ALGEBRA

5th

OF SECONDARY

ASESORÍA 2°MENSUAL

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1. Indicar un factor primo del polinomio:

$$m^2 - n^2 - 8m + 16$$

RESOLUCIÓN:

Agrupando convenientemente

$$\underbrace{m^2 - 8m + 16}_{(m-4)^2} - n^2$$

$$(m - 4)^2 - n^2$$

$$\underbrace{(m - 4 + n)}_{\text{FACTOR PRIMO}}\underbrace{(m - 4 - n)}_{\text{FACTOR PRIMO}}$$

RECORDAR :

- ✓ $a^2 - 2ab + b^2 = (a-b)^2$
- ✓ $a^2 - b^2 = (a+b)(a-b)$

∴ **Un factor primo es:**

$$(m + n - 4) \quad \vee \quad (m - n - 4)$$

2. Factorice: $m^6n^4 + 3m^4n^4 - 2m^5n^4 - 6m^3n^4$.

Luego, indique el número de factores primos.

RESOLUCIÓN:

Extraemos el factor común de cada término

$$m^3n^4[\underbrace{m^3 + 3m} \underbrace{- 2m^2 - 6}]$$

$$m^3n^4[m(m^2+3) - 2(m^2+3)]$$

$$\Rightarrow m^3n^4(m^2+3)(m-2)$$

FACTORES PRIMOS

- ✓ m
- ✓ n
- ✓ m^2+3
- ✓ $m-2$

$\therefore$ Número de factores primos: 4

3. Indique la suma de factores primos, luego de factorizar:

$$P(x) = x^6 - 7x^4 + 6x^3$$

RESOLUCIÓN:

$$P(x) = x^3 \boxed{(x^3 - 7x + 6)}$$

Por divisores binómicos :
$\mathrm{P.C} = \pm\{1; 2; 3; 6\}$
Si $x = 1 \Rightarrow 1^3 - 7(1) + 6 = 0$ **(CUMPLE)**

	1	0	−7	6
$x = 1$		1	1	−6
	1	1	−6	0

$$P(x) = x^3\ (x - 1)\ (x^2 + x - 6)$$

$$\begin{array}{cc} x & 3 \\ x & -2 \end{array}$$

$$P(x) = x^3\ (x - 1)\ (x + 3)\ (x - 2)$$

FACTORES PRIMOS
- ✓ x
- ✓ $x - 1$
- ✓ $x + 3$
- ✓ $x - 2$

$\therefore$ **Suma de factores primos: $4x$**

4. La suma de los factores primos resulta $ax + by + cz$

$$x^2 + 2xy + y^2 + 3xz + 3yz - 4z^2$$

Halle $a.b.c$

RESOLUCIÓN:

Por aspa doble

$$\boxed{-xz + 4xz = 3xz}$$

$$x^2 + 2xy + y^2 + 3xz + 3yz - 4z^2$$

x	y	$4z$
x	y	$-z$

$$\begin{array}{r} xy \\ + \; xy \\ \hline 2xy \end{array} \qquad \begin{array}{r} -yz \\ + \; 4yz \\ \hline 3yz \end{array}$$

$$(x + y + 4z)(x + y - z)$$

$$\sum F.P = x + y + 4z + x + y - z$$

$$\sum F.P = \underset{a}{2}x + \underset{b}{2}y + \underset{c}{3}z$$

$$\boxed{\therefore\ abc = 12}$$

5. **Efectúe:**

$$K = \frac{15}{\sqrt{7}+\sqrt{2}} + \frac{14}{\sqrt{7}} - \frac{10}{\sqrt{2}}$$

$$(\sqrt{7}+\sqrt{2})(\sqrt{7}-\sqrt{2}) = \sqrt{7}^2 - \sqrt{2}^2 = 5$$

RESOLUCIÓN:

Multiplicamos a cada término por su factor racionalizante

$$K = \underbrace{\frac{\cancel{15}}{\sqrt{7}+\sqrt{2}} \times \frac{\sqrt{7}-\sqrt{2}}{\sqrt{7}-\sqrt{2}}}_{\boxed{\cancel{5}}} + \underbrace{\frac{\cancel{14}}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}}}_{\boxed{\cancel{7}}} - \underbrace{\frac{\cancel{10}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}}_{\boxed{\cancel{2}}}$$

$$K = 3(\sqrt{7}-\sqrt{2}) + 2(\sqrt{7}) - 5(\sqrt{2})$$

$$K = 3\sqrt{7} - 3\sqrt{2} + 2\sqrt{7} - 5\sqrt{2}$$

$$\therefore K = 5\sqrt{7} - 8\sqrt{2}$$

6. Reduce la siguiente expresión:

$$R = \sqrt{15+\sqrt{216}} - \sqrt{14-6\sqrt{5}} - \sqrt{6}$$

RECORDAR:

Si $a > b$, entonces:

$$\sqrt{(a+b) \pm 2\sqrt{a.b}} = \sqrt{a} \pm \sqrt{b}$$

$$\boxed{\sqrt{216} = \sqrt{4}\sqrt{54} = 2\sqrt{54}}$$

$$\boxed{6\sqrt{5} = 2.3\sqrt{5} = 2\sqrt{9}\sqrt{5} = 2\sqrt{45}}$$

RESOLUCIÓN:

- $\sqrt{15+\sqrt{216}} = \sqrt{\underbrace{15}_{9+6} + 2\sqrt{\underbrace{54}_{9\times 6}}}$

$$= \sqrt{9} + \sqrt{6} = 3 + \sqrt{6}$$

- $\sqrt{14-6\sqrt{5}} = \sqrt{\underbrace{14}_{9+5} - 2\sqrt{\underbrace{45}_{9\times 5}}}$

$$= \sqrt{9} - \sqrt{5} = 3 - \sqrt{5}$$

Reemplazando en R :

$$R = 3 + \sqrt{6} - (3 - \sqrt{5}) - \sqrt{6}$$

$$R = \cancel{3} + \cancel{\sqrt{6}} - \cancel{3} + \sqrt{5} - \cancel{\sqrt{6}}$$

$$\boxed{\therefore\ R = \sqrt{5}}$$

7. Efectúe:

$$R=\frac{2\sqrt{6}}{\sqrt{2}+\sqrt{3}+\sqrt{5}}-\sqrt{2}-\sqrt{3}$$

$$(\sqrt{2}+\sqrt{3}+\sqrt{5})(\sqrt{2}+\sqrt{3}-\sqrt{5})$$
$$(\sqrt{2}+\sqrt{3})^2-\sqrt{5}^2$$
$$\sqrt{2}^2+2.\sqrt{2}.\sqrt{3}+\sqrt{3}^2-\sqrt{5}^2$$
$$5+2\sqrt{6}-5=2\sqrt{6}$$

RESOLUCIÓN:

$$R=\underbrace{\frac{\cancel{2\sqrt{6}}}{\sqrt{2}+\sqrt{3}+\sqrt{5}}\times\frac{\sqrt{2}+\sqrt{3}-\sqrt{5}}{\sqrt{2}+\sqrt{3}-\sqrt{5}}}_{\boxed{\cancel{2\sqrt{6}}}}-\sqrt{2}-\sqrt{3}$$

$$\Rightarrow\quad R=\cancel{\sqrt{2}}+\cancel{\sqrt{3}}-\sqrt{5}\ \cancel{-\sqrt{2}}\cancel{-\sqrt{3}}$$

$$\boxed{\therefore\ R=-\sqrt{5}}$$

8. Simplificar:

$$Q = \left(\frac{18! + 19! + 20!}{18! + 19!}\right) + \left(\frac{81!}{79! + 80!}\right)$$

RESOLUCIÓN:

POR PROPIEDADES:

$$Q = \frac{20^2 \cdot \cancel{18!}}{20 \cdot \cancel{18!}} + \frac{\cancel{81} \cdot 80 \cdot \cancel{79!}}{\cancel{81} \cdot \cancel{79!}}$$

$$Q = 20 + 80$$

$$Q = 100$$

RECORDAR :

$$\boxed{a! = a\,.(a-1)(a-2)!}$$

$$\boxed{a! + (a+1)! = (a+2)\,.\,a!}$$

$$\boxed{a! + (a+1)! + (a+2)! = (a+2)^2.\,a!}$$

$$\boxed{\therefore Q = 100}$$

9. Halle el valor de "x", en:

$$\frac{(x+1)!}{(x-2)!+(x-1)!}=5!$$

RESOLUCIÓN:

$$\frac{(x+1)!}{(x-2)!+(x-1)!}=5!$$

$$\frac{(x+1).\cancel{x}.(x-1)\cancel{(x-2)!}}{\cancel{x}\,.\,\cancel{(x-2)!}}=5!$$

RECORDAR :

$$\boxed{a!=a\,.(a-1)!}$$

$$\boxed{a!+(a+1)!=(a+2)\,.\,a!}$$

$$(x+1)\,(x-1)=120$$

$$\underline{(x+1)}\;\underline{(x-1)}=\underline{12}\times\underline{10}$$

$$\boxed{\therefore\ x=11}$$

10. Halle el valor de n y k en

$$C_9^{17} + 2C_{10}^{17} + C_{11}^{17}$$

Si es igual a C_k^n. Dé como respuesta el valor de $n + k$.

RESOLUCIÓN:

$$C_9^{17} + 2C_{10}^{17} + C_{11}^{17}$$

$$\underbrace{C_9^{17} + C_{10}^{17}}_{C_{10}^{18}} + \underbrace{C_{10}^{17} + C_{11}^{17}}_{C_{11}^{18}}$$

$$\underbrace{C_{10}^{18} + C_{11}^{18}}_{C_{11}^{19}}$$

$$C_{11}^{19} = C_8^{19}$$

$n = 19 \;\wedge\; k = 8 \quad \vee \quad n = 19 \;\wedge\; k = 11$

$$\boxed{\therefore\; n + k = 27 \;\vee\; n + k = 30}$$