



1. Simplifica los siguientes radicales.

a)  $\sqrt[4]{4}$

c)  $\sqrt[10]{400}$

b)  $\sqrt[6]{27}$

d)  $\sqrt[12]{8a^6b^9}$

2. Extrae factores de los siguientes radicales.

a)  $\sqrt{800}$

c)  $\sqrt[3]{256}$

b)  $\sqrt[3]{162}$

d)  $\sqrt[5]{32a^{17}b^{20}c^{11}}$

3. Opera:

a)  $\sqrt{108} + \sqrt{75} - \sqrt{48}$

b)  $\sqrt[3]{54} + 3\sqrt[3]{128} - \sqrt[3]{2000}$

4. Ordena de menor a mayor estos radicales.

$\sqrt{2}$     $\sqrt[3]{4}$     $\sqrt[4]{10}$     $\sqrt[6]{20}$     $\sqrt[12]{150}$

5. Opera.

a)  $\sqrt[4]{6} : \sqrt[6]{2}$

b)  $\frac{\sqrt{96} + \sqrt{150}}{3\sqrt{8} - \sqrt{2}}$

c)  $\frac{\sqrt[3]{250} + 5\sqrt[3]{16} - \sqrt[3]{54}}{\sqrt[3]{1024}}$

6. Racionaliza las siguientes expresiones.

a)  $\frac{2}{\sqrt{3}}$

c)  $\frac{3}{\sqrt{2}-1}$

b)  $\frac{6}{\sqrt[5]{4}}$

d)  $\frac{\sqrt{5}}{\sqrt{7}-\sqrt{3}}$

**Ficha Propiedades y operaciones con raíces**

1. a)  $\sqrt[4]{4} = \sqrt[4]{2^2} = \sqrt{2}$

b)  $\sqrt[6]{27} = \sqrt[6]{3^3} = \sqrt{3}$

c)  $\sqrt[10]{400} = \sqrt[10]{2^4 \cdot 5^2} = \sqrt[5]{2^2 \cdot 5} = \sqrt[5]{20}$

d)  $\sqrt[12]{8a^6b^9} = \sqrt[12]{2^3 a^6 b^9} = \sqrt[4]{2a^2b^3}$

2. a)  $\sqrt{800} = \sqrt{2^5 \cdot 5^2} = 20\sqrt{2}$

b)  $\sqrt[3]{162} = \sqrt[3]{3^4 \cdot 2} = 3\sqrt[3]{6}$

c)  $\sqrt[3]{256} = \sqrt[3]{2^8} = 4\sqrt[3]{4}$

d)  $\sqrt[5]{32a^{17}b^{20}c^{11}} = \sqrt[5]{2^5 \cdot a^{17}b^{20}c^{11}} = 2a^3b^4c^2 \cdot \sqrt[5]{a^2c}$

3. a)  $\sqrt{108} + \sqrt{75} - \sqrt{48} = \sqrt{2^2 \cdot 3^3} + \sqrt{3 \cdot 5^2} - \sqrt{2^4 \cdot 3} = 6\sqrt{3} + 5\sqrt{3} - 4\sqrt{3} = 7\sqrt{3}$

b)  $\sqrt[3]{54} + 3\sqrt[3]{128} - \sqrt[3]{2000} = \sqrt[3]{3^3 \cdot 2} + 3\sqrt[3]{2^7} - \sqrt[3]{2^4 \cdot 5^3} = 3\sqrt[3]{2} + 12\sqrt[3]{2} - 10\sqrt[3]{2} = 5\sqrt[3]{2}$

4.  $\sqrt{2} = \sqrt[12]{2^6} = \sqrt[12]{64}$      $\sqrt[3]{4} = \sqrt[12]{2^8} = \sqrt[12]{256}$      $\sqrt[4]{10} = \sqrt[12]{10^3} = \sqrt[12]{1000}$      $\sqrt[6]{20} = \sqrt[12]{20^2} = \sqrt[12]{400}$      $\sqrt[12]{150}$

$\Rightarrow \sqrt{2} < \sqrt[12]{150} < \sqrt[3]{4} < \sqrt[6]{20} < \sqrt[4]{10}$

5. a)  $\sqrt[4]{6} : \sqrt[6]{2} = \sqrt[4]{2 \cdot 3} : \sqrt[6]{2} = \sqrt[12]{\frac{2^3 \cdot 3^3}{2^2}} = \sqrt[12]{54}$

b)  $\frac{\sqrt{96} + \sqrt{150}}{3\sqrt{8} - \sqrt{2}} = \frac{4\sqrt{6} + 5\sqrt{6}}{6\sqrt{2} - \sqrt{2}} = \frac{10\sqrt{6}}{5\sqrt{2}} = 2\sqrt{3}$

c)  $\frac{\sqrt[3]{250} + 5\sqrt[3]{16} - \sqrt[3]{54}}{\sqrt[3]{1024}} = \frac{5\sqrt[3]{2} + 10\sqrt[3]{2} - 3\sqrt[3]{2}}{8\sqrt[3]{2}} = \frac{12\sqrt[3]{2}}{8\sqrt[3]{2}} = \frac{3}{2}$

6. a)  $\frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

b)  $\frac{6}{\sqrt[5]{4}} = \frac{6\sqrt[5]{8}}{2} = 3\sqrt[5]{8}$

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

d)  $\frac{\sqrt{5}}{\sqrt{7}-\sqrt{3}} = \frac{\sqrt{5}(\sqrt{7}+\sqrt{3})}{(\sqrt{7}-\sqrt{3})(\sqrt{7}+\sqrt{3})} = \frac{\sqrt{35}-\sqrt{15}}{4}$