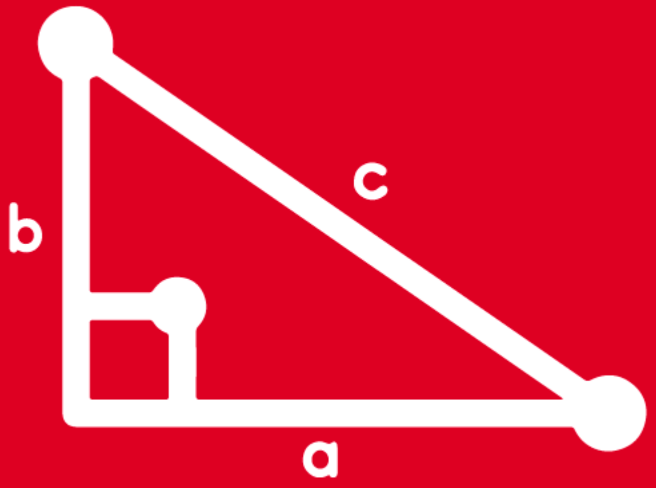
TRIGONOMETRY

TOMO VIII

5th
SECONDARY



Feedback

SACO OLIVEROS

HELICOPRACTICE 1

Halle el valor de: $E = \text{arcsen}(1) + \text{arccos}\left(\frac{1}{2}\right)$

Resolución:

Piden:

$$E = \underbrace{\text{arcsen}(1)}_{\alpha} + \underbrace{\text{arccos}\left(\frac{1}{2}\right)}_{\theta}$$

- $\alpha = \text{arcsen}(1) \Rightarrow \text{sen}\alpha = 1 \rightarrow \alpha = \frac{\pi}{2}$
- $\theta = \text{arccos}\left(\frac{1}{2}\right) \Rightarrow \cos\theta = \frac{1}{2} \rightarrow \theta = \frac{\pi}{3}$

Luego:

$$E = \alpha + \theta = \frac{\pi}{2} + \frac{\pi}{3}$$

$$\boxed{\therefore E = \frac{5\pi}{6}}$$

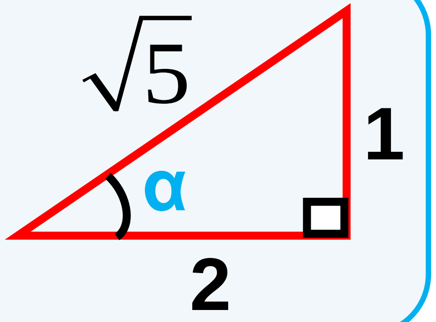
HELICOPRACTICE 2

Calcule el valor de: $E = \sqrt{5}\,\mathrm{sen}[\arctan(\tfrac{1}{2})] + \sqrt{10}\,\cos[\arctan(3)]$

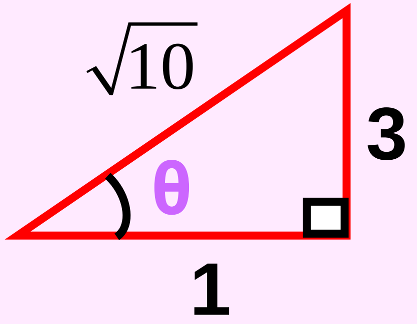
Resolución:

$$E = \sqrt{5}\,\mathrm{sen}[\underbrace{\arctan(\tfrac{1}{2})}_{\alpha}] + \sqrt{10}\cos[\underbrace{\arctan(3)}_{\theta}]$$

$\tan\alpha = \dfrac{1}{2} = \dfrac{Co}{Ca}$



$\tan\theta = \dfrac{3}{1} = \dfrac{Co}{Ca}$



Reemplazando:

$$E = \sqrt{5}\,\mathrm{sen}\alpha + \sqrt{10}\cos\theta \quad E = \cancel{\sqrt{5}}\left(\frac{1}{\cancel{\sqrt{5}}}\right) + \cancel{\sqrt{10}}\left(\frac{1}{\cancel{\sqrt{10}}}\right)$$

$$\boxed{\therefore E = 2}$$

HELICOPRACTICE 3

Halle el valor de x de la igualdad: $\operatorname{arccos}x - \operatorname{arcsen}x = \frac{\pi}{6}$

Resolución:

Dato: $\operatorname{arccos}x - \operatorname{arcsen}x = \frac{\pi}{6}$

$\operatorname{arccos}x - \left(\frac{\pi}{2} - \operatorname{arccos}x\right) = \frac{\pi}{6}$

$2\operatorname{arccos}x - \frac{\pi}{2} = \frac{\pi}{6}$

$2\operatorname{arccos}x = \frac{2\pi}{3}$

Propiedad

$\operatorname{arcsen}x + \operatorname{arccos}x = \frac{\pi}{2}$

$\operatorname{arccos}x = \frac{\pi}{3}$

$x = \cos\left(\frac{\pi}{3}\right)$

$x = \frac{1}{2}$

$\therefore \boxed{x = \frac{1}{2}}$

HELICOPRACTICE 4

Indique la menor solución positiva de:

$$2\text{sen}5x - 1 = 0$$

Resolución:

Del dato:

$$\text{sen}5x = \frac{1}{2} \ldots \text{ETE}$$

Recuerda:

$$\text{sen}30° = \frac{1}{2}$$

Luego: $5x = \frac{\pi}{6}$

$\therefore$ La menor solución positiva: $x = \frac{\pi}{30}$

HELICOPRACTICE 5

Halle la solución general de: cotx – tanx = 2

Resolución:

$$\underbrace{\cot x - \tan x}_{2\cot 2x} = 2$$

$\cot 2x = 1$

Luego: $\tan 2x = 1$ … ETE

$$Vp = \arctan(1) = \frac{\pi}{4}$$

Solución general para la tangente:

$$X_g = k\pi + V_p \ ; k \in \mathbb{Z}$$

$$2x = k\pi + \frac{\pi}{4} \ ; k \in \mathbb{Z}$$

$$\therefore \quad x = \frac{k\pi}{2} + \frac{\pi}{8} \ ; k \in \mathbb{Z}$$

HELICOPRACTICE 6

Indique el número de soluciones: $(\text{senx} + \text{cosx})^2 = \frac{3}{2}$

Para x ϵ [0;π]

Resolución:

$$\underbrace{(\text{senx} + \text{cosx})^2}_{} = \frac{3}{2}$$

$$1 + sen2x = \frac{3}{2}$$

$$\Rightarrow sen2x = \frac{1}{2} \ldots \text{ETE}$$

Vp = arcsen($\frac{1}{2}$) = $\frac{\pi}{6}$

La solución general para el seno:

$$X_g = k\pi + (-1)^k . V_p \ ; k \in \mathbb{Z}$$

$$2x = k\pi + (-1)^k . \frac{\pi}{6}$$

$$\boxed{x = \frac{k\pi}{2} + (-1)^k . \frac{\pi}{12} \ ; k \in \mathbb{Z}}$$

Tabular

$k = 0 ; 1$ /

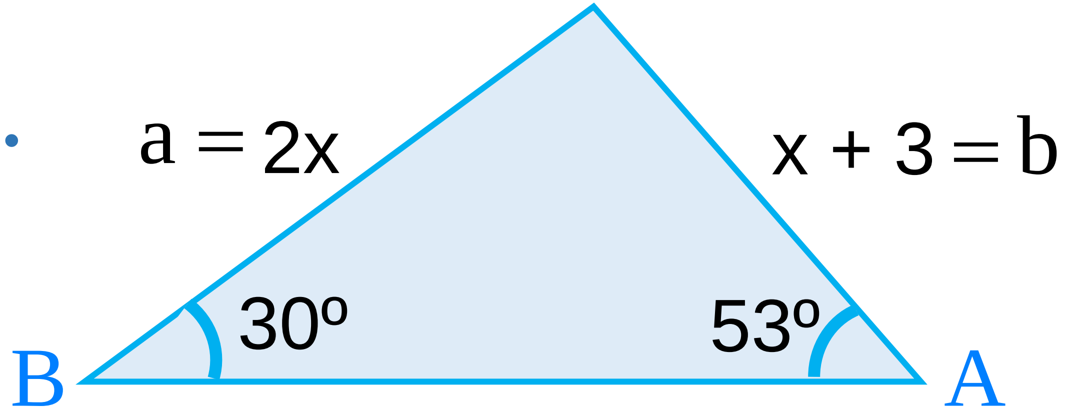
x ϵ [0;π]

$$x = \left\{\frac{\pi}{12} ; \frac{5\pi}{12}\right\}$$

∴ Hay 2 soluciones

HELICOPRACTICE 7

De la figura, calcule el valor de x.



Resolución:

Ley de Senos:

$$\frac{a}{\text{sen}A} = \frac{b}{\text{sen}B}$$

$$\Rightarrow \frac{2x}{\text{sen}53°} = \frac{x+3}{\text{sen}30°}$$

$$\Rightarrow 2x.\text{sen}30° = (x+3).\text{sen}53°$$

$$\Rightarrow \cancel{2}x.\frac{1}{\cancel{2}} = (x+3).\frac{4}{5}$$

$$\Rightarrow 5x = 4(x+3)$$

$$\Rightarrow 5x = 4x + 12$$

$$\Rightarrow x = 12$$

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

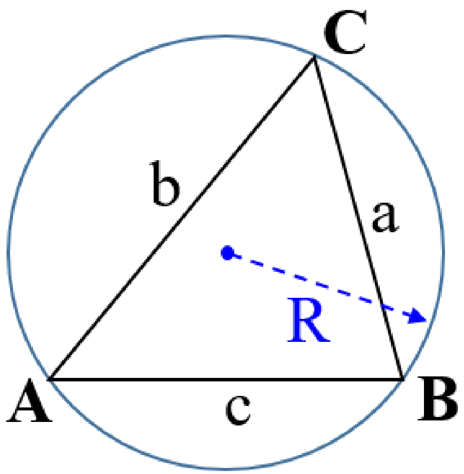
HELICOPRACTICE 8

Calcule la longitud de la circunferencia circunscrita al triángulo **ABC**, si: $\dfrac{5a}{\text{sen}A}-\dfrac{2b}{\text{sen}B}+\dfrac{c}{\text{sen}C}=24\text{m}$

Resolución:

Ley de senos:

$$a = 2R\,\text{Sen}A$$
$$b = 2R\,\text{Sen}B$$
$$c = 2R\,\text{Sen}C$$



En el DATO :

$$\frac{5(2R\cancel{\text{sen}A})}{\cancel{\text{sen}A}}-\frac{2(2R\cancel{\text{sen}B})}{\cancel{\text{sen}B}}+\frac{2R\cancel{\text{sen}C}}{\cancel{\text{sen}C}}=24\text{m}$$

$$\Rightarrow 5(2R)-2(2R)+(2R)=24\,\text{m}$$

$$\Rightarrow 8R=24\,\text{m}$$

$$\Rightarrow R=3\,\text{m}$$

PIDEN : Longitud de la circunferencia circunscrita

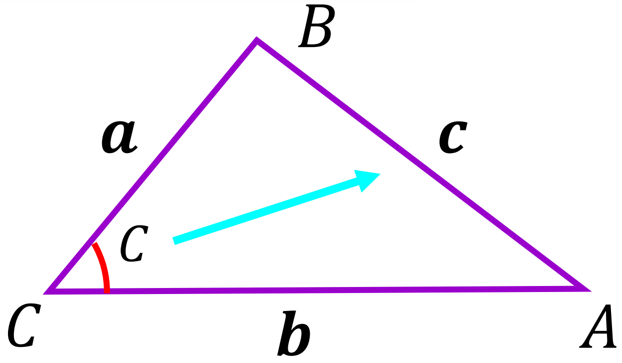
$$L_{\odot}=2\pi R \Rightarrow L_{\odot}=2\pi(3)$$

$$\boxed{\therefore\ L_{\odot}=6\pi\,\text{m}}$$

HELICOPRACTICE 9

Halle la medida del ángulo C en un triángulo ABC, de lados a, b y c; si se cumple: $(a+b)^2+(a-b)^2=2c^2-2ab$

Resolución:



Dato:

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

$\Rightarrow 2(a^2+b^2)=2c^2-2ab$

$\Rightarrow a^2+b^2=c^2-ab$

$\Rightarrow c^2=a^2+b^2+ab \;\ldots(\mathrm{I})$

Ley de cosenos:

$\boxed{c^2=a^2+b^2-2ab.\cos C} \;\ldots(\mathrm{II})$

$si:\ x+y=180°$

$\cos x=-\cos y$

Igualando (I) y (II):

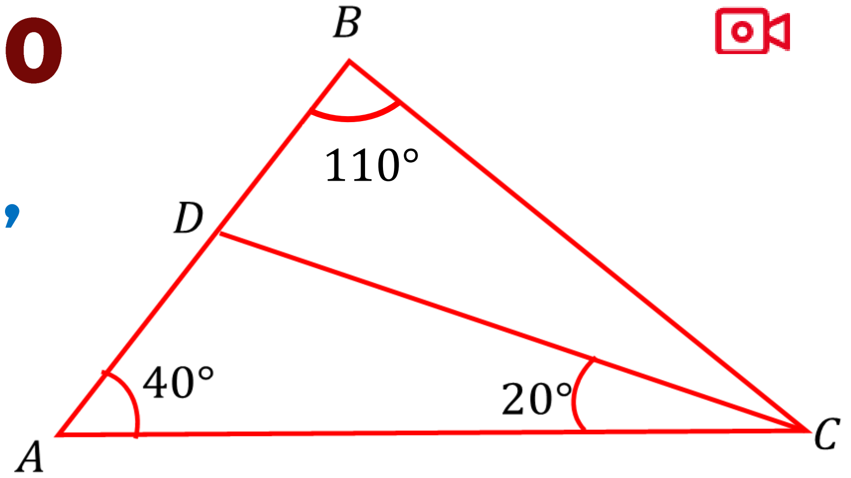
$\cancel{a^2+b^2}+ab=\cancel{a^2+b^2}-2ab.\cos C$

$\Rightarrow \cancel{ab}=-2\cancel{ab}.\cos C$

$\Rightarrow 1=-2\cos C \qquad \Rightarrow \cos C=-\dfrac{1}{2}$

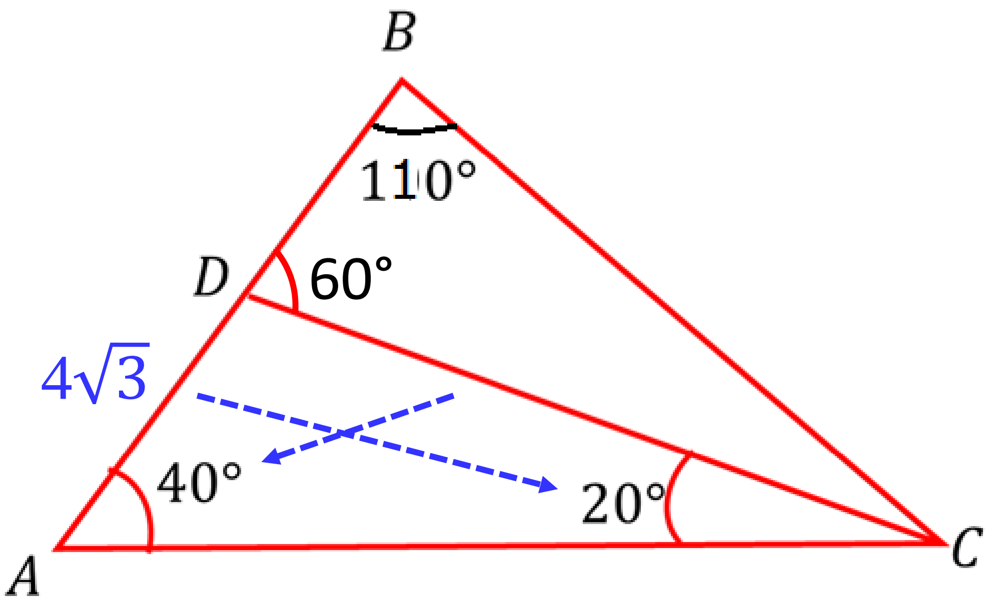
$\therefore \boxed{C=120°}$

HELICOPRACTICE 10



En el triángulo ABC, de la figura, $AD = 4\sqrt{3}$cm. Halle BC

Resolución:



Δ ADC: Ley de Senos

$$\frac{4\sqrt{3}}{\text{sen}20^0} = \frac{DC}{\text{sen}40^0}$$

$$\frac{4\sqrt{3}}{\cancel{\text{sen}20^0}} = \frac{DC}{2\cancel{\text{sen}20^0}cos20°}$$

$$\Rightarrow DC = 8\sqrt{3}cos20°$$

Recordar:

$$\text{sen}110^0 = \text{sen}(90° + 20°)$$
$$\text{sen}110^0 = \cos 20°$$

Δ DBC: Ley de Senos

$$\frac{BC}{\text{sen}60^0} = \frac{DC}{\text{sen}110^0}$$

$$\frac{BC}{\text{sen}60^0} = \frac{8\sqrt{3}\cancel{cos}20°}{\cancel{cos}20}$$

$$\Rightarrow BC = 8\sqrt{3}\left(\frac{\sqrt{3}}{2}\right)$$

$\therefore$ $\boxed{BC = 12cm}$