ALGEBRA

5th
SECONDARY

Asesoría tomo VIII

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PROBLEMA 1

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

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

$$¿PyG\ son\ inyectivas?$$

Resolución

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

1 2 1 4

P no es inyectiva

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

9 4 8 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

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

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

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

Para el Álgebra de funciones:

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

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

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

El Rango de F/G:

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

$Suma\ de\ elementos = 2 + 1 + 5 + 0 = 8$

PROBLEMA 3 Determine el valor de m, en:

$$f=\{(\cancel{-3;2}),(\cancel{0;0}),(2;4),(3;8),(4;3)\}$$

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

Hallamos el Dominio

$$Dom\ f=\{-3;0;2;3;4\}$$
$$Dom\ g=\{2;3;4;6\}$$

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

El Algebra de funciones

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

$$f/g=\{(2;\ \ ),(3;\ \ ),\cancel{(4;\ \ )}\}$$

Tenemos:

$$f/g(2)=4$$
$$f/g(3)=2$$

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

$$\therefore m=3$$

PROBLEMA 4

Si $x = log_9(log_4(log_2 16))$

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

Resolución

Recuerda!

$$\boxed{\log_b(b^x) = x}$$

$$\boxed{\log_b b = 1}$$

$$\boxed{\log_2 16 = \log_2(2^4) = 4}$$

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

$$\boxed{\log_4 4 = 1}$$

$$x = \log_9 1 \Rightarrow x = 0$$

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

$$\boxed{\therefore M = 5}$$

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

$\log_2(2^x) = x$

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

Resolución

Cambio de variable

$\boxed{x = 2^m}$

$\log_2(2^m) + \log_{(2^m)} 2^8 - 6 = 0$

$$\underbrace{m + \frac{8}{m} - 6 = 0}_{por\ "m"}$$

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

$m \qquad -4 = 0$

$m \qquad -2 = 0$

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

Suma de raices: $16 + 4 = 20$

PROBLEMA 6 Determine la menor solución de la ecuación: $100^x - 14.10^x + 40 = 0$

$$100^x - 14.10^x + 40 = 0$$

$$\begin{array}{lll} 10^x & -10 & = -10.10^x \\ 10^x & -4 & = \underline{-4.10^x} \\ & & -14.10^x \end{array}$$

$10^x = 10$

$x = 1$

$10^x = 4$

$log\,10^x = 4log$

$x = 2\log 2$

$x = 2(0{,}301) = 0,602$

$\therefore$ (*Menor solución*)

$x = 0,602$

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

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

$$= \frac{1}{log_a(abc)} + \frac{1}{log_b(abc)} + \frac{1}{log_c(abc)}$$

$$= log_{(abc)} a + log_{(abc)} b + log_{(abc)} c$$

$$= log_{(abc)} (abc) \longrightarrow \boxed{P = 1}$$

***PROBLEMA* 8** **Halle el valor de:**

$$\log_m\left[antilog_{m^4}\left[\log_{m^2}\left(antilog_{m^5} 2\right)\right]\right],$$

$$siendo: m > 1$$

Resolución

$$\log_m[antilog_{m^4}[\log_{m^2} m^{10}]]$$

$$= \log_m[antilog_{m^4} 5]$$

$$= \log_m m^{20} \rightarrow \boxed{\therefore 20}$$

PROBLEMA 9 Halle el valor de “x”, en:

$$antilog_3\left[colog_3\left(\frac{2}{x}\right)\right] = antilog_2 3$$

Resolución

$$antilog_3\left[-\log_3\left(\frac{2}{x}\right)\right] = 8$$

$$antilog_3\left[\log_3\left(\frac{x}{2}\right)\right] = 8$$

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

***PROBLEMA* 10** Sabiendo que: $\log 3 = a$; $\log 7 = b$

Determine: $\log_{63} 0,7$

Resolución

Usamos el Cambio de Base:

$$\log_{63} 0,7 = \frac{\log 0,7}{\log 63} = \frac{\log\left(\frac{7}{10}\right)}{\log(3.3.7)} =$$

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

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