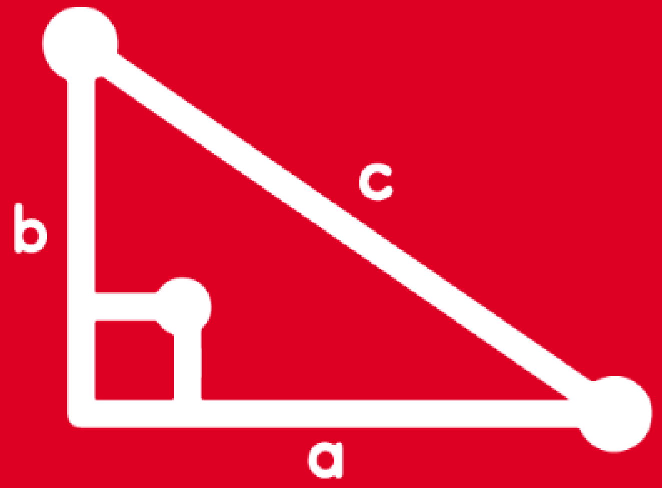
TRIGONOMETRY

TOMO VII



5th
SECONDARY

Feedback

SACO OLIVEROS

HELICO-PRACTICE 1

Reduzca: $E = \dfrac{\text{sen}65° + \text{sen}55°}{\cos 65° + \cos 55°}$

Resolución:

Recordar:

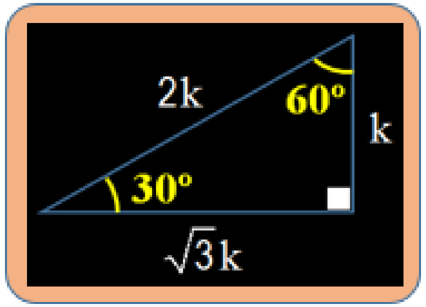
$$\text{sen}A + \text{sen}B = 2\text{sen}\left(\frac{A+B}{2}\right).\cos\left(\frac{A-B}{2}\right)$$

$$\cos A + \cos B = 2\cos\left(\frac{A+B}{2}\right).\cos\left(\frac{A-B}{2}\right)$$

$$E = \frac{\overset{\cancel{2}\text{sen}60°\cancel{\cos 5°}}{\text{sen}65° + \text{sen}55°}}{\underset{\cancel{2}\cos 60°\cancel{\cos 5°}}{\cos 65° + \cos 55°}}$$

$$E = \frac{\text{sen}60°}{\cos 60°}$$

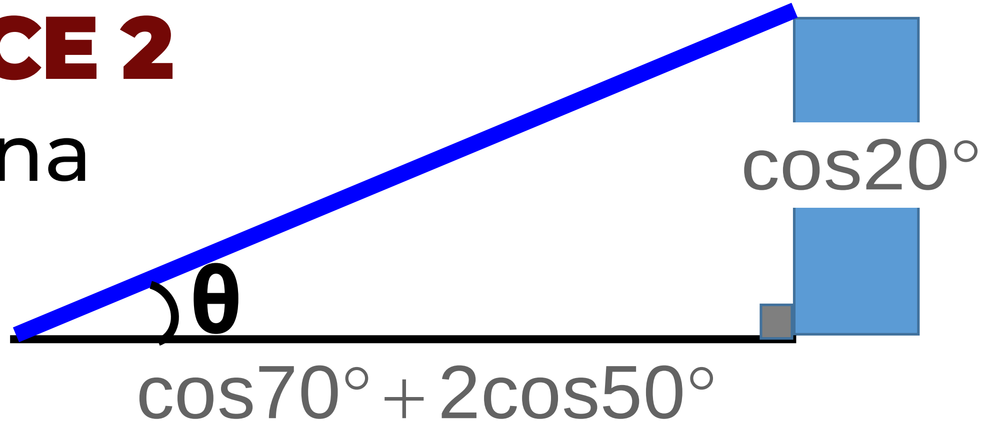
$$E = \tan 60°$$



$$\boxed{\therefore E = \sqrt{3}}$$

HELICO-PRACTICE 2

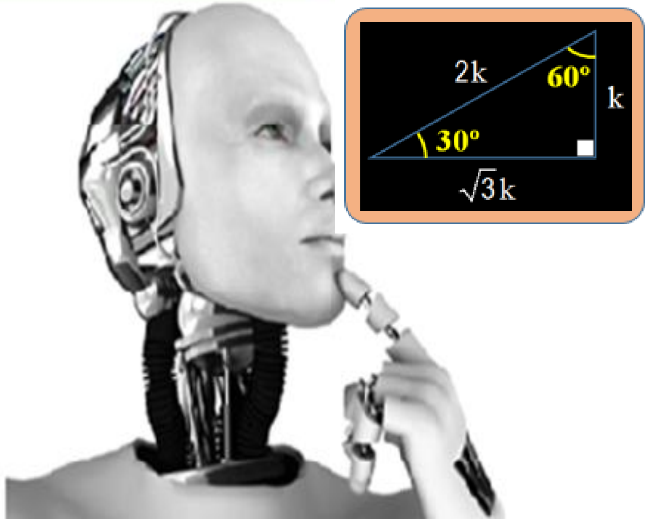
Una barra metálica descansa sobre una pared lisa, tal como se muestra en la figura. Calcule el valor de θ.



Resolución:

Recordar:

$$\cos A + \cos B = 2\cos\left(\frac{A+B}{2}\right).\cos\left(\frac{A-B}{2}\right)$$



$$\cot\theta = \frac{\cos 70° + 2\cos 50°}{\cos 20°} = \frac{\overbrace{\cos 70° + \cos 50°}^{2\cos 60° \cos 10°} + \cos 50°}{\cos 20°}$$

$$\cot\theta = \frac{\cancel{2}\left(\frac{1}{\cancel{2}}\right)\cos 10° + \cos 50°}{\cos 20°} = \frac{\overbrace{\cos 50° + \cos 10°}^{2\cos 30° \cancel{\cos 20°}}}{\cancel{\cos 20°}}$$

$$\cot\theta = 2\left(\frac{\sqrt{3}}{2}\right) \Rightarrow \cot\theta = \sqrt{3}$$

$$\boxed{\therefore \theta = 30°}$$

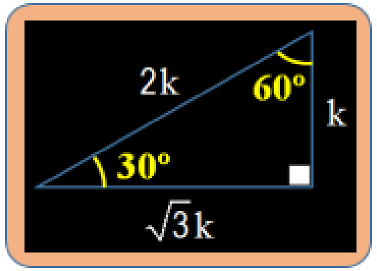
HELICO-PRACTICE 3

Halle el valor de m, si: $\dfrac{cos20°.cos10°}{sen30°} = m + sen80°$

Resolución:

Recordar

$$2cosxcosy = cos(x+y) + cos(x-y)$$



$$\frac{2\,cos20°cos10°}{2\,sen30°} = m + sen80°$$

$$\frac{cos30° + cos10°}{\cancel{2}\left(\frac{1}{\cancel{2}}\right)} = m + sen80°$$

$$\frac{\sqrt{3}}{2} + \cancel{sen80°} = m + \cancel{sen80°}$$

$$\therefore\ m = \frac{\sqrt{3}}{2}$$

HELICO-PRACTICE 4

Determine el rango de la función: $f(x) = 4senx + 5$

Resolución:

Se sabe que: $-1 \leq senx \leq 1$

Ahora le damos la forma de la función f:

$$-1 \leq senx \leq 1 \quad \ldots\ldots\ldots (x4)$$

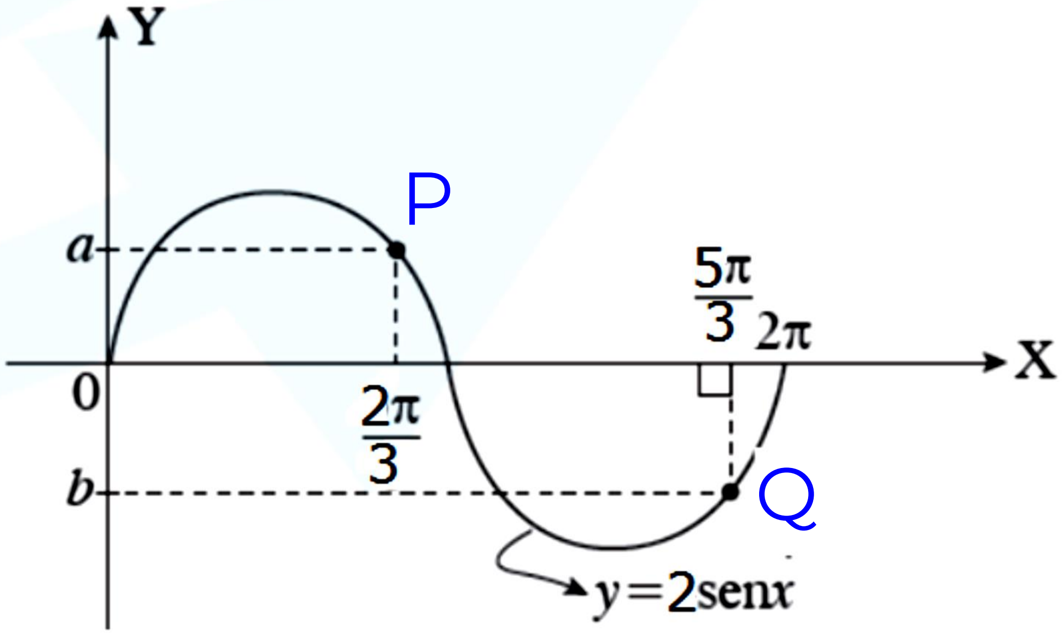
$$-4 \leq 4senx \leq 4 \quad \ldots\ldots\ldots (+5)$$

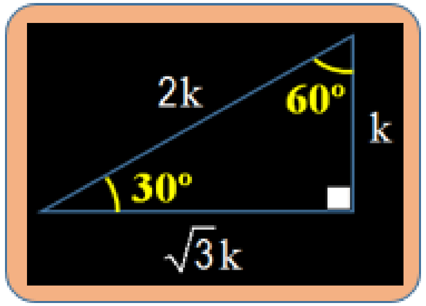
$$1 \leq \underbrace{4senx + 5}_{f(x)} \leq 9$$

$$\boxed{\therefore Ranf = [1; 9]}$$

HELICO-PRACTICE 5

Del gráfico, calcule a.b





Resolución:

Sea:

$f(x) = y = 2\text{sen}x$

$P\left(\frac{2\pi}{3}; a\right) \epsilon\ f$

$a = 2\text{sen}\left(\frac{2\pi}{3}\right)$

$a = 2\left(\frac{\sqrt{3}}{2}\right) \Rightarrow a = \sqrt{3}$

$Q\left(\frac{5\pi}{3}; b\right) \epsilon\ f$

$b = 2\text{sen}\left(\frac{5\pi}{3}\right)$

$b = 2\left(-\frac{\sqrt{3}}{2}\right) \Rightarrow b = -\sqrt{3}$

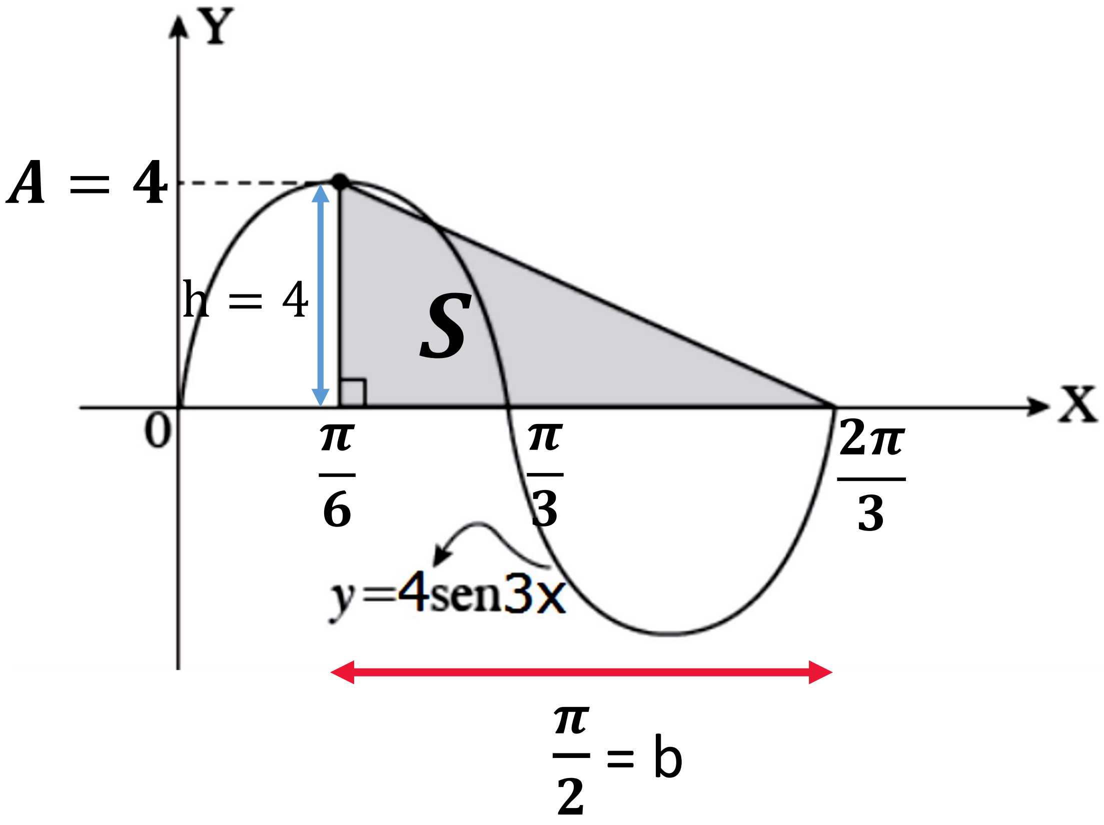
Piden:

$a.b = (\sqrt{3}).(-\sqrt{3})$

$\boxed{\therefore ab = -3}$

HELICO-PRACTICE 6

Del gráfico, determine el área de la región sombreada.



Resolución:

$Sea\ la\ función:\ f(x) = y = 4sen3x$

$Periodo\ de\ la\ función:$

$T = \frac{2\pi}{B} \rightarrow T = \frac{2\pi}{3}$

$Amplitud:\ A = 4$

$Calculando\ el\ área:$

$S = \frac{b.h}{2} \Rightarrow S = \frac{\left(\frac{\pi}{2}\right).(4)}{2}$

$\therefore S = \pi\, u^2$

HELICO-PRACTICE 7

Determine el rango de la función: $f(x) = 3\cos x - 2$

Resolución:

Se sabe que: $-1 \leq Cosx \leq 1$

Ahora le damos la forma de la función f:

$-1 \leq Cosx \leq 1 \ldots\ldots(x3)$

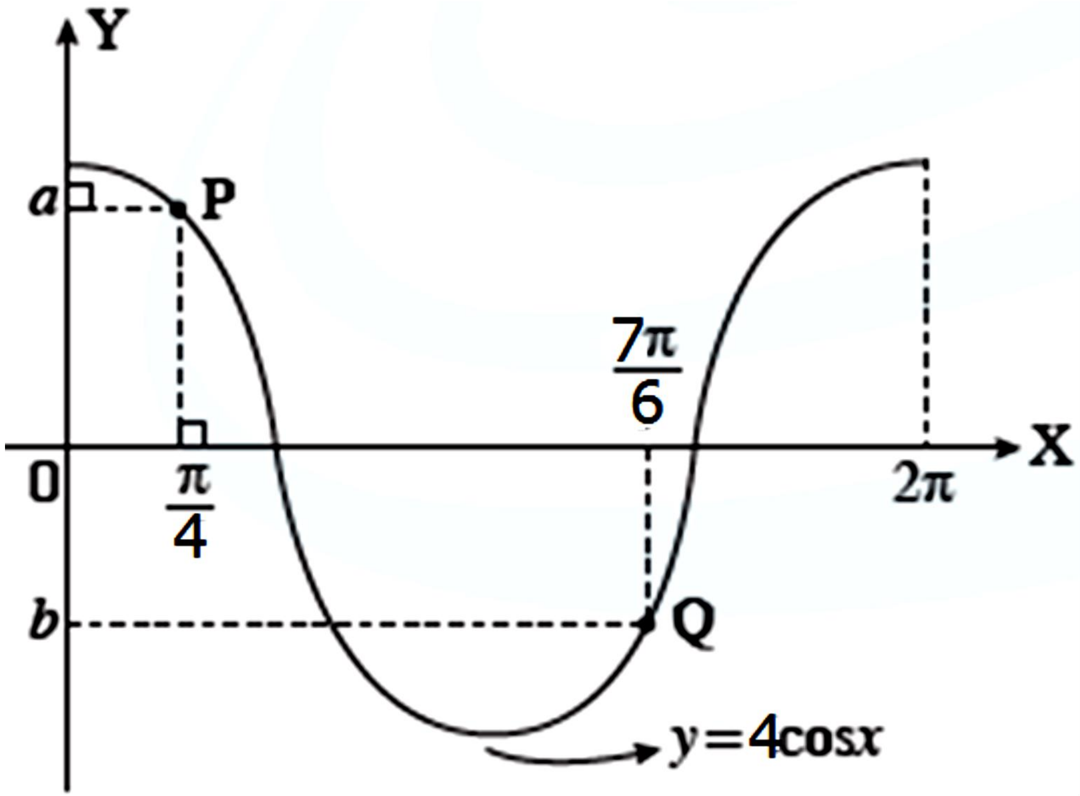
$-3 \leq 3Cosx \leq 3 \ldots\ldots(-2)$

$-5 \leq \underbrace{3Cosx - 2}_{f(x)} \leq 1$

$\boxed{\therefore Ranf = [-5;1]}$

HELICO-PRACTICE 8

Del gráfico, calcule a·b



Resolución:

Sea : f (x) = y = 4cosx

$Q\left(\frac{7\pi}{6};b\right) \in f$

$\Rightarrow b = 4\cos\left(\frac{7\pi}{6}\right)$

$\Rightarrow b = -4\cos\left(\frac{\pi}{6}\right)$

$\Rightarrow b = -4\left(\frac{\sqrt{3}}{2}\right)$

$\Rightarrow b = -2\sqrt{3}$

$P\left(\frac{\pi}{4};a\right) \in f$

$\Rightarrow a = 4\cos\left(\frac{\pi}{4}\right)$

$\Rightarrow a = 4\left(\frac{\sqrt{2}}{2}\right)$

$\Rightarrow a = 2\sqrt{2}$

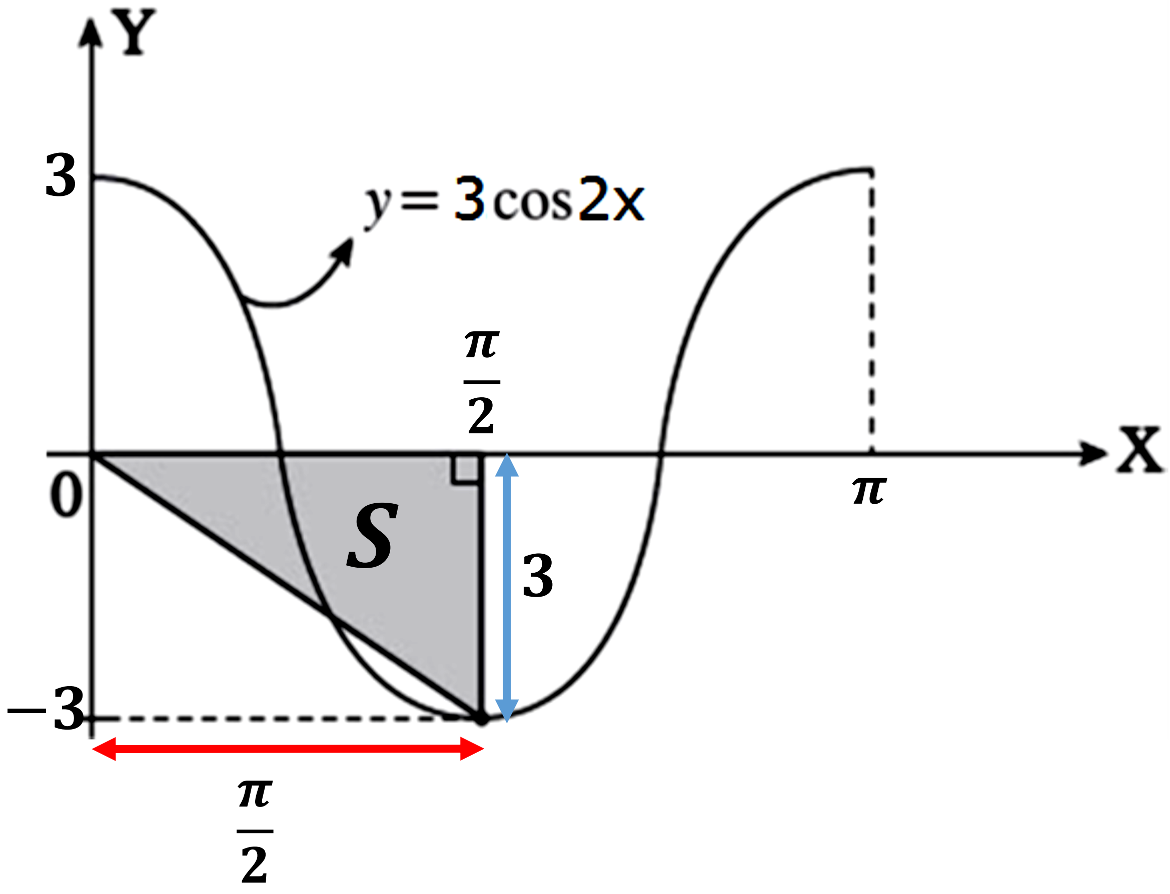
Nos piden:

$a.b = (2\sqrt{2})(-2\sqrt{3})$

$\boxed{\therefore\ ab = -4\sqrt{6}}$

HELICO-PRACTICE 9

Del gráfico, determine el área de la región sombreada.



Resolución:

Sea la función: $f(x) = y = 3cos2x$

Periodo de la función:

$$T = \frac{2\pi}{B} \longrightarrow T = \frac{2\pi}{2} = \pi$$

Amplitud: $A = 3$

Calculando el área: $S = \dfrac{\left(\frac{\pi}{2}\right).(3)}{2}$

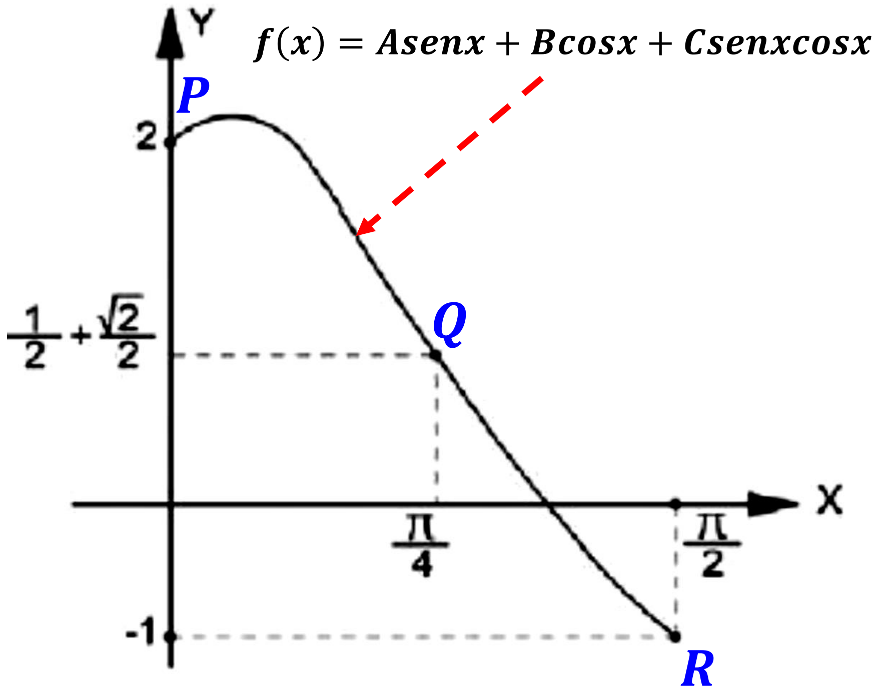
$$\therefore S = \frac{3\pi}{4}u^2$$

HELICO-PRACTICE 10

Sean A, B, C constantes y $f:\mathbb{R}\to\mathbb{R}$ dada por

$$f(x)=A\,\text{sen}(x)+B\cos(x)+C\,\text{sen}(x)\cos(x)$$

cuya gráfica parcial se muestra a continuación:



Calcule $A+B+C$

Resolución:

El punto P $\in \boldsymbol{f(x)}$

$$f(0) = Asen(0) + Bcos(0) + Csen(0)\cos(0)$$

$$2 = A(0) + B(1) + C(0)(1) \longrightarrow \boxed{\mathbf{2 = B}}$$

El punto R $\in \boldsymbol{f(x)}$

$$f\left(\frac{\pi}{2}\right) = Asen\left(\frac{\pi}{2}\right) + Bcos\left(\frac{\pi}{2}\right) + Csen\left(\frac{\pi}{2}\right) cos\left(\frac{\pi}{2}\right)$$

$$-1 = A(1) + 2(0) + C(1)(0) \longrightarrow \boxed{\mathbf{-1 = A}}$$

El punto Q $\in \boldsymbol{f(x)}$

$$f\left(\frac{\pi}{4}\right) = Asen\left(\frac{\pi}{4}\right) + Bcos\left(\frac{\pi}{4}\right) + Csen\left(\frac{\pi}{4}\right) cos\left(\frac{\pi}{4}\right)$$

$$\frac{1}{2}+\frac{\sqrt{2}}{2} = -1\left(\frac{\sqrt{2}}{2}\right) + 2\left(\frac{\sqrt{2}}{2}\right) + C\left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{2}}{2}\right)$$

$$\frac{1}{2}+\cancel{\frac{\sqrt{2}}{2}} = \cancel{\frac{\sqrt{2}}{2}} + C\left(\frac{1}{2}\right) \longrightarrow \boxed{\mathbf{1 = C}}$$

$$\boxed{\therefore A + B + C = 2}$$