

**GUÍA Nº 10**  
**POTENCIAS, RAICES Y LOGARITMOS**

I. Calcular:

$$1. \frac{2^{-3} \cdot 5^{-1}}{-2^4 \cdot \left(\frac{1}{2}\right)^{-2}} \quad \text{R: } -\frac{1}{2^8}$$

$$2. \frac{3^2 + 4^2}{5^{-1}}$$

$$3. \frac{5 \cdot 3^{-1} + (-4)^2}{2^{-2} + 2^3} \quad \text{R: } \frac{212}{99}$$

$$4. \frac{2^3 \cdot 2^{-3}}{\left(\frac{1}{3}\right)^{-2} \cdot \left(\frac{2}{3}\right)^2}$$

$$5. \frac{75^{10} \cdot 24^{16} \cdot 18^{22}}{36^{24} \cdot 10^{20} \cdot 9^{11}} \quad \text{R: } 4$$

$$6. \left\{ \frac{(15)^5 \cdot 48 \cdot (14)^3}{(35)^3 \cdot 6^4 \cdot (30)^2} \right\}^2$$

$$7. \frac{(-2)^{-2} - (2)^{-3}}{(-2)^{-3} - (2)^{-2}} - \left(\frac{3}{2}\right)^{-1} \quad \text{R: } 4$$

$$8. \left\{ \frac{(15)^5 \cdot 48 \cdot (14)^3}{(35)^3 \cdot 6^4 \cdot (30)^2} \right\}^2$$

$$9. \left[ \left(-\frac{3}{2}\right)^{-2} - \left(-\frac{3}{2}\right)^{-3} - 6^{-1} - (-6)^{-3} \right]^{\frac{2}{3}} \quad \text{R: } \frac{36}{25}$$

$$10. \frac{\frac{1}{3} + \left[ \frac{0,4}{\frac{5}{2}} - 2 \cdot \left( \frac{3}{2} + 4 \cdot \frac{5}{8} \right) \right]}{\frac{2}{5} - 1}$$

$$11. \frac{0,8 \cdot \left(\frac{4}{5} \cdot 1,25\right)}{0,64 - \frac{1}{25}} + \frac{\left(1,08 - \frac{3}{25}\right) \cdot \frac{4}{7}}{\left(6\frac{5}{9} - 3\frac{1}{4}\right) \cdot 2\frac{2}{17}} + \left(1,2 \cdot \frac{1}{2}\right) \cdot \frac{4}{5}$$

II. Sabiendo que:

1. Si :  $2^x = 3$  , calcular :  $E = 4^x + 8^x + 16^x$

2. Si:  $2^n = 3$  , hallar :  $E = 8^{n+1}$

3. Si:  $A = \left[ \left(\frac{1}{3}\right)^{-3} + \left(\frac{16}{121}\right)^{\frac{1}{2}} + \left(\frac{2}{5}\right)^{-2} \right]^{2^{-1}}$  . Entonces el valor de :  $\left(\frac{2A-5}{A+1}\right)^{\frac{1}{3}}$  ;

es :

4. Si :  $3^{-n} = 4^{-1}$  , entonces  $9^{2n}$  es igual a :

5. Si :  $5^x = 7^y$  , calcular el valor de :  $\frac{5^{x+3} - 7^{y+2}}{7^{y+1} - 5^{x+1}}$

6. Siendo :  $A = \frac{x^{-3}}{x^{-6}} \cdot \left[\frac{x^{-6}}{x^{-3}}\right]^2$  ; Efectúe :  $B = \frac{A^{-3}}{A^{-6}} \cdot \left[\frac{A^{-6}}{A^{-3}}\right]^2$

III. Calcular:

1.  $\sqrt{50} + \sqrt{72} + 2\sqrt{8} + \sqrt{32}$  R:  $19\sqrt{2}$

2.  $\sqrt{12} + \sqrt{75} + \sqrt{100} + 2\sqrt{27}$

3.  $\sqrt[3]{27} + \sqrt[3]{-8} + \sqrt[3]{1000}$  R: 11

4.  $\sqrt{9+16} + \sqrt{144+16}$

IV. Expresar en notación logarítmica

1.  $2^x = 5$  R:  $\log_2 5 = x$

2.  $3^x = 7$

3.  $6^x = 1$  R:  $\log_6 1 = x$

4.  $11^y = 2$

V. Expresar como potencias:

- |    |                      |                  |
|----|----------------------|------------------|
| 1. | $\log_p q = c$       | R: $p^c = q$     |
| 2. | $\log_a x = y$       |                  |
| 3. | $\log_2 a = 5$       | R: $2^5 = a$     |
| 4. | $\log_5 4 = a$       |                  |
| 5. | $\log_{10} 1000 = x$ | R: $10^x = 1000$ |
| 6. | $\log_{a+1} x = y$   |                  |
| 7. | $\log_2 8 = 3$       | R: $2^3 = 8$     |
| 8. | $\log_{1/2} 16 = -4$ |                  |

VI. Calcular el valor de x:

- |    |                     |      |
|----|---------------------|------|
| 1. | $\log_2 x = 1$      | R: 2 |
| 2. | $\log_6 x = 3$      |      |
| 3. | $\log_{0,2} x = -1$ | R: 5 |
| 4. | $\log_x 121 = 2$    |      |
| 5. | $\log_x 16 = 4$     | R: 2 |
| 6. | $\log_x 1/9 = 2$    |      |
| 7. | $\log_2 32 = x$     | R: 5 |
| 8. | $\log_3 81 = x$     |      |
| 9. | $\log_4 16 = x$     | R: 2 |

VII. Si  $\log 2 = a$ ,  $\log 3 = b$  y  $\log 7 = c$  determine:

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|----|---------------------|----------------|
| 1. | $\log 8$            | R: $3a$        |
| 2. | $\log 9$            |                |
| 3. | $\log 5$            | R: $1 - a$     |
| 4. | $\log 54$           |                |
| 5. | $\log \frac{1}{6}$  | R: $-(a + b)$  |
| 6. | $\log \frac{1}{98}$ |                |
| 7. | $\log \frac{1}{36}$ | R: $-2(a + b)$ |