



# Materiales Educativos GRATIS

## ALGEBRA

## SEGUNDO

# LOGARITMO DE UN PRODUCTO Y DE UN COCIENTE

Si  $x > 0$ ;  $y > 0$ ;  $a \in \mathbb{R}^+ - \{1\}$  se cumple lo siguiente:

### 1. LOGARITMO DE UN PRODUCTO

$$\text{Log}_a(x \cdot y) = \text{Log}_a x + \text{Log}_a y$$

Ejemplos:

- ❖  $\text{Log}_2 35 = \text{Log}_2(5 \times 7) = \text{Log}_2 5 + \text{Log}_2 7$
- ❖  $\text{Log}_{27} 3 + \text{Log}_{27} 9 = \text{Log}_{27}(3 \times 9) = \text{Log}_{27} 27 = 1$

### 2. LOGARITMO DE UN COCIENTE

$$\text{Log}_a\left(\frac{x}{y}\right) = \text{Log}_a x - \text{Log}_a y$$

Ejemplos:

- ❖  $\text{Log}_3\left(\frac{4}{7}\right) = \text{Log}_3 4 - \text{Log}_3 7$
- ❖  $\text{Log}_4 28 - \text{Log}_4 7 \Rightarrow \text{Log}_4\left(\frac{28}{7}\right) \Rightarrow \text{Log}_4 4 = 1$

## Trabajando en clase

### Integral

1. Determina el equivalente del siguiente logaritmo

$$A = \text{Log}_{11} 33$$

2. Determina el equivalente del siguiente logaritmo

$$B = \text{Log}_4\left(\frac{9}{4}\right)$$

3. Calcula:

$$A = \text{Log}_{28} 7 + \text{Log}_{28} 4$$

### Católica

4. Si:  $\text{Log}_7 2 = a$ ,  
 $\text{Log}_7 3 = b$ ;  $\text{Log}_7 5 = c$

$$\text{Calcular: } \text{Log}_7\left(\frac{6}{5}\right)$$

Resolución:

$$\text{Log}_7\left(\frac{6}{5}\right) = \text{Log}_7 6 - \text{Log}_7 5$$

$$\Rightarrow \text{Log}_7(3 \times 2) - \text{Log}_7 5$$

$$\Rightarrow \text{Log}_7 3 + \text{Log}_7 2 - \text{Log}_7 5$$

$$\Rightarrow b + a - c$$

5. Si:  $\text{Log}_5 3 = m$ ,  $\text{Log}_5 7 = n$

$$\text{Log}_5 11 = p$$

$$\text{Calcular: } \text{Log}_5\left(\frac{21}{11}\right)$$

6. Calcular:

$$E = \text{Log}_2 20 - \text{Log}_2 5$$

7. Si:  $\text{Log} 2 = x$ ;  $\text{Log} 3 = y$

$$\text{Log} 5 = z \quad \text{Calcula: } \text{Log} 30$$

### UNMSM

8. Calcula:

$$E = \text{Log}_5 15 + \text{Log}_5 2 - \text{Log}_5 6$$

Resolución:

$$E = \text{Log}_5 15 + \text{Log}_5 2 - \text{Log}_5 6$$

$$E = \text{Log}_5\left(\frac{15 \times 2}{6}\right) \Rightarrow E = \text{Log}_5\left(\frac{30}{6}\right)$$

$$E = \text{Log}_5 5 \Rightarrow E = 1$$

9. Calcula:

$$F = \text{Log} 25 + \text{Log} 8 - \text{Log} 2$$

10. Calcula:

$$\text{Log}_3\left(\frac{8}{3}\right) + \text{Log}_3\left(\frac{27}{8}\right)$$

11. Si:

$$A = \text{Log}_7 35 - \text{Log}_7 5$$

$$B = \text{Log}_9 3 + \text{Log}_9 27$$

Calcular:  $B^A$

### UNI

12. Si:

$$\text{Log}2 = a; \text{Log}3 = b$$

Hallar el valor de  $\text{Log}30$

**Resolución:**

$$\text{Log}30 = \text{Log}(2 \times 3 \times 5) = \text{Log}2 + \text{Log}3 + \text{Log}5$$

Pero:

$$\text{Log}5 = \text{Log}\left(\frac{10}{2}\right) = \text{Log}10 - \text{Log}2$$

Entonces:

$$\text{Log}30 = \text{Log}2 + \text{Log}3 + \text{Log}10 - \text{Log}2$$

$$= a + b + 1 - a$$

$$\text{Log}30 = b + 1$$

13. Si:

$$\text{Log}2 = m; \text{Log}7 = n$$

Hallar el valor de  $\text{Log}70$

14. Calcular:

$$\frac{1}{3} \left[ \text{Log}_{\frac{2}{3}} 4 + \text{Log}_{\frac{2}{3}} 2 - \text{Log}_{\frac{2}{3}} 27 \right]$$