## Producto y cociente de radicales

**RECORDAR:**

- Propiedades de las raíces: $\sqrt[n]{a}\cdot\sqrt[n]{b}=\sqrt[n]{a\cdot b}$

  $\dfrac{\sqrt[n]{a}}{\sqrt[n]{b}}=\sqrt[n]{\dfrac{a}{b}}$

  $\left(\sqrt[n]{a}\right)^m=\sqrt[n]{a^m}$

  $\sqrt[m]{\sqrt[n]{a}}=\sqrt[m\cdot n]{a}$

- Introducir/extraer factores: $x\cdot\sqrt[n]{a}=\sqrt[n]{x^n\cdot a}$

**1.** **Multiplicar los siguientes radicales del mismo índice**, simplificando siempre que sea posible (véase el primer ejemplo):

**a)** $\sqrt{2}\,\sqrt{32}=\sqrt{64}=8$

**b)** $\sqrt{2}\,\sqrt{15}=$

**c)** $\sqrt[3]{2}\,\sqrt[3]{4}=$

**d)** $\sqrt{3}\,\sqrt{27}=$

**e)** $\sqrt{3}\,\sqrt{4}=$

**f)** $\sqrt[3]{2}\,\sqrt[3]{5}=$

**g)** $\sqrt{32}\,\sqrt{8}=$ $(Sol:16)$

**h)** $\sqrt{13}\,\sqrt{13}=$

**i)** $\sqrt[3]{9}\,\sqrt[3]{81}=$ $(Sol:9)$

**j)** $\sqrt{2}\,\sqrt{8}\,\sqrt{16}=$ $(Sol:16)$

**k)** $\sqrt{12}\,\sqrt{3}=$ $(Sol:6)$

**l)** $2\sqrt{18}\cdot 3\sqrt{2}=$ $(Sol:36)$

**m)** $\sqrt{2x^3}\,\sqrt{2x}=$ $(Sol:2x^2)$

**n)** $\sqrt{12}\,\sqrt{6}\,\sqrt{18}$ $(Sol:36)$

**o)** $\left(2\sqrt{2}\right)^2 =$ *(Sol: 8)*

**p)** $\left(3\sqrt{5}\right)^2 =$ *(Sol: 45)*

**2.** **Multiplicar los siguientes radicales de distinto índice**, simplificando siempre que sea posible (véase el primer ejemplo):

**a)** $\sqrt{2}\ \sqrt[4]{64} = \sqrt{2}\ \sqrt[4]{2^6} = \sqrt{2}\ \sqrt{2^3} = \sqrt{2^4} = 2^2 = 4$

**b)** $\sqrt[6]{9}\ \sqrt[3]{9} =$ $(Sol: 3)$

**c)** $\sqrt[4]{x^{10}}\ \sqrt[6]{x^9} =$ $\left(Sol: x^4\right)$

**d)** $\sqrt[6]{7^{10}}\ \sqrt[3]{49} =$ $\left(Sol: \sqrt[3]{7^7}\right)$

**e)** $\sqrt[4]{1024}\ \sqrt[6]{8} =$ $(Sol: 8)$

**f)** $\sqrt[4]{4a^2}\ \sqrt{8a} =$ $(Sol: 4a)$

**g)** $\sqrt{3}\ \sqrt[6]{27} =$ $(Sol: 3)$

**h)** $\sqrt[6]{2^9}\ \sqrt[4]{1024} =$ $(Sol: 16)$

**i)** $\sqrt[4]{25}\ \sqrt{25}\ \sqrt{5} =$ $(Sol: 25)$

**3.** Simplificar, aplicando convenientemente las propiedades de las raíces (véase el primer ejemplo):

**a)** $\dfrac{\sqrt{32}}{\sqrt{2}} = \sqrt{16} = 4$

**b)** $\dfrac{\sqrt{8}}{\sqrt{2}} =$ $(Sol: 2)$

**c)** $\dfrac{\sqrt[3]{81}}{\sqrt[3]{9}} =$

**d)** $\dfrac{\sqrt{15}}{\sqrt{3}} =$

**e)** $\dfrac{\sqrt{27}}{\sqrt{3}} =$ $(Sol: 3)$

**f)** $\dfrac{\sqrt[3]{16}}{\sqrt[3]{2}} =$ $(Sol: 2)$

**g)** $\sqrt{\dfrac{256}{729}} =$ $\left(Sol: 16/27\right)$

**h)** $\dfrac{\sqrt{21}}{2\sqrt{7}} =$ $\left(Sol: \sqrt{3}/2\right)$

**i)** $\dfrac{\sqrt{33}}{\sqrt{3}} =$

**j)** $\sqrt[3]{\dfrac{125}{512}} =$ $\left(Sol: 5/8\right)$

**k)** $\sqrt[4]{\dfrac{16}{625}} =$

**l)** $\dfrac{\sqrt{2}\ \sqrt{8}}{\sqrt{32}} =$ $\left(Sol: 1/\sqrt{2}\right)$

**m)** $\dfrac{\sqrt{2}\,\sqrt{3}}{\sqrt{6}} =$ $(Sol: 1)$

**n)** $\dfrac{\sqrt{8a^3}}{\sqrt{2a}} =$ $(Sol: 2a)$

**o)** $\left(\dfrac{3}{2}\right)^2 : \left(1+\sqrt{\dfrac{1}{8}+\dfrac{7}{16}}-\dfrac{3}{2}\right) : \left(-\dfrac{2}{3}+1\right)^2 =$ $(Sol: 81)$

**4.** **Dividir los siguientes radicales de distinto índice**, simplificando siempre que sea posible (véase el primer ejemplo):

**a)** $\dfrac{\sqrt{128}}{\sqrt[6]{8}} = \dfrac{\sqrt{2^7}}{\sqrt[6]{2^3}} = \dfrac{\sqrt{2^7}}{\sqrt{2}} = \sqrt{2^6} = 2^3 = 8$

**b)** $\dfrac{\sqrt[4]{64}}{\sqrt[6]{8}} =$ $(Sol: 2)$

**c)** $\dfrac{\sqrt[3]{27}}{\sqrt[6]{81}} =$ $\left(Sol: \sqrt[3]{3}\right)$

**d)** $\dfrac{\sqrt{5^5}}{\sqrt[4]{5^6}} =$ $(Sol: 5)$

**e)** $\dfrac{\sqrt[4]{a^{14}}}{\sqrt[6]{a^9}} =$ $\left(Sol: a^2\right)$

**f)** $\dfrac{\sqrt{7^3}}{\sqrt[4]{49}} =$ $(Sol: 7)$

**g)** $\dfrac{\sqrt[6]{x^{15}}}{\sqrt[10]{x^{15}}} =$ $(Sol: x)$

**h)** $\dfrac{\sqrt{a^3b^5}}{\sqrt{ab^3}} =$ $(Sol: ab)$

**i)** $\dfrac{\sqrt[4]{81}}{\sqrt[4]{9}\,\sqrt{3}} =$ $(Sol: 1)$

**j)** $\dfrac{\sqrt[4]{4}\,\sqrt{2}}{\sqrt[6]{8}} =$ $\left(Sol: \sqrt{2}\right)$

**k)** $\dfrac{\sqrt[4]{x^2}\cdot\sqrt{x^3}}{\sqrt{x}\cdot\sqrt[6]{x^9}} =$ $(Sol: 1)$

**l)** $\dfrac{\sqrt{125}}{\sqrt[4]{25}} =$ $(Sol: 5)$

**m)** $\sqrt{36}\,\sqrt[3]{125} - \dfrac{\sqrt[3]{8}}{\sqrt{16}} =$ $(Sol: 59/2)$