



# Materiales Educativos GRATIS

## ALGEBRA

## SEGUNDO

# REGLA DE LA CADENA DE LOGARITMOS

### 1. CAMBIO DE BASE

$$\text{Log}_a b = \frac{\text{Log}_N b}{\text{Log}_N a} \quad N > 0 \wedge N \neq 1$$

Cambiamos a base «N».

Ejemplos:

- ❖ Cambiar  $\text{Log}_{13} 5$  a base 7.

Resolución:

$$\text{Log}_3 5 = \frac{\text{Log}_7 5}{\text{Log}_7 3}$$

- ❖ Reducir:  $\frac{\text{Log}_{11} 7}{\text{Log}_{11} 13}$

$$\frac{\text{Log}_{11} 7}{\text{Log}_{11} 13} = \text{Log}_{13} 7$$

Observación:

$$\text{Log}_3 4 = \frac{\text{Log}_4 4}{\text{Log}_4 3} = \frac{1}{\text{Log}_4 3}$$

### 2. REGLA DE LA CADENA

$$\text{Log}_a b \cdot \text{Log}_b c \cdot \text{Log}_c d = \text{Log}_a d$$

$a > 0; a \neq 1; b > 0; b \neq 1; c > 0; c \neq 1; d > 0$

Ejemplo:

- ❖ Calcular  $x = \text{Log}_3 7 \cdot \text{Log}_7 11 \cdot \text{Log}_{11} 27$

Resolución:

$$x = \text{Log}_3 7 \cdot \text{Log}_7 11 \cdot \text{Log}_{11} 27 \Rightarrow x = \text{Log}_3 27$$

$$\Rightarrow x = 3$$

## Trabajando en clase

### Integral

1. Cambia a base 3 el  $\text{Log}_{15} 3$
2. Cambia a base 5 el  $\text{Log}_{12} 25$
3. Cambia a base 10 el  $\text{Log}_7 8$

### Católica

4. Calcular el equivalente de:

$$\frac{\text{Log}_9 4}{\text{Log}_9 5}$$

Resolución:

$$\frac{\text{Log}_9 4}{\text{Log}_9 5} = \text{Log}_5 4$$

5. Calcular el equivalente de

$$\frac{\text{Log}_5 8}{\text{Log}_5 3}$$

6. Calcular:

$$A = \text{Log}_2 17 \cdot \text{Log}_{17} 5 \cdot \text{Log}_5 4$$

7. Si:  $x = \text{Log}_2 7 \cdot \text{Log}_7 5 \cdot \text{Log}_5 8$ , calcular  $\text{Log}_x 27$

### UNMSM

8. Si:  $a = \text{Log}_3 5; b = \text{Log}_3 7$ , calcular  $\text{Log}_7 5$

Resolución:

$$\text{Log}_7 5 = \frac{\text{Log}_3 5}{\text{Log}_3 7} = \frac{a}{b}$$

9. Si:  $m = \text{Log}_9 7; n = \text{Log}_9 4$ , calcular  $\text{Log}_4 7$

10. Si:  $k = \text{Log}_7 3$ , calcular  $\text{Log}_5 7$

11. Si:  $x = \text{Log}_2 5 \cdot \text{Log}_5 8$

$$y = \text{Log}_7 17 \cdot \text{Log}_{17} 7$$

Calcular:  $\text{Log}_x y$

UNI

12. Si:  $a = \text{Log}_7 2$  y  $b = \text{Log}_7 3$   
Calcula  $\text{Log}_{14} 6$

Resolución:

$$\text{Log}_{14} 6 = \frac{\text{Log}_7 6}{\text{Log}_7 14} = \frac{\text{Log}_7 (3 \times 2)}{\text{Log}_7 (7 \times 2)} = \frac{\text{Log}_7 3 + \text{Log}_7 2}{\text{Log}_7 7 + \text{Log}_7 2}$$

$$\Rightarrow \frac{b + a}{1 + a}$$

13. Si:  $m = \text{Log}_9 5$  y  $n = \text{Log}_9 7$

Calcula:  $\text{Log}_{45} 35$

14. Si:  $x = \text{Log}_{\sqrt{5}} 6 \cdot \text{Log}_2 \sqrt{5} \cdot \text{Log}_6 16 \cdot \text{Log}_{\sqrt{5}} \sqrt{3}$

Calcula:  $\text{Log}_x 256$