3

a.	I	R_i	$\bar{R}_j$	X_A	X_B	X_C
I	I	R_i	$\bar{R}_j$	X_A	X_B	X_C
R_i	R_i	R_j	I	X_C	X_A	X_B
$\bar{R}_j$	$\bar{R}_j$	I	R_i	X_B	X_C	X_A
X_A	X_A	X_B	X_C	I	R_i	$\bar{R}_j$
X_B	X_B	X_C	X_A	$\bar{R}_j$	I	R_i
X_C	X_C	X_A	X_B	R_i	$\bar{R}_j$	I

b

- Es cerrado bajo la operación ✓
- Es asociativo

$$R_i(R_j X_A) = (R_i R_j) X_A$$

$$R_i(X_B) = I X_A$$

$$X_A = X_A$$

- Existe el elemento neutro

$I(R_i) = R_i$, $I(X_A) = X_A$

- Existe inverso

$X_K(X_K) = I$

$R_i(\bar{R}_j) = I$

c.

$R_i = \{(A\alpha, B\beta, C\gamma), (A\beta, B\gamma, C\alpha), (A\gamma, B\alpha, C\beta)\}$

$\bar{R}_j = \{(A\alpha, B\beta, C\gamma), (A\gamma, B\alpha, C\beta), (A\beta, B\gamma, C\alpha\}$

$(I, X_A) = \{(A\alpha, B\beta, C\gamma), (A\alpha, B\gamma, C\beta)\}$

$(I, X_B) = \{(A\alpha, B\beta, C\gamma)(A\gamma, B\beta, C\alpha)\}$

$(I, X_C) = \{(A\alpha, B\beta, C\gamma)(A\beta, B\alpha, C\gamma)\}$

d.

	I	A	B	C	D	E
I	I	A	B	C	D	E
A	A	B	I	E	C	D
B	B	I	A	D	E	C
C	C	D	E	I	A	B
D	D	E	C	B	I	B
E	E	C	D	A	A	I

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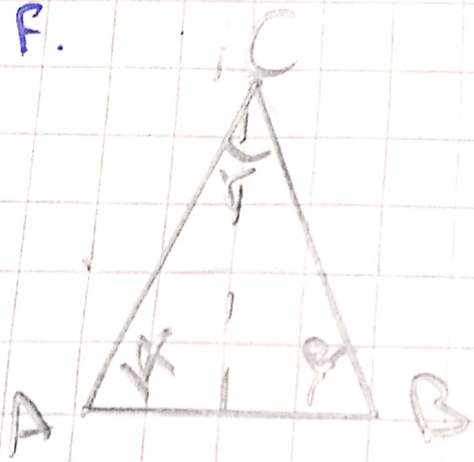
e Si son isomorfos pues comparten la misma tabla de multiplicación.

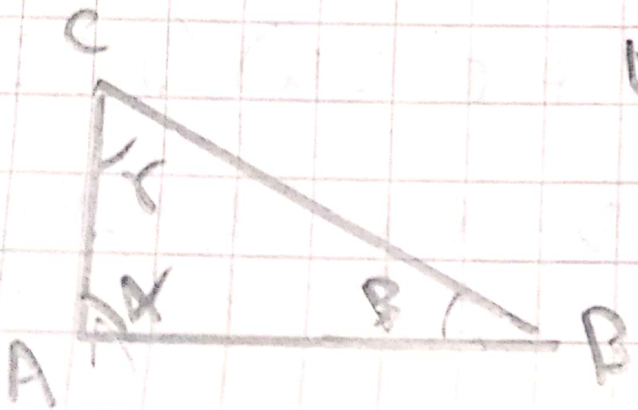
F.



isosceles

Simetría X_c

No tiene simetría en rotación



Escaleno

No tiene simetría de rotación ni traslación.

(10) $|P_n\rangle \leftrightarrow p(x) = a_0 + a_1x + a_2x^2 + \dots a_{n-1}x^{n-1}$

a)

• $(a_0 + a_1x + \dots + a_{n-1}x^{n-1}) + (b_0 + b_1x + \dots + b_{n-1}x^{n-1})$

$= (a_0+b_0) + (a_1+b_1)x + \dots + (a_{n-1}+b_{n-1})x^{n-1}$

$c_0 + c_1x + \dots + c_{n-1}x^{n-1}$

• $(a_0 + a_1x + \dots + a_{n-1}x^{n-1}) + (b_0 + b_1x \dots + b_{n-1}x^{n-1})$

$= (a_0+b_0) + (a_1+b_1)x + \dots + (a_{n-1}+b_{n-1})x^{n-1}$

$= (b_0+a_0) + (b_1+a_1)x + \dots + (b_{n-1}+a_{n-1})x^{n-1}$

$= (b_0 + b_1x + \dots + b_{n-1}x^{n-1}) + (a_0 + a_1x + \dots + a_{n-1}x^{n-1})$

• $(a_0 + a_1x \dots + a_{n-1}x^{n-1}) + (0 + 0_1x + \dots + 0_{n-1}x^{n-1})$

$= (a_0 + 0) + (a_1 + 0_1) + \dots + (a_{n-1} + 0_{n-1})x_{n-1}$

$= a_0 + a_1x + \dots + a_{n-1}x^{n-1}$

• $[(a_0 + a_1x + \dots + a_{n-1}x^{n-1}) + (b_0 + b_1x + \dots + b_{n-1}x^{n-1}$

$+ (c_0 + c_1x + \dots + c_{n-1}x^{n-1})$

$= [(a_0+b_0) + (a_1+b_1)x + \dots + (a_{n-1}+b_{n-1})x^{n-1}]$

$+ (c_0 + c_1x + \dots + c_{n-1}x^{n-1})$

$$= (a_0 + b_0 + c_0) + (a_1 + b_1 + c_1)x + \dots + (a_{n-1} + b_{n-1} + c_{n-1})x^{n-1}$$

$$= (a_0 + a_1 x + \dots + a_{n-1} x^{n-1}) + [(b_0 + c_0) + (b_1 + c_1)x + (b_{n-1} + c_{n-1})x^{n-1}]$$

$$= (a_0 + a_1 x + \dots + a_{n-1} x^{n-1}) + [(b_0 + b_1 x + \dots + b_{n-1} x^{n-1}) + (c_0 + c_1 x + \dots + c_{n-1} x^{n-1})]$$

$$= (a_0 + a_1 x + \dots + a_{n-1} x^{n-1}) + [(-a_0) + (-a_1)x + \dots + (-a_{n-1})x^{n-1}]$$

$$= (a_0 + (-a_0)) + (a_1 + (-a_1))x + \dots (a_{n-1} + (-a_{n-1}))x^{n-1}$$

$$= 0_0 + 0_1 x + \dots + 0_{n-1} x^{n-1} = 0$$

$$* \quad \alpha(a_0 + a_1 x + \dots + a_{n-1} x^{n-1}) = (\alpha a_0) + (\alpha a_1)x + \dots + (\alpha a_{n-1})x^{n-1}$$

$$= |\alpha p\rangle$$

$$* \quad \alpha[|p_a\rangle + |p_b\rangle]$$

$$= \alpha[(a_0 + b_0) + (a_1 + b_1)x + \dots + (a_{n-1} + b_{n-1})x^{n-1}]$$

$$= (\alpha a_0 + \alpha b_0) + (\alpha a_1 + \alpha a_2)x + \dots + (\alpha a_{n-1} + \alpha b_{n-1})x^{n-1}$$

$= (\alpha a_0 + \alpha a_1 x + \dots + \alpha a_{n-1} x^{n-1})$
$+ (\alpha b_0 + \alpha b_1 x + \dots + \alpha b_{n-1} x^{n-1})$

$= |\alpha p_a\rangle + |p_b\rangle$

* $(\alpha+\beta)|p\rangle = (\alpha+\beta)(a_0) + (\alpha+\beta)(a_1)x^1$
$+ \dots + (\alpha+\beta) a_{n-1} x^{n-1}$

$= \alpha a_0 + \alpha a_1 x^1 + \dots + \alpha a_{n-1} x^{n-1}$
$+ \beta a_0 + \beta a_1 x^1 + \dots + \beta a_{n-1} x^{n-1}$

$= |\alpha p\rangle + |\beta\rangle$

* $\alpha(\beta|p\rangle)$

$= \alpha\beta a_0 + \alpha\beta a_1 x^1 + \dots + \alpha\beta a_{n-1} x^{n-1}$

$= \alpha\beta (a_0 + a_1 x^1 + \dots + a_{n-1} x^{n-1})$

$= \alpha\beta |p\rangle$

* $1|p\rangle = (1 a_0) + (1 \cdot a_1) x^1 + \dots + (1 \cdot a_{n-1}) x^{n-1}$

$= a_0 + a_1 x^1 + \dots + a_{n-1} x^{n-1} = |p\rangle$

10) sea n entero y α racional

b. $\alpha(n_0 + n_1 x + \dots + n_{n-1} x^{n-1})$

$= \underbrace{(\alpha n_0)}_{\text{Difere de enteros.}} + (\alpha n_1)x + \dots + (\alpha n_{n-1})x^{n-1}$

c. RTA. El polinomio cero y los polinomios de grado $n-1$

★ Polinomio cero y polinomios de grado par.

sea $x+1$, $2-x$

$(x+1)+(2-x)=3$

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