

ALGEBRA



ASESORÍA







Obtenga el grado absoluto del término del lugar 12

$$P(x) = \left(x^5 + x^8\right)^{18}$$

Resolución

$$t_{12} = t_{11+1}$$
 $k = 11$ $n = 18$

$$t_{12} = C_{11}^{18} (x^5)^7 . (x^8)^{11}$$

$$t_{12} = C_{11}^{18} x^{35} . x^{88}$$

$$GA = 35 + 88$$

Recordar

$$(a+b)^n$$

$$(a+b)^n$$

$$\Rightarrow t_{k+1} = c_k^n a^{n-k} . b^k$$

RPTA: GA = **123**



Indique el término del lugar 6 en el desarrollo :

$$\mathbf{N}(x) = \left(x^3 + \frac{1}{x^2}\right)^{50}$$

<u>Resolución</u>

$$t_6 = t_{5+1}$$
 • $k = 5$ • $n = 50$

$$(a+b)^n$$

Recordar
$$(a+b)^n$$

$$t_{k+1} = c_k^n a^{n-k} . b^k$$

Entonces:

$$t_6 = C_5^{50} (x^3)^{45} \cdot \left(\frac{1}{x^2}\right)^5 = C_5^{50} x^{135} \cdot \left(\frac{1}{x^{10}}\right)$$



$$t_6 = C_5^{50} x^{125}$$



En la expansión $\left(a^4+b^4\right)^{3n}$ los términos del lugar n+6 y n+8 equidistan de los extremos. Determine el exponente de a en el término central

Resolución

$$t_{n+6} = t_{n+5+1} \implies \left\{ \bullet \quad k = n+5 \right\}$$

$$t_{n+6} = C_{n+5}^{3n} (a^4)^{3n-n-5} \cdot (b^4)^{n+5}$$

$$t_{n+8} = C_{n+7}^{3n}(a^4)^{3n-n-7} \cdot (b^4)^{n+7}$$

$$C_{n+5}^{3n} = C_{n+7}^{3n}$$

Se cumple:
$$n+5=n+7$$
 (F)

$$n+5+n+7=3n$$

$$2n+12=3n$$

$$12=n \qquad (a^4+b^4)^{36}$$

Como
$$n$$
 es par: $t_c = t_{\frac{n}{2}+1} = t_{18+1} = t_{19}$

$$t_{19} = t_{18+1} = c_{18}^{36} (a^4)^{18} (b^4)^{18}$$

piden exponente de a:
$$(a^4)^{18} = a^{72}$$



Sabiendo que:
$$z = \frac{(1+i)^2}{(1-i)^2} + 10\left(\frac{2+3i}{1-2i}\right)$$
Calcular $t = \frac{Im(z)+2}{Re(z)+1}$

Resolución

Recordar:

$$(1+i)^2=2i$$

$$(1-i)^2 = -2i$$

•
$$i^2 = -1$$

$$Z = \frac{2i}{-2i} + 10 \cdot \frac{(2+3i)}{1-2i} \cdot \frac{(1+2i)}{(1+2i)}$$

$$Z = -1 + 10 \frac{(2+4i+3i+6i^2)}{1+2^2}$$

$$Z = -1 + 10^{\frac{(-4+7i)}{1}}$$

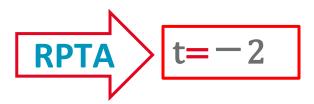
$$Z = -1 - 8 + 14i$$

$$Z = -9 + 14i$$

Reemplazando

$$t = \frac{14 + 2}{-9 + 1}$$

$$t = \frac{16}{-8}$$





De la Identidad: $(1+i)^2 + (1+i)^4 + (1+i)^8 \equiv a+bi$ Calcular $w = (a + b)^2$

Resolución

Recordar:

$$(1+i)^2=2i$$

$$(1+i)^2 = 2i$$
$$(1-i)^2 = -2i$$
$$i^2 = -1$$

$$i^2 = -1$$

$$(1+i)^{2} + [(1+i)^{2}]^{2} + [(1+i)^{2}]^{4} \equiv a+bi$$

$$2i + (2i)^{2} + (2i)^{4} \equiv a+bi$$

$$2i + 2^{2} \cdot i^{2} + 2^{4} \cdot i^{4}$$

$$2i + 4(-1) + 16(1) \equiv a+bi$$

$$12+2i \equiv a+bi$$

$$a = 12 \qquad b = 2$$

Piden
$$w = (12 + 2)^2 = 14^2 = 196$$





Sabiendo que:
$$\sqrt{A + Bi} = x + yi$$
, $Halle M = \frac{B^2}{y^2A + y^4}$

Resolución

ELEVANDO AL CUADRADO

$$(\sqrt{A} + Bi)^{2} = (x + y i)^{2}$$

$$A + Bi = x^{2} + 2xyi + (yi)^{2}$$

$$A + Bi = x^{2} - y^{2} + 2xyi$$

$$A = x^{2} - y^{2} \land B = 2xy$$
REMPLAZANDO $M = \frac{(2xy)^{2}}{v^{2}(A + v^{2})}$

$$M = \frac{4x^2y^2}{y^2(x^2 - y^2 + y^2)}$$

$$M = \frac{4x^2y^2}{x^2y^2} = 4$$

Rpta.
$$M=4$$



Halle el valor de x, si se cumple:

$$\frac{a+1}{x+b} - \frac{a-b}{a-x} = \frac{b+1}{x+b}$$

Resolución

$$\frac{a+1}{x+b} - \frac{b+1}{x+b} = \frac{a-b}{a-x}$$

$$\frac{a-b}{x+b} = \frac{a-b}{a-x}$$

$$a-x = x+b$$

$$a - b = 2x$$



$$\frac{a-b}{2}=x$$



Determine el valor de x en la ecuación

$$\mathbf{M} = \frac{x^2 + 14x + 50}{x^2 - 6x + 10} = \left(\frac{x - 3}{x + 7}\right)^{-2}$$

Resolución

$$M = \frac{x^2 + 14x + 50}{x^2 - 6x + 10} = \frac{(x+7)^2}{(x-3)^2}$$

$$M = \frac{x^2 + 14x + 50}{x^2 - 6x + 10} = \frac{x^2 + 14x + 49}{x^2 - 6x + 9}$$

$$m = x^2 + 14x + 49$$

$$n = x^2 - 6x + 9$$

$$\frac{m+1}{n+1} = \frac{m}{n}$$

$$m + n = mn + m$$

$$n = m$$

$$-6x + 9 = x^{2} + 14x + 49$$

$$-40 = 20x$$

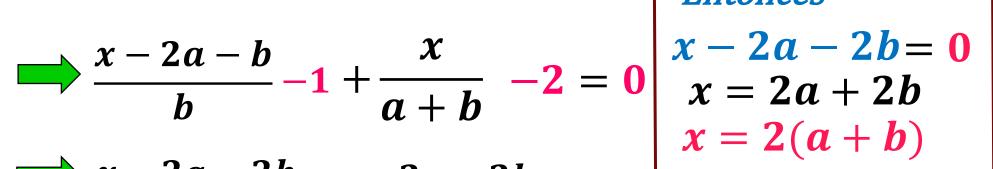
$$RPTA$$

$$-2 = x$$



Si x_0 es solución de la ecuación lineal $\frac{x-2a-b}{b} + \frac{x}{a+b} = 3$ Calcule el valor de $\frac{x_0}{a+b}$; considere $a; b \in \mathbb{R}^+$

Resolución



$$\frac{x - 2a - 2b}{b} + \frac{x - 2a - 2b}{a + b} = 0$$

$$(x - 2a - 2b) \left[\frac{1}{b} + \frac{1}{a + b} \right] = 0$$

Entonces

$$x - 2a - 2b = 0$$

$$x = 2a + 2b$$

$$x = 2(a + b)$$

$$x = x_0$$

$$x_0 = 2(a + b)$$

Piden:
$$\frac{x_0}{a+b}$$

|*Remplazando*

$$=\frac{2(a+b)}{a+b}$$



Rpta: 2



Paúl quiere regalar una laptop a su hija Anita para sus clases virtuales; si Paúl tiene ahorrado s/ 1000. ¿Cuánto dinero le falta? Sí la laptop cuesta 10x soles, donde x se obtiene al resolver

$$\sqrt[3]{14 + \sqrt{x}} + \sqrt[3]{14 - \sqrt{x}} = 4$$

Resolución

IDENTIDAD DE CAUCHY

$$(a+b)^3 = a^3 + b^3 + 3(a+b)(ab)$$

Elevando al cubo:

$$12(\sqrt[3]{14^2 - x}) = 36^{3}$$
$$(\sqrt[3]{14^2 - x}) = 3$$

Elevando al cubo:

$$14^2 - x = 27$$

$$196 - 27 = x$$

$$169 = x$$

Reemplazando:

$$laptop 10(169) = 1690$$

$$1690 - 1000 = 690$$

