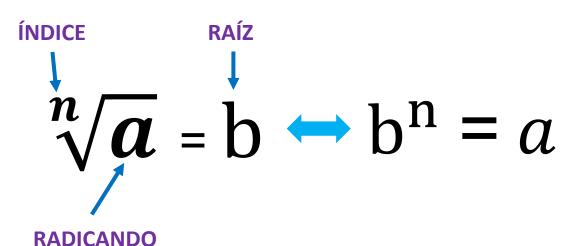
# RADICACIÓN EN R

#### **DEFINICIÓN**



Donde:  $n \in N \land n \ge 2$ 

# **Ejemplo:**

$$\sqrt[5]{32} = 2 \text{ pues } 2^5 = 32$$
  
 $\sqrt{100} = \sqrt[2]{100} = 10 \text{ pues } 10^2 = 100$ 

#### **EXPONENTE FRACCIONARIO**

$$a^{\frac{m}{n}} = \sqrt[n]{a}^{m} = \sqrt[n]{a^{m}}$$

Donde  $\frac{m}{n}$  es irreductible

#### **Ejemplo:**

$$16^{3/4} = \sqrt[4]{16}^3 = 2^3 = 8$$

#### **TEOREMAS**

I) 
$$\sqrt[n]{a}$$
 = a

### **Ejemplo:**

$$\sqrt[6]{4}^{12} = \sqrt[6]{4}^{(6)(2)} = 4^2 = 16$$

II) 
$$\sqrt[n]{a}$$
.  $\sqrt[n]{b} = \sqrt[n]{a.b}$ 

### **Ejemplo:**

$$\sqrt{8}$$
  $\sqrt{2} = \sqrt{16} = 4$ 

$$\text{III}) \frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$$

# **Ejemplo:**

$$\frac{\sqrt[3]{56}}{\sqrt[3]{7}} = \sqrt[3]{8} = 2$$

IV) 
$$\sqrt[m]{\sqrt[n]{a}} = \sqrt[m.n]{a}$$

# **Ejemplo:**

$$\left(\sqrt[4]{6\sqrt{4}}\right)^{48} = \sqrt[4]{6}\sqrt{4}^{(24)(2)} = 4^2 = 16$$

V) 
$$\sqrt[n]{a^m} = \sqrt[n.k]{\sqrt{a^{m.k}}}$$

# **Ejemplo:**

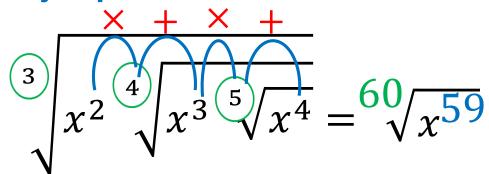
$$\sqrt[3]{a^2} \cdot \sqrt[4]{a^3} = \sqrt[3.4]{a^{2.4}} \cdot \sqrt[4.3]{a^{3.3}} = \sqrt[12]{a^8 \cdot a^9}$$

$$= \sqrt[12]{a^{17}}$$

$$= \sqrt[12]{a^{17}}$$

VI) 
$$\sqrt{a^{\alpha}} \cdot \sqrt{a^{\beta}} \cdot \sqrt{a^{\theta}} = \sqrt{a^{(\alpha. n + \beta)p+\theta}}$$

### **Ejemplo:**



## **EJERCICIOS DE APLICACIÓN**

1. Efectuar:

$$M = \frac{\sqrt[3]{x} \cdot \sqrt[3]{x} \cdot \sqrt[3]{x} \cdot \sqrt[3]{x}}{\sqrt[44 \ factores}} \div \frac{x^{-3}}{x^{-1}}$$

Resolución
$$M = \frac{(\sqrt[3]{x})^{45}}{\sqrt{(\sqrt{x})^{44}}} \left(\frac{x^{-1}}{x^{-3}}\right)$$

$$M = \frac{x^{15}}{\sqrt{x^{22}}} \left( x^{-1+3} \right) = \frac{x^{15+2}}{x^{11}}$$

$$\therefore M = x^6$$

2. Reducir: 
$$E = \frac{\sqrt[6]{2} \cdot \sqrt[3]{2} \cdot \sqrt[4]{2}}{\sqrt[5]{2} \cdot \sqrt[2]{2}}$$

#### Resolución

Calculamos: MCM(6;3:4;5;20) = 60

$$E = \frac{\sqrt[6(10)]{2^{(10)}} \sqrt[3(20)]{2^{(20)}} \sqrt[4(15)]{2^{(15)}}}{\sqrt[5]{2^{(12)}} \sqrt[20]{2^{(12)}} \sqrt[20]{3^{(3)}}}$$

$$E = \sqrt[60]{\frac{2^{10} \cdot 2^{20} \cdot 2^{15}}{2^{12} \cdot 2^{3}}} = \sqrt[(2)(30)]{2^{30}} = \sqrt{2}$$

Reducir: 
$$M = \frac{\sqrt[5]{x^2 \sqrt[3]{x^4 \sqrt{x^7}}}}{\sqrt[3]{4 \sqrt[5]{\frac{1}{x^6}}}}$$

#### Resolución

$$M = \frac{\sqrt{\frac{x^{2}}{x^{2}}} + x + \frac{1}{\sqrt{x^{2}}}}{\sqrt{\frac{x^{2}}{x^{2}}}} = \frac{\sqrt{\frac{2}{x^{2}}}}{\sqrt{\frac{x^{2}}{x^{2}}}} = \frac{\sqrt{\frac{2}{x^{2}}}}{\sqrt{\frac{x^{2}}{x^{2}}}}$$

$$M = \sqrt{\frac{54 + 51}{x}} = \sqrt{\frac{4}{x}} \sqrt{\frac{15}{x}}$$

$$\therefore M = \sqrt[4]{x^7}$$

Calcular: "A + B + C"

Si: 
$$A = \sqrt{9.\sqrt{9.\sqrt{9...}}}$$
  $B = \sqrt{132 + \sqrt{132 + ...}}$   $C = \sqrt{5}$ 

$$B = \sqrt{132 + \sqrt{132 + \sqrt{132 + \dots}}}$$

$$C = \begin{bmatrix} 64 \\ 5 \\ 64 \\ \hline \sqrt{5} \\ 64 \\ \hline \cdot \\ \cdot \end{bmatrix}$$

# RESOLUCIÓN

$$A = \sqrt[3]{-1/9} = \sqrt{9}$$

$$A = 3$$

$$132 = (11).(12)$$
 mayor

$$B=12$$

$$C = \sqrt[5]{64} = \sqrt[6]{64}$$
  $C = 2$ 

$$\therefore A + B + C = 17$$