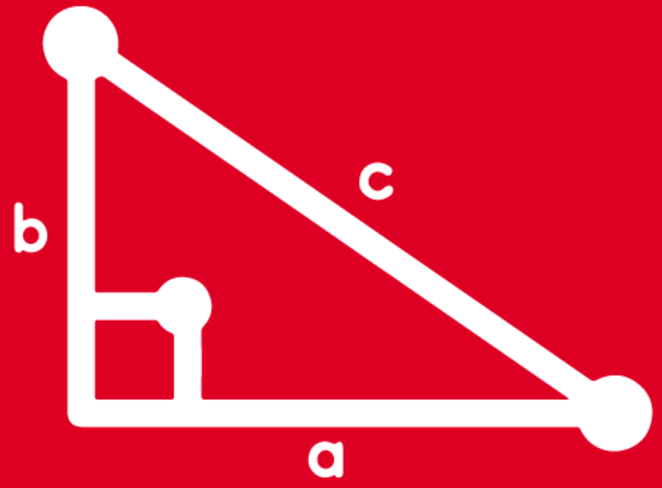
TRIGONOMETRY

Tomo 02
Sesión 01



4th
SECONDARY

FEEDBACK

SACO OLIVEROS

1. Si $5cos\alpha - 2 = 0$, donde α es la medida de un ángulo agudo, efectúe:

$$\boldsymbol{Q = \sqrt{21}(Cot\alpha + Csc\alpha)}$$

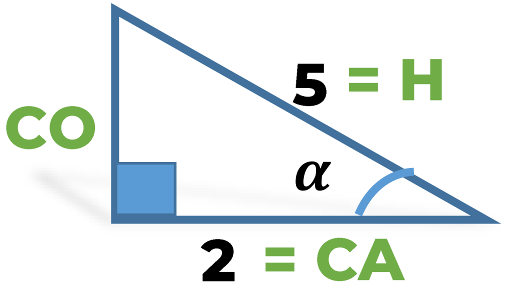
Resolución:

Recordar

$$cos\alpha = \frac{CA}{H} \quad cot\alpha = \frac{CA}{CO} \quad csc\alpha = \frac{H}{CO}$$

Dato:

$5cos\alpha - 2 = 0$ ➡ $cos\alpha = \frac{2}{5} = \frac{CA}{H}$



Por el teorema de Pitágoras

$5^2 = 2^2 + (CO)^2$ ➡ $CO = \sqrt{21}$

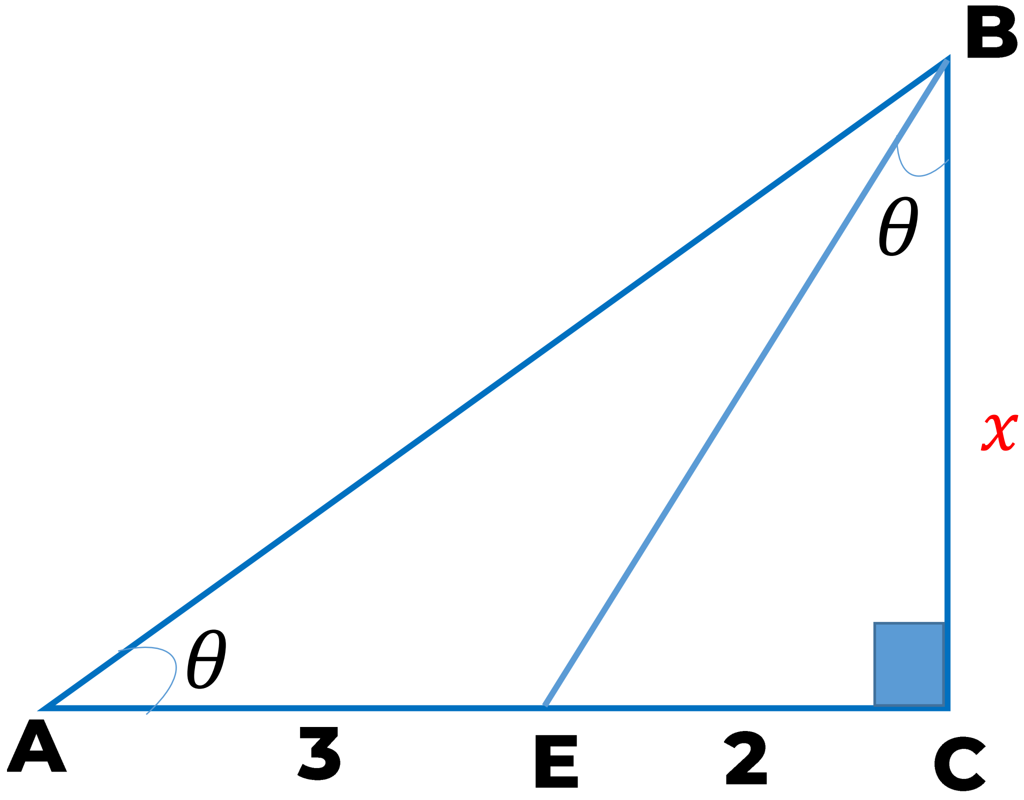
Piden:

$$Q = \sqrt{21}(Cot\alpha + Csc\alpha)$$

$$Q = \sqrt{21}\left(\frac{2}{\sqrt{21}} + \frac{5}{\sqrt{21}}\right)$$

$$Q = \cancel{\sqrt{21}}\left(\frac{7}{\cancel{\sqrt{21}}}\right)$$ ➡ $\boxed{\therefore \mathbf{Q = 7}}$

2. Hallar $\cot\theta$



Resolución:

Colocamos una variable al lado BC

En el ◣ BCE:

$$\cot\theta = \frac{x}{2} \quad \text{....(1)}$$

En el ◣ BCA:

$$\cot\theta = \frac{5}{x} \quad \text{....(2)}$$

Igualamos las ecuaciones (1) y (2):

$$\frac{x}{2} = \frac{5}{x} \Rightarrow x = \sqrt{10}$$

$$\therefore\ Cot\theta = \frac{\sqrt{10}}{2}$$

Recordar:

$$cot\alpha = \frac{CA}{CO}$$

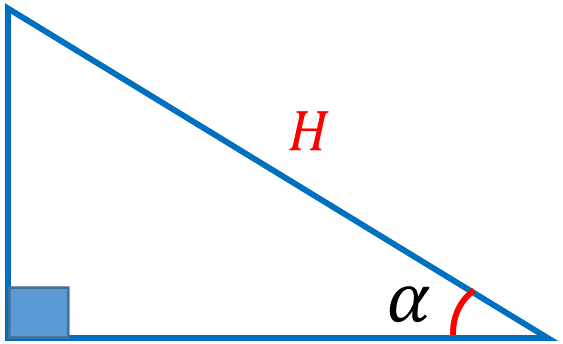
3. Si $\tan\alpha = \sqrt{7}$, donde $0° < \alpha < 90°$, Calcular:

$$\mathrm{E} = tan^2\alpha + \left(2\sqrt{8}\right)cos\ \alpha$$

Resolución:

Recorda:

$$\boldsymbol{cos\alpha = \frac{CA}{H}} \qquad \boldsymbol{tan\alpha = \frac{CO}{CA}}$$



$$\tan\alpha = \frac{\sqrt{7}}{1} = \frac{\mathrm{CO}}{CA}$$

Por el teorema de Pitágoras

$$H^2 = (\sqrt{7})^2 + (1)^2$$

$$H^2 = 7 + 1$$

$$\boldsymbol{H = \sqrt{8}}$$

Piden:

$$E = tan^2\alpha + \left(2\sqrt{8}\right)cos\ \alpha$$

$$E = (\sqrt{7})^2 + (2\cancel{\sqrt{8}})\left(\frac{1}{\cancel{\sqrt{8}}}\right)$$

$$E = 7 + 2$$

$$\boxed{\therefore \boldsymbol{E = 9}}$$

4. Halle el valor de x si:

$$2x.sec^2 45°.sen^2 30° + sec60° = 3x.csc^2 60°.tan37$$

Resolución:

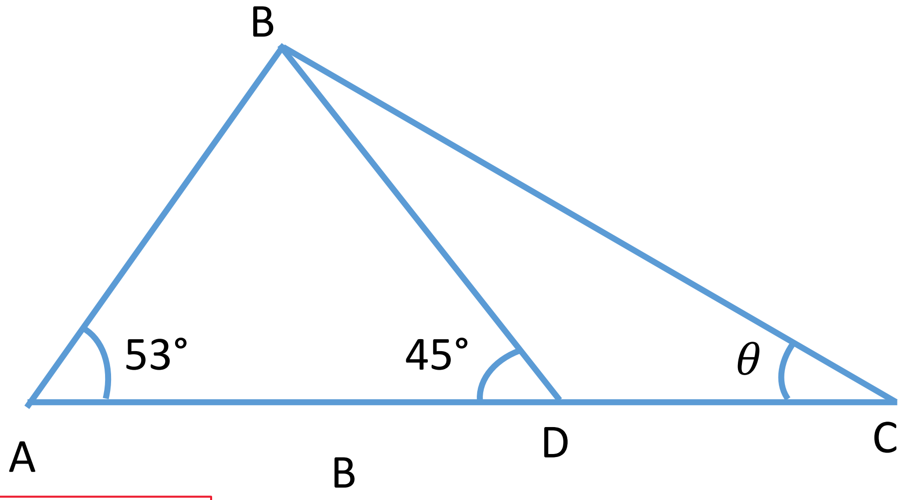
$$2x.\left(\frac{\sqrt{2}}{1}\right)^2.\left(\frac{1}{2}\right)^2 + 2 = 3x.\left(\frac{2}{\sqrt{3}}\right)^2.\left(\frac{3}{4}\right)$$

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

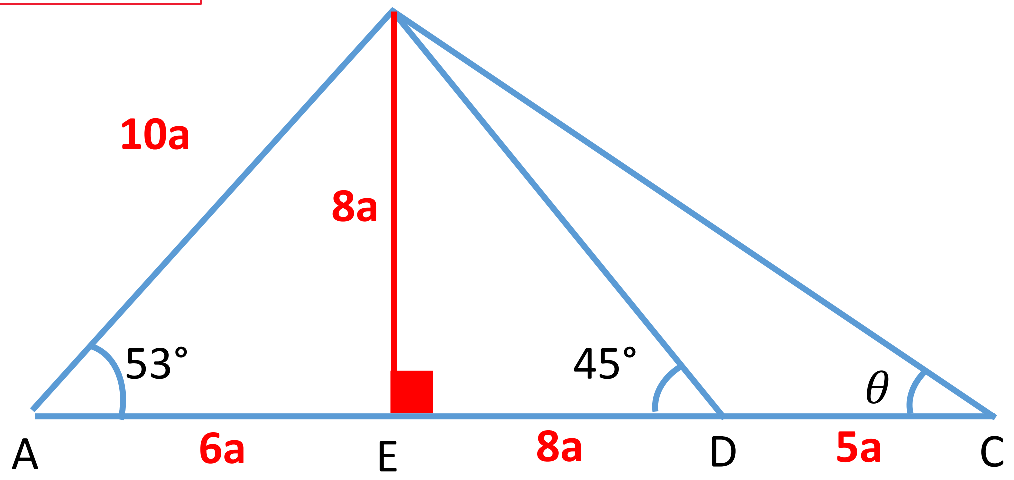
$$x + 2 = 3x$$

$$\boxed{\therefore \boldsymbol{x = 1}}$$

5. Del gráfico, calcule cotθ, si $AB = 2DC$



Resolución:



Trazamos la altura $\overline{BE}$

En el ◣ ABE: (53°,37°)

$\overline{AB} = 10a$; $\overline{BE} = 8a$; $\overline{AE} = 6a$

En el ◣ BED: (45°,45°):

$\overline{ED} = 8a$

Dato:

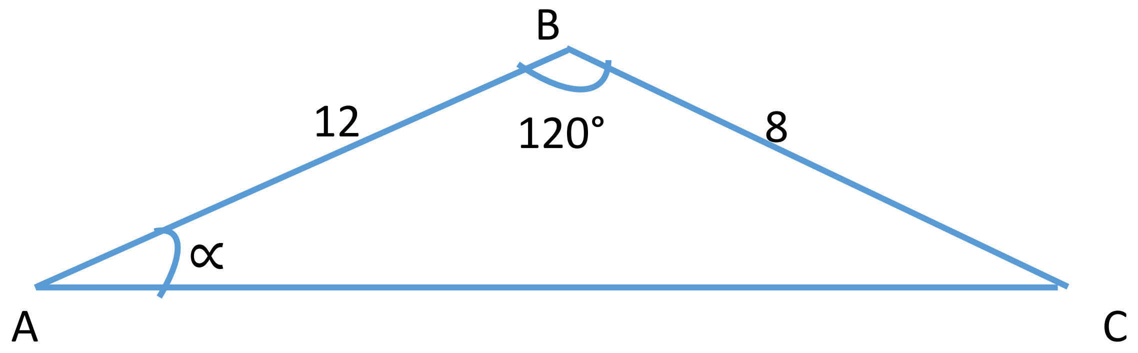
$\overline{AB} = 2\overline{DC}$ ⇨ $\overline{DC} = 5a$

Finalmente:

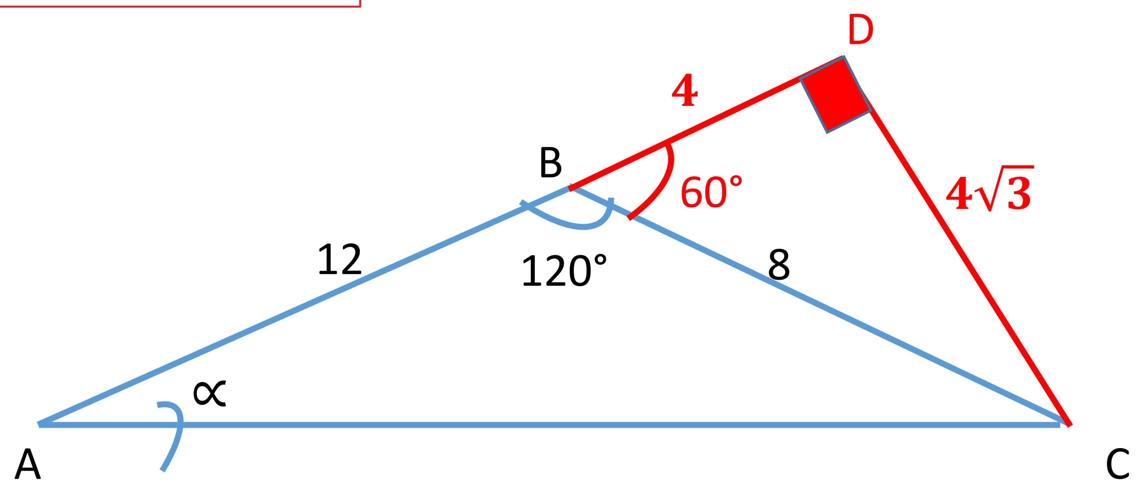
En el ◣ BEC: $cot\theta = \frac{8\cancel{a}}{13\cancel{a}}$

$$\boxed{\therefore\ Cot\theta = \frac{8}{13}}$$

6. Del gráfico, calcule $\tan\propto$.



Resolución:



Trazamos las líneas auxiliares $\overline{BD}$ y $\overline{DC}$ formando un ángulo de $90°$

Completamos el ◺ BDC $(60°, 30°)$

Finalmente :

Del ◺ ADC: $\tan\propto = \dfrac{\cancel{4}\sqrt{3}}{\cancel{16}}$

$$\boxed{\therefore \tan\propto = \frac{\sqrt{3}}{4}}$$

7. Si $tan9x = cot6x$, efectúe: $Q = tan^2 10x + csc5x$

Resolución:

Por propiedad de R.T. complementarias:

$$9x + 6x = 90^0$$

$$15x = 90^0$$

$$x = 6^0$$

Reemplazando:

$$Q = tan^2 10(6^0) + csc5(6^0)$$

$$Q = tan^2 60° + csc30°$$

$$Q = (\sqrt{3})^2 + 2$$

$$\boxed{\therefore Q = 5}$$

8. $Determine\ \ Q = \text{sen}(x+y)\ \ ,\ si:$

$$sen(x+15°).csc(35°-x) = 1 \quad ; \quad \tan(3y-20°) = \cot(30°+y)$$

Resolución:

Dato:

$$sen(x+15°).csc(35°-x) = 1$$

R.T. Recíprocas:

$$x + 15° = 35° - x$$

$$2x = 20°$$

$$x = 10°$$

Dato:

$$\tan(3y-20°) = \cot(30°+y)$$

R.T. de ángulos Complementarias:

$$3y - 20 + 30° + y = 90°$$

$$4y = 80°$$

$$y = 20°$$

Piden:

$$Q = \text{sen}(x+y)$$

$$Q = \text{sen}(30°)$$

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

9. Si: $sen5\emptyset.\csc(2\emptyset+45°)=\frac{sen20°.sec70°}{tan55°.tan35°}$, Efectúe: $M=sec4\emptyset+tan3\emptyset$

Resolución:

Dato:

$$sen5\emptyset.\csc(2\emptyset+45°)=\frac{sen20°.sec70°}{tan55°.tan35°}$$

R.T. de ángulos Complementarios y Recíprocas:

$$sen5\emptyset.\csc(2\emptyset+45°)=\frac{\cancel{sen20°}.\cancel{csc20°}}{\cancel{tan55°}.\cancel{cot55°}}$$

$$sen5\emptyset.\csc(2\emptyset+45°)=1$$

R.T. Recíprocas:

$$5\emptyset=2\emptyset+45°$$

$$3\emptyset=45° \Rightarrow \emptyset=15°$$

Piden:

$$M=sec4(15^0)+tan3(15^0)$$

$$M=sec60°+tan45°$$

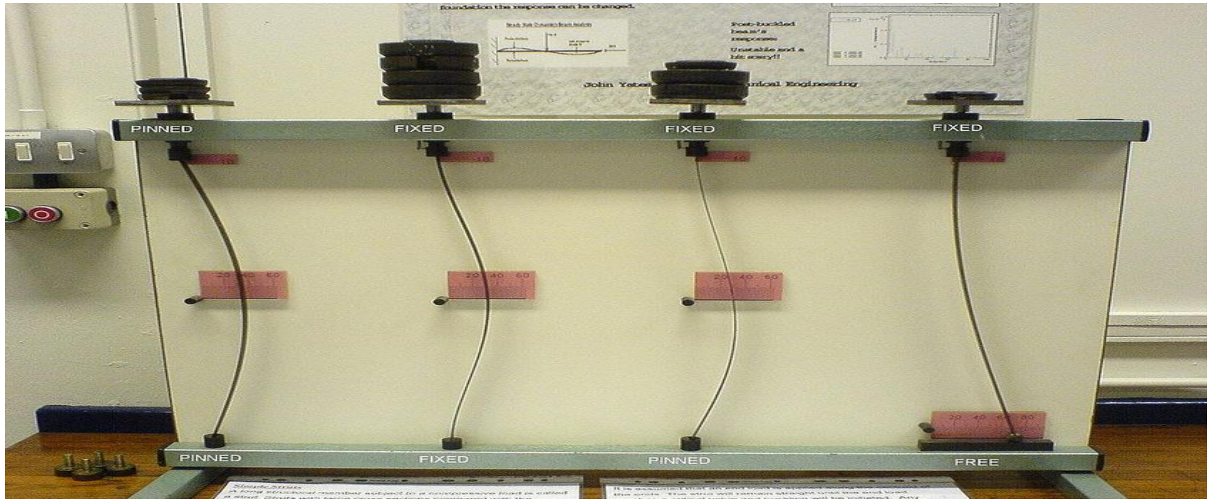
$$M=(2)+(1)$$

$$\boxed{\therefore M=3}$$

10. Se define como pandeo a la flexión producida por una carga axial pudiendo ser esta variable o critica, sabiendo que una pieza metálica es sometida a 3 cargas axiales a, b y c definidas en Newton(N), dar como respuesta el promedio de las cargas: $a = 8sen30° - 2tan45°$

$$b = 4sec^2 45° - sec60°$$

$$a = 4sec60° - 2cot45°$$



Resolución:

$$a = \underbrace{8sen30°} - \underbrace{3tan45°}$$

$$a = \cancel{8}^{4}\left(\frac{1}{\cancel{2}}\right) - 3(1) \Rightarrow \boxed{a = 1N}$$

$$b = \underbrace{4sec^2 45°} - \underbrace{sec60°}$$

$$b = 4\,(\cancel{\sqrt{2}})^{\cancel{2}} - (2) \Rightarrow \boxed{b = 6N}$$

$$c = \underbrace{4csc53°} + \underbrace{3cot45°}$$

$$c = \cancel{4}\left(\frac{5}{\cancel{4}}\right) + 3\,(1) \Rightarrow \boxed{c = 8N}$$

$$P = \frac{a+b+c}{3} = \frac{1+6+8}{3}$$

$$\boxed{\therefore P = 5}$$