2DA CLASE

EJERCICIOS DE APLICACIÓN

1. Efectuar:

$$M = \frac{\overbrace{\sqrt[3]{x}\,.\,\sqrt[3]{x}\,.\,\sqrt[3]{x}\ldots\sqrt[3]{x}}^{45\ factores}}{\sqrt{\underbrace{\sqrt{x}\,.\sqrt{x}\,.\sqrt{x}\ldots.\sqrt{x}}_{44\ factores}}} \div \frac{x^{-3}}{x^{-1}}$$

Resolución

$$M = \frac{(\sqrt[3]{x})^{45}}{\sqrt{(\sqrt{x})^{44}}}\left(\frac{x^{-1}}{x^{-3}}\right) = \frac{x^{15}}{\sqrt{x^{22}}}\;(x^{2})$$

$$M = \frac{x^{17}}{x^{11}} \qquad \therefore M = x^{6}$$

2. Reducir:

$$E = \frac{\sqrt[6]{2}.\sqrt[3]{2}.\sqrt[4]{2}}{\sqrt[5]{2}.\sqrt[20]{2}}$$

Resolución

Calculamos: MCM(6;3:4;5;20)= **60**

$$E = \frac{\sqrt[6(10)]{2^{(10)}}.\ \sqrt[3(20)]{2^{(20)}}.\ \sqrt[4(15)]{2^{(15)}}}{\sqrt[5(12)]{2^{(12)}}.\ \sqrt[20(3)]{2^{(3)}}}$$

$$E = \sqrt[60]{\frac{2^{10}.2^{20}.2^{15}}{2^{12}.2^{3}}} = \sqrt[(2)(\cancel{30})]{2^{\cancel{30}}}$$

$$E = \sqrt{2}$$

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3. Reducir:

$$M=\frac{\sqrt[5]{x^{2}\sqrt[3]{x^{4}\sqrt{x^{7}}}}}{\sqrt[3]{\dfrac{\sqrt[4]{\dfrac{\sqrt[5]{\dfrac{1}{x^{6}}}}{x}}}{x^{2}}}}$$

Resolución

$$M=\frac{\sqrt[5]{x^{2}\sqrt[3]{x^{4}\sqrt[2]{x^{7}}}}}{\sqrt[3]{x^{-2}\sqrt[4]{x^{-1}\sqrt[5]{x^{-6}}}}}$$

$$M=\frac{\sqrt[(2)30]{x^{27(2)}}}{\sqrt[60]{x^{-51}}}$$

$$M=\sqrt[60]{x^{54+51}}$$

$$M=\sqrt[(15)(4)]{x^{(15)(7)}}$$

$$\therefore M=\sqrt[4]{x^{7}}$$

4. Si: $x^{-3^{3^{-x}}}=3$

Hallar: $G=\sqrt[x]{x}$

Resolución

$$x=3^{-\left(\frac{1}{3}\right)^{3^{-x}}}$$

$$x=\left(\frac{1}{3}\right)^{\left(\frac{1}{3}\right)^{\left(\frac{1}{3}\right)^{x}}}$$

Por corolario

$$\boxed{\text{Si: } x^{x^{\cdot^{\cdot^{\cdot^{x^{n}}}}}}=n \Rightarrow x=\sqrt[n]{n}}$$

$$\frac{1}{3}=\sqrt[x]{x} \longrightarrow G=\frac{1}{3}$$

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5. Si se cumple:

$2^x + 2^{x-1} + 2^{x-2} + 2^{x-3} + 2^{x-4} + 2^{x-5} = 504$

Hallar: $x^2 + 1$

Resolución

$$2^{x-5}\underbrace{(2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0)} = 504$$

$$2^{x-5}\,(\cancel{2^6 - 1}) = (\cancel{63})(8)$$

$$\cancel{2}^{x-5} = \cancel{2}^3 \quad \longrightarrow \quad X = 8$$

$$\therefore\ 8^2 + 1 = 65$$

6. Calcular el valor de: $E = \sqrt{x^2 + 5}$

si "x" verifica: $3^{4^{2^x}} = 81^{2^6}$

Resolución

$$\cancel{3}^{4^{2^x}} = \cancel{3}^{4(2^6)}$$

$$2^{2(2^x)} = 2^{2(2^6)}$$

$$2^{2^{1+x}} = 2^8$$

X = 2

Nos piden:

$$E = \sqrt{2^2 + 5} \quad \longrightarrow \quad \therefore\ E = 3$$

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7. Resolver: $x^{x^{18}} = \sqrt[6]{3}$

Resolución

Aplicamos el teorema:

$$\boxed{x^x = a^a \rightarrow x = a}$$

Entonces:

$$x^{x^{18}(18)} = \sqrt[6]{3}^{\,18}$$

$$\left(x^{18}\right)^{x^{18}} = 3^3$$

$$\rightarrow \quad x^{18} = 3$$

$$\rightarrow \quad x = \sqrt[18]{3}$$

8. Hallar el valor de "x" en:

$$x^{1+x^{1+x^{1+x^{\cdot^{\cdot^{\cdot}}}}}} = \sqrt[3]{\frac{x^5}{\sqrt[3]{\frac{x^5}{\sqrt[3]{\frac{x^5}{\vdots}}}}}} = \theta$$

Resolución

$$\sqrt[3]{\frac{x^5}{\theta}} = \theta \rightarrow x^5 = \theta^3$$

$$\theta = x^{\frac{5}{3}}$$

$$x^{1+\theta} = \theta \rightarrow 1 + \theta = 5/3$$

$$\boxed{\theta = 2/3}$$

Luego:

$$\frac{2}{3} = x^{\frac{5}{3}} \rightarrow x = \sqrt[5]{\frac{8}{27}}$$