ALGEBRA

2th

Session II

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1. Indique el exponente final de x en:

$$M = \frac{\overbrace{x^5.x^5.x^5.........x^5}^{(2n+1)factores}}{\underbrace{x.x.x........x}_{(10n)factores}}$$

RECORDEMOS

$$b^n = \underbrace{b.b.b\ldots b}_{n\ veces}$$

$$(a^m)^n = a^{m.n}$$

RESOLUCIÓN

$$M = \frac{(x^5)^{2n+1}}{x^{10n}}$$

$$M = \frac{x^{\cancel{10n}+5}}{x^{\cancel{10n}}}$$

$$M = x^5$$

$$\boxed{\therefore 5}$$

2. Simplifique

$$A = \frac{3^{2m+3}+3^{2m+2}+3^{2m+1}}{3^{2m+1}}$$

RECORDEMOS

$$\boxed{a^{m+n} = a^m . a^n}$$

RESOLUCIÓN

$$A = \frac{3^{2m}.3^3 + 3^{2m}.3^2 + 3^{2m}.3^1}{3^{2m}.3^1} = \frac{\cancel{3^{2m}}(3^3 + 3^2 + 3^1)}{\cancel{3^{2m}}.3}$$

$$A = \frac{27+9+3}{3} = \frac{39}{3} = 13$$

$$\boxed{\therefore A = 13}$$

3. Reduce

$$S=\frac{(x^{-2^3}.x^{(-2)^2}.x^{-(-2)^5})^2}{x^{-3^2}.x^{(-2)^3}}$$

RECORDEMOS

$$\boxed{(a^m)^n = a^{m.n}}$$

$$\boxed{b^m.b^n = b^{m+n}}$$

RESOLUCIÓN

Efectuando en el numerador y denominador:

$$S=\frac{(x^{-8}.x^{4}.x^{32})^2}{x^{-9}.x^{-8}} = \frac{(x^{28})^2}{x^{-17}} = \frac{x^{56}}{x^{-17}} = x^{73}$$

$$\boxed{\therefore S = x^{73}}$$

4. Simplifique

$$U = \frac{8^{2n+1}.16^{n-2}}{32^{2n-1}}$$

RECORDEMOS

$$\boxed{(a^m)^n = a^{m.n}}$$

$$\boxed{b^m.b^n = b^{m+n}}$$

RESOLUCIÓN

Descomponiendo las bases:

$$U = \frac{(2^3)^{2n+1}.(2^4)^{n-2}}{(2^5)^{2n-1}} = \frac{2^{6n+3}.2^{4n-8}}{2^{10n-5}} = \frac{2^{\cancel{10n-5}}}{2^{\cancel{10n-5}}} = 1$$

$$\boxed{\therefore U = 1}$$

5. Efectúe

$$A = \sqrt{81x^{26}} + \sqrt[3]{125x^{39}}$$

RECORDEMOS

$$\boxed{\sqrt[n]{a^x . b^y} = \sqrt[n]{a^x} . \sqrt[n]{b^y}}$$

$$\boxed{\sqrt[n]{a^m} = a^{\frac{m}{n}}}$$

RESOLUCIÓN

$$A = \sqrt{81} . \sqrt{x^{26}} + \sqrt[3]{125} . \sqrt[3]{x^{39}}$$

$$A = 9 . x^{13} + 5 . x^{13}$$

$$\boxed{\therefore A = 14x^{13}}$$

6. Simplifique

$$S = \sqrt[\sqrt{3}]{\sqrt[\sqrt{5}]{\sqrt[\sqrt{3}]{\sqrt[\sqrt{5}]{2^{120}}}}}$$

RESOLUCIÓN

RECORDEMOS

$$\sqrt[m]{\sqrt[n]{\sqrt[p]{a}}} = \sqrt[mnp]{a}$$

$$\sqrt[n]{a^m} = a^{\frac{m}{n}}$$

$$S = \sqrt[\sqrt{3}.\sqrt{5}\sqrt{3}.\sqrt{5}]{2^{120}}$$

$$= \sqrt[3.5]{2^{120}}$$

$$= \sqrt[15]{2^{120}}$$

$$= 2^{\frac{120}{15}}$$

$$= 2^{8}$$

$$\boxed{\therefore S = 256}$$

7. Efectúe

$$R = \sqrt[3]{x^2 . \sqrt[4]{x^3 . \sqrt{x}}} \, . \sqrt[24]{x} \quad ; x \neq 0$$

RESOLUCIÓN

RECORDEMOS

Radicales Sucesivos. Regla practica

$$\sqrt[m]{x^a . \sqrt[n]{x^b . \sqrt[p]{x^c}}} = \sqrt[mnp]{x^{(an+b)p+c}}$$

$$R = \sqrt[3.4.2]{x^{(2.4+3)2+1}} \, . \sqrt[24]{x}$$

$$R = \sqrt[24]{x^{23}} . \sqrt[24]{x}$$

$$R = x^{\frac{23}{24}} . \, x^{\frac{1}{24}} = x^{\frac{23+1}{24}}$$

$$R = x^{\frac{24}{24}} = x^1$$

$$\boxed{\therefore \quad R = x}$$

8. Determine el valor de "x"

$$5^{x+4} + 5^{x+3} + 5^{+2} + 5^{x+1} = 780$$

RESOLUCIÓN

RECORDEMOS

$$\boxed{a^{m+n} = a^m . a^n}$$

$$5^x(5^4 + 5^3 + 5^2 + 5^1) = 780$$

$$5^x(625 + 125 + 25 + 5) = 780$$

$$5^x(780) = 780$$

$$5^x = \frac{780}{780}$$

$$5^x = 1$$

$$\boxed{\therefore x = 0}$$

9. Si el valor de "x" en la ecuación, representa la nota del examen de Álgebra de Paolo. ¿Cuál fue su nota?

$$5^{9^{x+1}} = 5^{3^{x+17}}$$

RESOLUCIÓN

RECORDEMOS

$$a^m = a^n \quad \Rightarrow \quad m = n$$

$$Considerando\ a > 0\ y\ a \neq 1$$

$$\cancel{5}^{9^{x+1}} = \cancel{5}^{3^{x+17}}$$

$$9^{x+1} = 3^{x+17}$$

$$(3^2)^{x+1} = 3^{x+17}$$

$$\cancel{3}^{2x+2} = \cancel{3}^{x+17}$$

$$2x + 2 = x + 17$$

$$x = 15$$

$$\boxed{\therefore\ La\ nota\ de\ Paolo\ fue\ 15}$$

10. Halle el valor de "x"

$$x^{x^{\frac{1}{5}}} = \frac{1}{5}$$

RESOLUCIÓN

RECORDEMOS

$$\boxed{(a^m)^n = (a^n)^m}$$

Elevando ambos miembros a la $\frac{1}{5}$

$$\left(x^{x^{\frac{1}{5}}}\right)^{\frac{1}{5}} = \left(\frac{1}{5}\right)^{\frac{1}{5}}$$

$$\left(x^{\frac{1}{5}}\right)^{x^{\frac{1}{5}}} = \left(\frac{1}{5}\right)^{\frac{1}{5}}$$

$$x^{\frac{1}{5}} = \frac{1}{5}$$

$$x = \left(\frac{1}{5}\right)^{5}$$

$$\boxed{\therefore\ x = \frac{1}{3125}}$$