



ALGEBRA

5th
SECONDARY

Asesoría tomo VIII



 **SACO OLIVEROS**



PROBLEMA 1

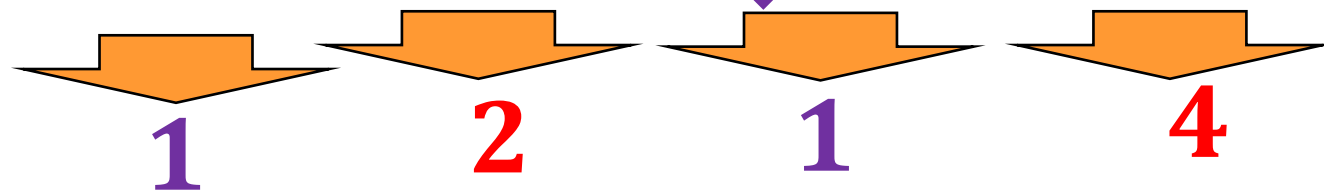
$$P = \{(6; 1), (2; 2), (7; 1), (15; 4)\}$$

$$Q = \{(0; 9), (1; 4), (2; 8), (3; 5)\}$$

¿ P y Q son inyectivas?

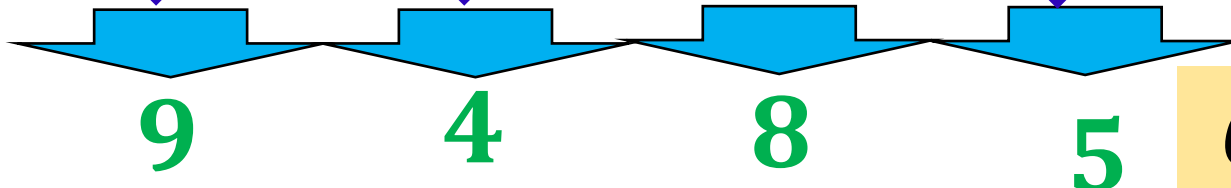
Resolución

$$P = \{(\cancel{6}; 1), (\cancel{2}; 2), (\cancel{7}; 1), (\cancel{15}; 4)\}$$



P **no** es
inyectiva

$$Q = \{(\cancel{0}; 9), (\cancel{1}; 4), (\cancel{2}; 8), (\cancel{3}; 5)\}$$



Q es inyectiva:

PROBLEMA 2 Sean las funciones

$$F = \{(\cancel{1; 1}), (2; 3), (0; 4), (3; 5), (4; 0)\}$$

$$G = \{(2; 3), (3; 1), (4; 1), (0; 2), (\cancel{5; 5})\}$$

Determine la suma de elementos del Rango de F/G

El Dominio de F/G

$$\text{Dom } F = \{1; 2; 0; 3; 4\}$$

$$\text{Dom } G = \{2; 3; 4; 0; 5\}$$

$$\text{Dom } F/G = \{0; 2; 3; 4\}$$

Para el Álgebra de funciones:

$$F = \{(0; 4), (2; 3), (3; 5), (4; 0)\}$$

$$G = \{(0; 2), (2; 3), (3; 1), (4; 1)\}$$

$$F/G = \{(0; 2), (2; 1), (3; 5), (4; 0)\}$$

El Rango de F/G :

$$\text{Ran } F/G = \{2; 1; 5; 0\}$$

Suma de elementos

$$= 2 + 1 + 5 + 0 = 8$$

PROBLEMA 3 Determine el valor de m, en:

$$f = \{(-3; 2), (0; 0), (2; 4), (3; 8), (4; 3)\}$$
$$g = \{(2; 1), (3; 4), (4; 0), (6; 2)\}. \text{ Si: } f/g(m)=2$$

Hallamos el Dominio

$$\text{Dom } f = \{-3; 0; 2; 3; 4\}$$

$$\text{Dom } g = \{2; 3; 4; 6\}$$

$$\text{Dom } f/g = \{2; 3; \cancel{4}\}$$

El Algebra de funciones

$$f = \{(2; \boxed{4}), (3; \boxed{8}), (4; \boxed{3})\}$$
$$g = \{(2; \boxed{1}), (3; \boxed{4}), (4; \boxed{0})\}.$$

Tenemos:

$$f/g(2) = 4$$

$$f/g(3) = 2$$

$$f/g(m) = 2$$

$$\therefore m = 3$$



PROBLEMA 4

$$\text{Si } x = \log_9(\log_4(\log_2 16))$$

Halle el valor de: $M = 5^{1+2x}$

Resolución

Recuerda!

$$\log_b(b^x) = x$$

$$\log_b b = 1$$

$$\log_2 16 = \log_2(2^4) = 4$$

$$x = \log_9(\log_4 4)$$

$$\log_4 4 = 1$$

$$x = \log_9 1 \rightarrow x = 0$$

$$\rightarrow M = 5^{1+2(0)}$$

$$\therefore M = 5$$

PROBLEMA 5 Halle la suma de raíces,
en : $\log_2 x - \log_x 256 - 6 = 0$

Resolución

Cambio de
variable

$$x = 2^m$$

$$\log_2(2^m) + \log_{(2^m)} 2^8 - 6 = 0$$
$$\underbrace{m + \frac{8}{m} - 6 = 0}_{\text{por "m"}}$$

$$\log_2(2^x) = x$$

$$\log_{(2^y)}(2^x) = \frac{x}{y}$$

$$m^2 - 6m + 8 = 0$$

$$\begin{array}{l} m \\ m \end{array} \quad \begin{array}{l} -4 = 0 \\ -2 = 0 \end{array}$$

m	$x = 2^m$
4	$2^4 = 16$
2	$2^2 = 4$

Suma de raíces:

$$16 + 4 = 20$$

PROBLEMA 6 Determine la menor solución de la ecuación: $100^x - 14 \cdot 10^x + 40 = 0$

$$100^x - 14 \cdot 10^x + 40 = 0$$

$$\begin{array}{rcl} 10^x & -10 & = -10 \cdot 10^x \\ 10^x & -4 & = -4 \cdot 10^x \\ & & \hline & & -14 \cdot 10^x \end{array}$$

$$\begin{array}{l|l} 10^x = 10 & 10^x = 4 \\ x = 1 & \log 10^x = 4 \log \end{array} \quad \begin{array}{l} x = 2 \log 2 \\ x = 2(0,301) = 0,602 \\ \therefore \text{(Menor solución)} \\ x = 0,602 \end{array}$$

PROBLEMA 7 A qué es igual:



$$P = \frac{1}{1 + \log_a(bc)} + \frac{1}{1 + \log_b(ac)} + \frac{1}{1 + \log_c(ab)}$$

$$1 = \log_x x$$

$$\frac{1}{\log_y x} = \log_x y$$

Resolución

$$\begin{aligned} P &= \frac{1}{\log_a a + \log_a(bc)} + \frac{1}{\log_b b + \log_b(ac)} + \frac{1}{\log_c c + \log_c(ab)} \\ &= \frac{1}{\log_a(abc)} + \frac{1}{\log_b(abc)} + \frac{1}{\log_c(abc)} \\ &= \log_{(abc)} a + \log_{(abc)} b + \log_{(abc)} c \\ &= \log_{(abc)} (abc) \end{aligned} \longrightarrow P = 1$$

PROBLEMA 8 Halle el valor de:

$$\log_m \left[\text{antilog}_m^4 \left[\log_m^2 (\text{antilog}_m^5 2) \right] \right],$$

siendo: $m > 1$

Resolución

$$\log_m [\text{antilog}_m^4 [\log_m^2 m^{10}]]$$

$$= \log_m [\text{antilog}_m^4 5]$$

$$= \log_m m^{20}$$



∴20



PROBLEMA 9 Halle el valor de “x”, en:

$$\text{antilog}_3 \left[\text{colog}_3 \left(\frac{2}{x} \right) \right] = \text{antilog}_2 3$$

Resolución

$$\text{antilog}_3 \left[-\log_3 \left(\frac{2}{x} \right) \right] = 8$$

$$\text{antilog}_3 \left[\log_3 \left(\frac{x}{2} \right) \right] = 8$$

$$\frac{x}{2} = 8 \quad \longrightarrow \quad \boxed{x = 16}$$

PROBLEMA 10 Sabiendo que: $\log 3 = a$; $\log 7 = b$
Determine: $\log_{63} 0,7$



Resolución

Usamos el Cambio de Base:

$$\log_{63} 0,7 = \frac{\log 0,7}{\log 63} = \frac{\log\left(\frac{7}{10}\right)}{\log(3 \cdot 3 \cdot 7)} =$$

$$\frac{\log 7 - \log 10}{\log 3 + \log 3 + \log 7} = \boxed{\frac{b - 1}{2a + b}}$$

$$\therefore \boxed{\frac{b-1}{2a+b}}$$