



# Materiales Educativos GRATIS

## ALGEBRA

## PRIMERO

# PROPIEDADES DE LA RADICACIÓN

### Marco teórico

“n”: índice

“b”: cantidad subradical

“m”: raíz

$${}^n\sqrt{b} = m \leftrightarrow m^n = b$$

•  $\sqrt{36} = 6$ , porque  $6^2 = 36$

•  $\sqrt[3]{27} = 3$ , porque  $3^3 = 27$

### LEY DE SIGNOS

• impar  $\sqrt{+} = +$                        $\sqrt{243} = 3$

• impar  $\sqrt{-} = -$                        $\sqrt[3]{-125} = -5$

• par  $\sqrt{+} = +$                        $\sqrt[4]{16} = 2$

### 1. Exponente de fracciones

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

Ejemplos:

•  $\sqrt[5]{x^{10}} = x^{\frac{10}{5}} = x^2$

•  $8^{\frac{1}{3}} = \sqrt[3]{8} = 2$

•  $a^{\frac{2}{3}} = \sqrt[3]{a^2}$

•  $25^{\frac{1}{2}} = \sqrt{25} = 2$

### 2. Raíz de un producto

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

Ejemplos:

•  $\sqrt[5]{x^{30} y^{20}} = \sqrt[5]{x^{30}} \cdot \sqrt[5]{y^{20}} = x^6 y^4$

•  $\sqrt[4]{16 \cdot 81} = \sqrt[4]{16} \cdot \sqrt[4]{81} = 2 \cdot 3 = 6$

•  $\sqrt{32} = \sqrt{16 \cdot 2} = \sqrt{16} \cdot \sqrt{2} = 4\sqrt{2}$

•  $\sqrt{17} \cdot \sqrt{2} = \sqrt{17 \cdot 2} = \sqrt{34}$

•  $\sqrt[3]{x} \cdot \sqrt[3]{x^7} \cdot \sqrt[3]{x^4} = \sqrt[3]{x^1 \cdot x^7 \cdot x^4} = \sqrt[3]{x^{12}} = x^4$

### 3. Raíz de raíz

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

Ejemplos:

•  $\sqrt{\sqrt{x^{12}}} = \sqrt[2 \cdot 2]{x^{12}} = \sqrt[4]{x^{12}} = x^3$

•  $\sqrt[3]{\sqrt{x^{12}}} = \sqrt[3 \cdot 2]{x^{12}} = \sqrt[6]{x^{12}} = x^2$

•  $\sqrt[4]{\sqrt{a^{16} \cdot b^{40}}} = \sqrt[4 \cdot 2]{a^{16} b^{40}} = \sqrt[8]{a^{16} b^{40}} = a^2 b^5$

### 4. Raíz de un cociente

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

Ejemplo:

•  $\sqrt{\frac{81}{144}} = \frac{\sqrt{81}}{\sqrt{144}} = \frac{9}{12} = \frac{3}{4}$

•  $\sqrt[3]{\frac{a^{12}}{b^9}} = \frac{\sqrt[3]{a^{12}}}{\sqrt[3]{b^9}} = \frac{a^4}{b^3}$

•  $\sqrt[5]{\frac{160}{5}} = \sqrt[5]{\frac{160}{5}} = \sqrt[5]{32} = 2$

## • Trabajando en Clase

### Integral

1. Calcula:

$$F = \sqrt[5]{-32} - \sqrt[4]{16} - \sqrt[3]{-64}$$

2. Calcula:

$$T = 8^{\frac{1}{3}} + 81^{\frac{1}{4}} - 25^{\frac{1}{2}}$$

3. Reduce:

$$E = \sqrt[3]{x^5} \cdot \sqrt[5]{x^7} \cdot \sqrt[3]{x^4} \cdot \sqrt[5]{x^8}$$

### PUCP

4. Calcula:

$$M = \sqrt{8} + \sqrt{50} - \sqrt{18}$$

Resolución:

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

$$\sqrt{50} = \sqrt{25 \cdot 2} = \sqrt{25} \cdot \sqrt{2} = 5\sqrt{2}$$

$$\sqrt{18} = \sqrt{9 \cdot 2} = \sqrt{9} \cdot \sqrt{2} = 3\sqrt{2}$$

$$M = 2\sqrt{2} + 5\sqrt{2} - 3\sqrt{2}$$

$$M = 7\sqrt{2} - 3\sqrt{2}$$

$$M = 4\sqrt{2}$$

5. Calcula:

$$M = \sqrt{27} + \sqrt{12} - \sqrt{75}$$

6. Reduce:

$$B = \sqrt[3]{\sqrt[4]{x^7}} \cdot \sqrt[12]{\sqrt{x^{14}}} \cdot \sqrt[6]{\sqrt[4]{x^{-2}}}$$

7. Calcula:

$$N = \sqrt[5]{\frac{32}{243}} - \sqrt[4]{\frac{625}{81}} - \sqrt[3]{\frac{64}{27}}$$

### UNMSM

8. Calcula:

$$A = 64^{3^{-1}} + 81^{4^{-1}} - 32^{5^{-1}}$$

Resolución:

$$3^{-1} = \frac{1}{3}$$

$$4^{-1} = \frac{1}{4}$$

$$5^{-1} = \frac{1}{5}$$

$$A = 64^{\frac{1}{3}} + 81^{\frac{1}{4}} - 32^{\frac{1}{5}}$$

$$A = \sqrt[3]{64} + \sqrt[4]{81} - \sqrt[5]{32}$$

$$A = 4 + 3 - 2$$

$$A = 5$$

9. Calcula:

$$M = 8^{3^{-1}} + 49^{2^{-1}} - 64^{6^{-1}}$$

10. Calcula:

$$N = \frac{\sqrt[6]{128}}{\sqrt[6]{2}} - \frac{\sqrt[4]{64}}{\sqrt[4]{4}} - \frac{\sqrt{27}}{\sqrt{3}}$$

11. Calcula:

$$A = \sqrt[3]{9} \cdot \sqrt[3]{3} + \sqrt[5]{8} \cdot \sqrt[5]{4}$$

### UNI

12. Reduce:

$$P = \sqrt[4]{81x^8y^{16}} + \sqrt{36x^4y^8}$$

Resolución:

$$P = \sqrt[4]{81x^8y^{16}} + \sqrt{36x^4y^8}$$

$$P = \sqrt[4]{81} \sqrt[4]{x^8} \sqrt[4]{y^{16}} + \sqrt{36} \sqrt{x^4} \sqrt{y^8}$$

$$P = 3x^2y^4 + 6x^2y^4$$

$$P = 9x^2y^4$$

13. Reduce:

$$Q = \sqrt[5]{32x^{10}} + \sqrt[4]{81x^8}$$

14. Calcula:

$$S = \left(\frac{1}{16}\right)^{-\frac{1}{4}} - 5^2 + 1^3$$