cdot 5\sqrt{2}}{5\sqrt{32} \cdot 3\sqrt{18}} = \frac{4\sqrt{6} \cdot 2\sqrt{3} \cdot 5\sqrt{2}}{5 \cdot 4\sqrt{2} \cdot 3\sqrt{6} \cdot \sqrt{3}} = \frac{2}{3}$$

$$b) \frac{a\sqrt{b^2ac^3} \cdot \sqrt[3]{abc^5}}{c\sqrt{ab^2c} \cdot \sqrt[3]{a^4bc^2}} = \frac{abc\sqrt{ac} \cdot c \sqrt[3]{abc^2}}{bc\sqrt{ac} \cdot a \sqrt[3]{abc^2}} = c$$

5.- Efectúa las siguientes operaciones, simplificando el resultado:

$$a) \sqrt{x+y+2\sqrt{xy}} \cdot \sqrt{x+y-2\sqrt{xy}} = \sqrt{(x+y+2\sqrt{xy})(x+y-2\sqrt{xy})} = \\ = \sqrt{(x+y)^2 - (2\sqrt{xy})^2} = \sqrt{x^2 + 2xy + y^2 - 4xy} = \sqrt{x^2 - 2xy + y^2} = \sqrt{(x-y)^2} = x-y$$

$$b) \sqrt[3]{(a+b)^2} \cdot \sqrt{(a+b)^3} = \sqrt[6]{(a+b)^4} \cdot \sqrt[6]{(a+b)^6} = \sqrt[6]{(a+b)^{10}} = (a+b) \cdot \sqrt[3]{(a+b)^2}$$

$$c) \sqrt{2\sqrt{2}\sqrt{2}} \cdot \sqrt[3]{3\sqrt[3]{3}\sqrt[3]{3}} = \sqrt{2\sqrt{2^3}} \cdot \sqrt[3]{3\sqrt[3]{3^4}} = \sqrt{\sqrt{2^7}} \cdot \sqrt[3]{\sqrt[3]{3^{13}}} = \\ = \sqrt[8]{2^7} \cdot \sqrt[27]{3^{13}} = \sqrt[216]{2^{189} \cdot 3^{104}}$$

$$d) 5\sqrt{25} \cdot \sqrt{125} \cdot \sqrt{5} = 5\sqrt{25 \cdot 625} = 5\sqrt{25^2} = 5 \cdot 25 = 125$$

6.- Calcula, simplificando el resultado:

$$a) (-\sqrt{7})^2 = 7$$

$$b) (-2\sqrt{5})^2 = 20$$

$$c) (\sqrt{3} + 5) \cdot (5 - \sqrt{3}) = (5 + \sqrt{3}) \cdot (5 - \sqrt{3}) = 25 - 3 = 22$$

$$d) \frac{3\sqrt{20}}{5\sqrt{5}} = \frac{3 \cdot 2\sqrt{5}}{5\sqrt{5}} = \frac{6}{5}$$

$$e) 2\sqrt{2} \cdot 3\sqrt{3} = 6\sqrt{6}$$

$$f) (3\sqrt{5} + 5\sqrt{3}) \cdot (5\sqrt{5} - 3\sqrt{3}) = 15\sqrt{25} - 9\sqrt{15} + 25\sqrt{15} - 15\sqrt{9} = 30 + 16\sqrt{15}$$