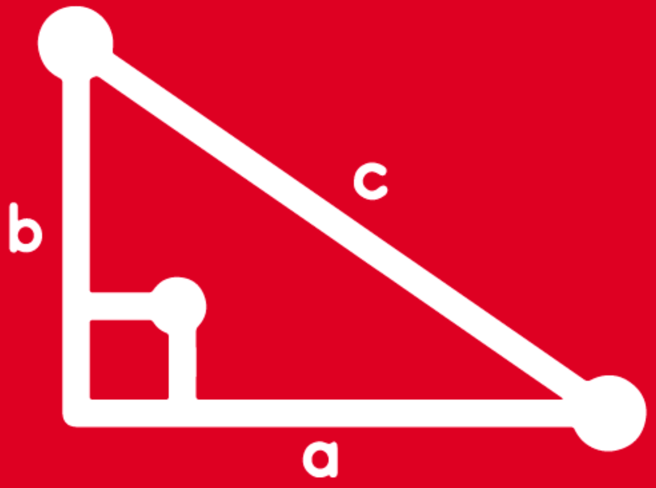
TRIGONOMETRY

TOMO 2

4th
SECONDARY



FEEDBACK

SACO OLIVEROS

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

$$Q = \sqrt{21}(cot\alpha + csc\alpha)$$

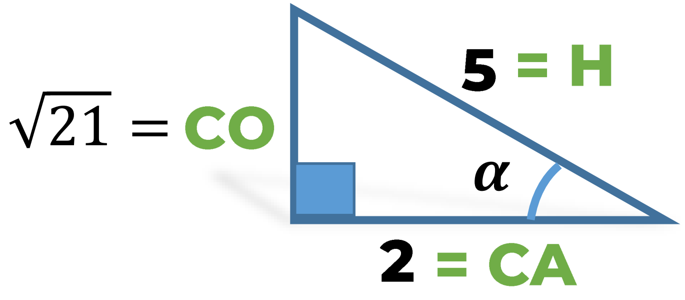
Resolución:

Recordar:

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

Dato:

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



Teorema de Pitágoras

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

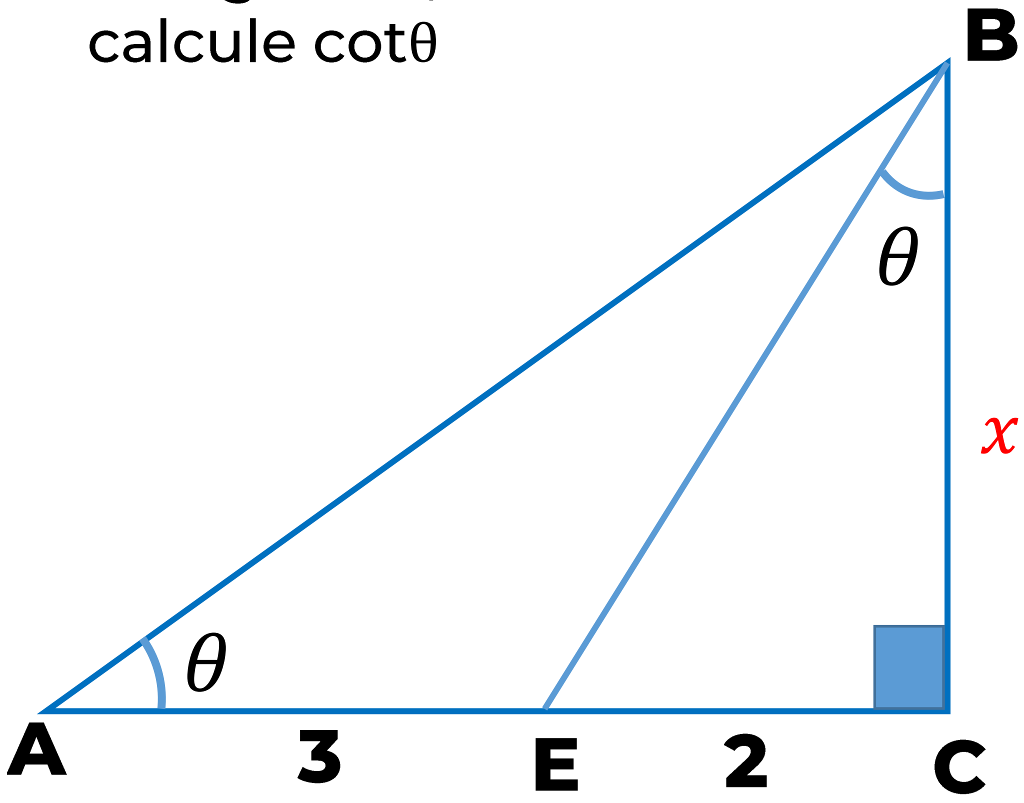
Calculamos:

$$Q = \sqrt{21}(cot\alpha + csc\alpha)$$

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

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

2. Del gráfico, calcule cotθ



Recordar:

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

Resolución:

Sea BC = x

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):

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

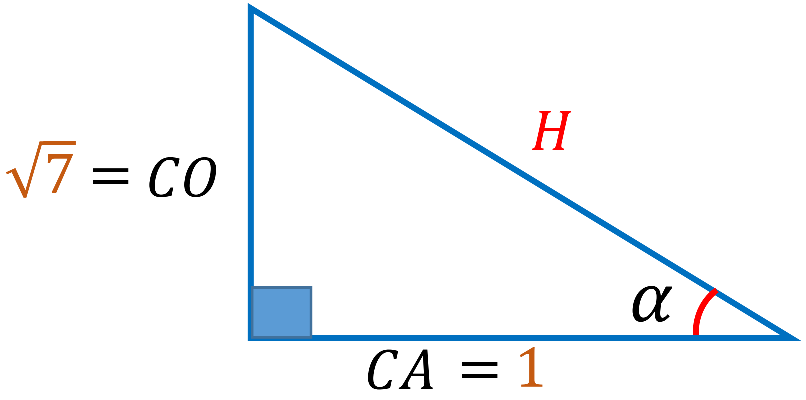
$$\therefore cot\theta = \frac{\sqrt{10}}{2}$$

3. Si $\tan\alpha = \sqrt{7}$, donde $0° < \alpha < 90°$, Calcular: $E = tan^2\alpha + (2\sqrt{8})cos\ \alpha$

Resolución:

Recordar:

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



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

Teorema de Pitágoras

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

$$H^2 = 7 + 1$$

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

Calculamos:

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

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

$$E = 7 + 2$$

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

4. Halle el valor de x , si:

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

Resolución:

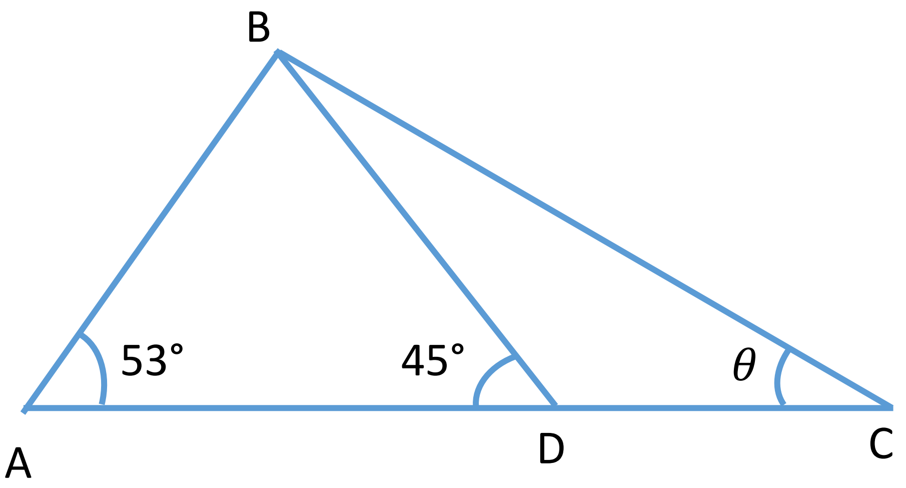
$$2x.\left(\frac{\sqrt{2}}{1}\right)^2.\left(\frac{1}{2}\right)^2 + (2) = 3x.\left(\frac{2}{\sqrt{3}}\right)^2.\left(\frac{3}{4}\right)$$

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

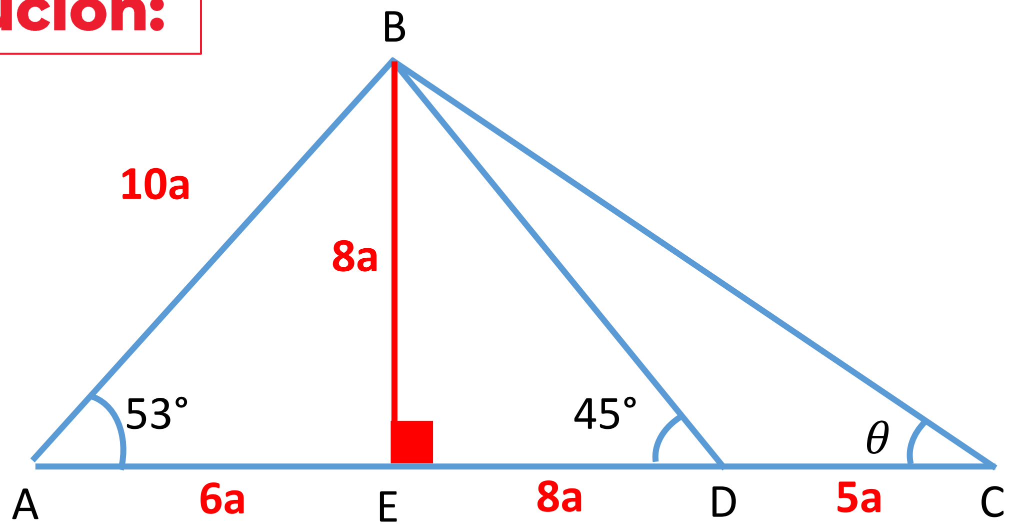
$$x + 2 = 3x$$

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

5. Del gráfico, calcule cotθ, si $\mathrm{AB} = 2\mathrm{DC}$



Resolución:



Trazamos la altura $\overline{BE}$

En el ◣ ABE: (53°,37°)

$AB = 10a\ ;\ BE = 8a\ ;\ AE = 6a$

En el ◣ BED: (45°,45°):

$ED = 8a$

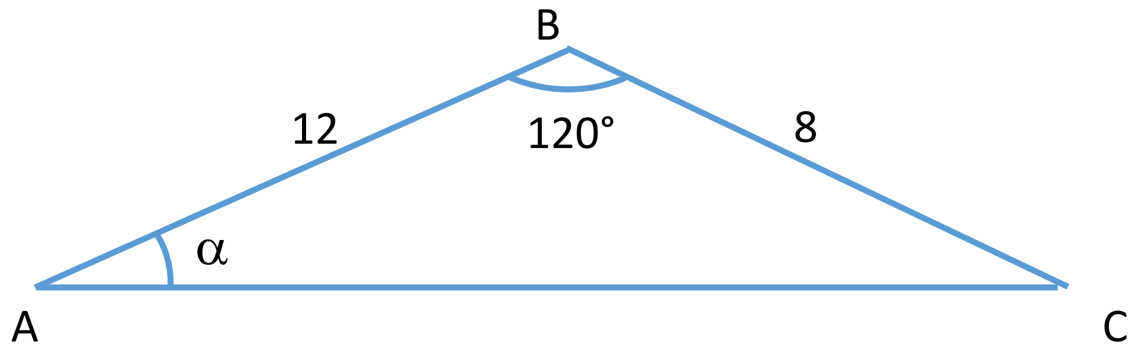
Dato: $AB = 2DC$ ⇨ $DC = 5a$

Finalmente:

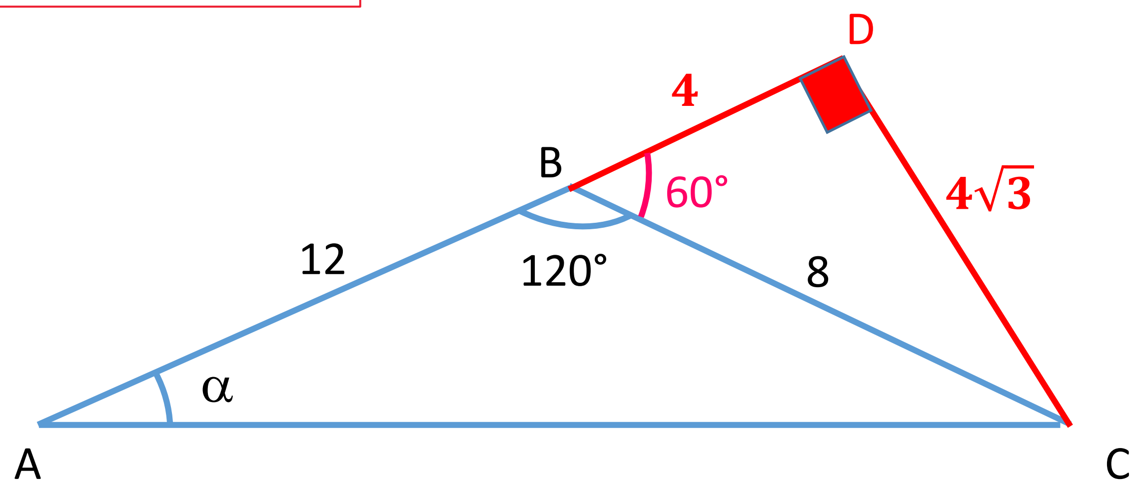
En el ◣ BEC: $cot\theta = \frac{13\cancel{a}}{8\cancel{a}}$

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

6. Del gráfico, calcule tanα.



Resolución:



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

Completamos el ◣ BDC $(60°, 30°)$

Finalmente:

Del ◣ ADC: $tan\alpha = \frac{\cancel{4}\sqrt{3}}{\cancel{16}}$

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

7. Si $\tan 9x = \cot 6x$, efectúe: $Q = \tan^2 10x + \csc 5x$

Resolución:

R.T. de ángulos complementarios en el DATO:

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

$$15x = 90^0$$

$$\boxed{x = 6^0}$$

Reemplazamos en Q:

$$Q = \tan^2 10(6^0) + \csc 5(6^0)$$

$$Q = \tan^2 60° + \csc 30°$$

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

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

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

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

Resolución:

Dato:

$$\text{sen}(x + 15°).\csc(35° - x) = 1$$

R.T. Recíprocas:

$$x + 15° = 35° - x$$

$$2x = 20°$$

$$x = 10°$$

Dato:

$$\tan(3y - 20°) = \cot(30° + y)$$

R.T. de ángulos Complementarios:

$$3y - 20 + 30° + y = 90°$$

$$4y = 80°$$

$$y = 20°$$

Calculamos:

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

$$Q = \text{sen}(30°)$$

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

9. Si: $sen5\emptyset.\csc(2\emptyset+45°)=\dfrac{sen20°.sec70°}{tan55°.tan35°}$. 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 Recíprocos:

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

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

R.T. Recíprocas:

$$5\emptyset=2\emptyset+45°$$

$$3\emptyset=45° \Rightarrow \boxed{\emptyset=15°}$$

Calculamos:

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

$$M=sec60°+tan45°$$

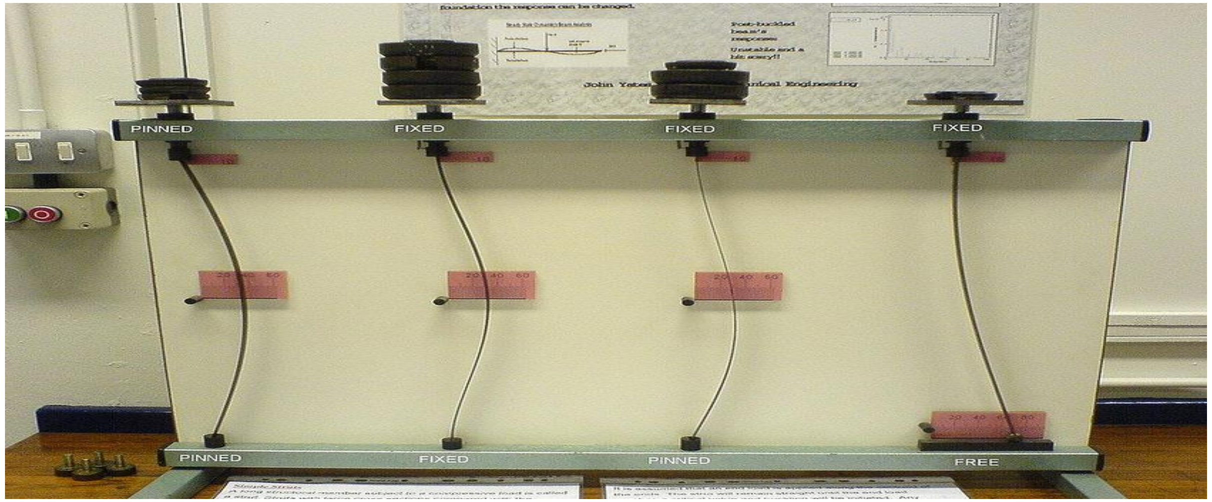
$$M=(2)+(1)$$

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

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: $a = 8\text{sen}30° - 3\tan45°$

$b = 4\sec^2 45° - \sec60°$

$c = 4\csc53° + 3\cot45°$



Resolución:

$$a = 8\text{sen}30° - 3\tan45°$$

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

$$b = 4\sec^2 45° - \sec60°$$

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

$$c = 4\csc53° + 3\cot45°$$

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

$$P = \frac{a+b+c}{3} = \frac{1+6+8}{3} \qquad \boxed{\therefore P = 5N}$$