

Radicales

1 Simplifica las siguientes expresiones:

$$a) \sqrt[4]{a^3} \cdot \sqrt[5]{a^4} : \sqrt{a} = \sqrt[20]{a^{15}} \cdot \sqrt[20]{a^{16}} : \sqrt{a} = \sqrt[20]{a^{31}} : \sqrt{a} = \sqrt[20]{a^{31}} : \sqrt[20]{a^{10}} = \sqrt[20]{a^{21}} = a^{20}\sqrt{a}$$

$$b) \sqrt[3]{2\sqrt{3}} : \sqrt[3]{4} = \sqrt[3]{\sqrt{12}} : \sqrt[3]{4} = \sqrt[6]{12} : \sqrt[6]{4} = \sqrt[6]{3}$$

$$c) \left(\frac{\sqrt[6]{32}}{\sqrt{8}}\right)^8 = \left(\frac{\sqrt[6]{32}}{\sqrt[6]{8^3}}\right)^8 = \left(\sqrt[6]{\frac{32}{8^3}}\right)^8 = \left(\sqrt[6]{\frac{2^5}{2^9}}\right)^8 = \left(\sqrt[6]{\frac{1}{2^4}}\right)^8 = \sqrt[6]{\frac{1}{2^{32}}} = \frac{1}{2^5} \sqrt[6]{\frac{1}{2^2}} = \frac{1}{32} \sqrt[3]{\frac{1}{2}}$$

$$d) \frac{\sqrt{ab} \cdot \sqrt[3]{ab^2}}{\sqrt[6]{a^2b}} = \frac{\sqrt[6]{a^3b^3} \cdot \sqrt[6]{a^2b^4}}{\sqrt[6]{a^2b}} = \frac{\sqrt[6]{a^5b^7}}{\sqrt[6]{a^2b}} = \sqrt[6]{\frac{a^5b^7}{a^2b}} = \sqrt[6]{a^3b^6} = b\sqrt[6]{a^3} = b\sqrt{a}$$

2 Opera y simplifica:

$$a) \sqrt[3]{3a^3} - \sqrt[3]{81b^6} = a\sqrt[3]{3} - 3b^2\sqrt[3]{3} = (a - 3b^2)\sqrt[3]{3}$$

$$b) \sqrt{9a+27} - \sqrt{4a+12} = \sqrt{9(a+3)} - \sqrt{4(a+3)} = 3\sqrt{a+3} - 2\sqrt{a+3} = (3-2)\sqrt{a+3} = \sqrt{a+3}$$

3 Opera y simplifica:

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

4 Racionaliza y opera:

$$a) \frac{\sqrt{32}}{5} - \frac{3\sqrt{50}}{2} + \frac{5}{\sqrt{18}} = \frac{\sqrt{2^5}}{5} - \frac{3\sqrt{2 \cdot 5^2}}{2} + \frac{5}{\sqrt{2 \cdot 3^2}} = \frac{4\sqrt{2}}{5} - \frac{15\sqrt{2}}{2} + \frac{5}{3\sqrt{2}} = \frac{4\sqrt{2}}{5} - \frac{15\sqrt{2}}{2} + \frac{5\sqrt{2}}{6} = \frac{24\sqrt{2} - 225\sqrt{2} + 25\sqrt{2}}{30} = \frac{-176\sqrt{2}}{30} = \frac{-88\sqrt{2}}{15}$$

$$b) \frac{3\sqrt{8} + \sqrt{18} - 2\sqrt{72}}{4\sqrt{8} + \sqrt{2}} = \frac{3\sqrt{2^3} + \sqrt{2 \cdot 3^2} - 2\sqrt{2^3 \cdot 3^2}}{4\sqrt{2^3} + \sqrt{2}} = \frac{6\sqrt{2} + 3\sqrt{2} - 12\sqrt{2}}{8\sqrt{2} + \sqrt{2}} = \frac{-3\sqrt{2}}{9\sqrt{2}} = \frac{-3}{9} = -\frac{1}{3}$$

$$c) \frac{-\sqrt{27} + \sqrt{48} + 5\sqrt{75}}{2\sqrt{75} - \sqrt{3}} = \frac{-\sqrt{3^3} + \sqrt{2^4 \cdot 3} + 5\sqrt{3 \cdot 5^2}}{2\sqrt{3 \cdot 5^2} - \sqrt{3}} = \frac{-3\sqrt{3} + 4\sqrt{3} + 25\sqrt{3}}{10\sqrt{3} - \sqrt{3}} = \frac{26\sqrt{3}}{9\sqrt{3}} = \frac{26}{9}$$