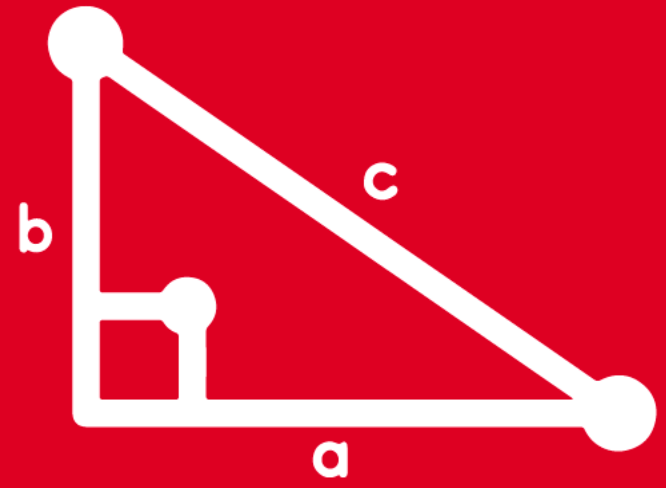
TRIGONOMETRY

TOMO 4



4th
SECONDARY

REVIEW

SACO OLIVEROS

1. Halle el cuadrante en el que pertenece el ánguloβ, para que cumpla las siguientes condiciones:

$$sec323°.sen\beta > 0 \quad y \quad cot162°.cos\beta > 0$$

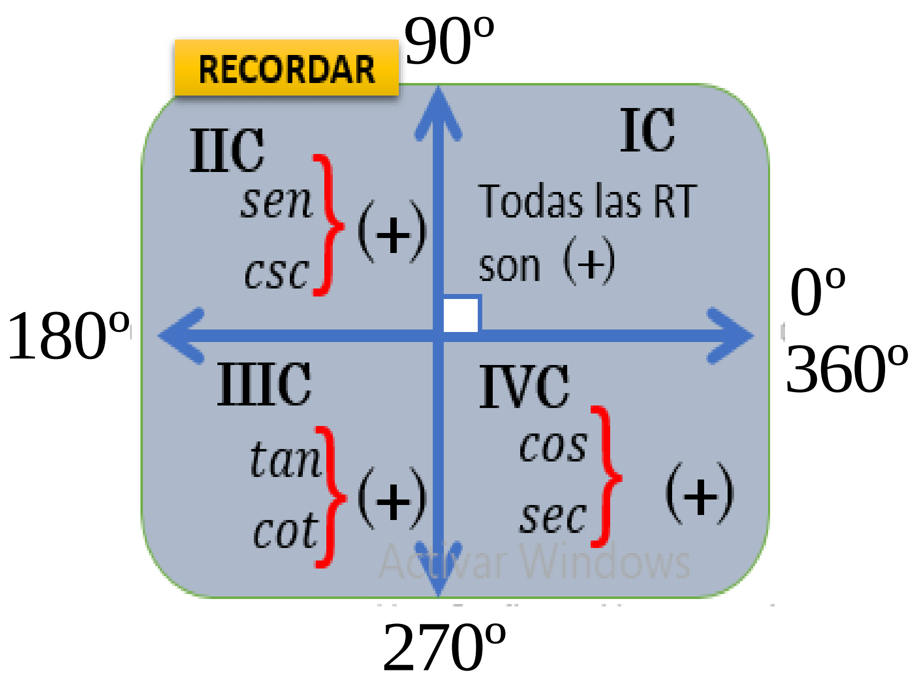
Resolución:

➤ $\underbrace{\overbrace{sec323°}^{IVC}}_{(+)}.\underbrace{sen\beta}_{(+)} > 0 \Rightarrow sen\beta > 0 \quad \begin{cases} \beta \in IC \\ \boxed{\beta \in IIC} \end{cases}$

➤ $\underbrace{\overbrace{cot162°}^{IIC}}_{(-)}.\underbrace{cos\beta}_{(-)} > 0 \Rightarrow cos\beta < 0 \quad \begin{cases} \boxed{\beta \in IIC} \\ \beta \in IIIC \end{cases}$

$$\therefore \beta \in IIC$$

$(+)(+) = (+)$
$(-)(-) = (+)$



2. Si $\cot\theta = -\frac{2}{3}$, donde $\theta \in IVC$ efectúe: $R = \sqrt{13}.(sen\theta + cos\theta)$

Resolución:

$$cot\theta = -\frac{2}{3} = \frac{x}{y}$$

Como $\theta \in IVC$ se tiene que:
$x > 0\ ;\ y < 0$

Entonces: $x = 2\ ;\ y = -3$

Radio vector: $\boxed{r = \sqrt{x^2 + y^2}}$

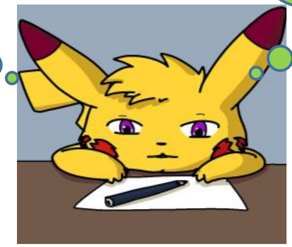
$$r = \sqrt{(2)^2 + (-3)^2}$$

$$\boxed{r = \sqrt{13}}$$

Calculamos: $R = \sqrt{13}.(sen\theta + cos\theta)$

$$sen\alpha = \frac{y}{r}$$

$$cos\alpha = \frac{x}{r}$$



$$R = \cancel{\sqrt{13}}.\left(\frac{-3}{\cancel{\sqrt{13}}} + \frac{2}{\cancel{\sqrt{13}}}\right)$$

$$R = -3 + 2$$

$$\boxed{\therefore R = -1}$$

3. Siendo α y β ángulos cuadrantales positivos y menores a una vuelta, además: $sec\alpha + sen\beta = 0$. Calcule: $E = tan\left(\frac{\alpha}{4}\right) + sec^2\left(\frac{\beta}{3}\right)$

Resolución:

- Del dato:

$$0° < \alpha , \beta < 360°$$

- Además:

$$\underbrace{sec\alpha}_{-1} + \underbrace{sen\beta}_{1} = 0$$

$\alpha = 180°$ $\beta = 90°$

Calculamos: $E = \tan\left(\frac{\alpha}{4}\right) + \sec^2\left(\frac{\beta}{3}\right)$

R.T	0° ; 360°	90°	180°	270°
SEN	O	1	0	-1
COS	1	O	-1	0
TAN	0	N.D	0	N.D
COT	N.D	0	N.D	0
SEC	1	N.D	-1	N.D
CSC	N	1	N.D	-1

$$\therefore E = \frac{7}{3}$$

4. Simplifique: $P = \sqrt{3}sec(-30°) - 5cot(-53°).cos(-37°)$

Resolución:

$$P = \sqrt{3}sec(-30°) - 5cot(-53°).\cos(-37°)$$

$$P = \sqrt{3}\,(\boldsymbol{sec30°})\ -5\,(\boldsymbol{-cot53°}).(\boldsymbol{cos37°})$$

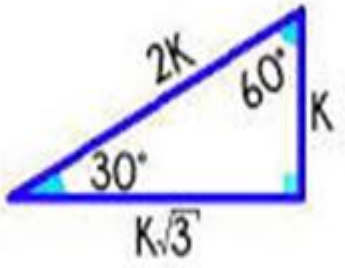
$$P = \cancel{\sqrt{3}}\left(\frac{2}{\cancel{\sqrt{3}}}\right)\ -\cancel{5}\left(-\frac{3}{\cancel{4}}\right)\left(\frac{\cancel{4}}{\cancel{5}}\right)$$

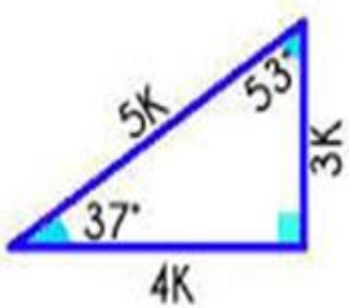
$$P = 2 - (-3)$$

$$P = 2 + 3$$

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

$sen(-x) = -senx$	$csc(-x) = -cscx$
$\cos(-x) = cosx$	$sec(-x) = secx$
$tan(-x) = -tanx$	$cot(-x) = -cotx$





5. Reduzca: $L = \dfrac{3sen\,(180^\circ - x)}{cos(270^\circ + x)} + \dfrac{2sec(90^\circ - x)}{csc(180^\circ + x)}$

Resolución:

$$L = \frac{3sen\,\overbrace{(180^\circ - x)}^{IIC}}{cos\underbrace{(270^\circ + x)}_{IVC}} + \frac{2sec\overbrace{(90^\circ - x)}^{IC}}{csc\underbrace{(180^\circ + x)}_{IIIC}}$$

$$L = \frac{3\cancel{(+senx)}}{\cancel{(+senx)}} + \frac{2\cancel{(+cscx)}}{\cancel{(-cscx)}}$$

$$L = 3 + (-2)$$

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

RECORDAR

IIC: sen, csc (+)

IC: Todas las RT son (+)

IIIC: tan, cot (+)

IVC: cos, sec (+)

90°

IIC $\begin{cases} 90^\circ + x \\ 180^\circ - x \end{cases}$ | $\begin{cases} 90^\circ - x \\ x \end{cases}$ IC

180° | 0° 360°

IIIC $\begin{cases} 180^\circ + x \\ 270^\circ - x \end{cases}$ | $\begin{cases} 360^\circ - x \\ 270^\circ + x \end{cases}$ IVC

270°

6. Si $\alpha - \beta = 90^\circ$, reduzca: $E = \dfrac{tan\alpha}{cot\beta} + sec\alpha . sec\beta$

Resolución:

Dato:

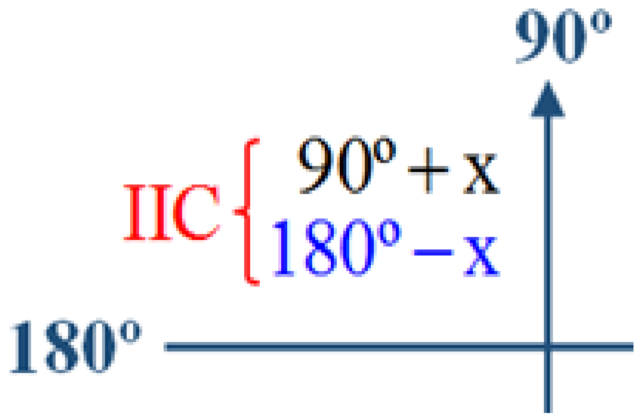
$$\alpha - \beta = 90^\circ \Rightarrow \boxed{\alpha = 90^\circ + \beta}$$

Piden:

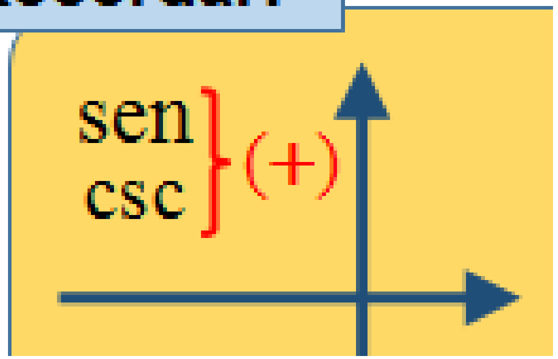
$$E = \frac{\tan(\overbrace{90^\circ + \beta}^{IIC})}{\cot\beta} + \text{sen}(\overbrace{90^\circ + \beta}^{IIC}).\sec(\beta)$$

$$E = \underbrace{\frac{\cancel{-cot\beta}}{\cancel{cot\beta}}}_{-1} + \underbrace{(cos\beta).(sec\beta)}_{1}$$

$$\boxed{\therefore E = 0}$$



Recordar:



7. Efectúe: $E = tan2115° + sec1320°$

Resolución:

$$\begin{array}{r|l} 2115° & 360° \\ \hline 1800° & 5 \\ \hline 315° & \end{array} \qquad \begin{array}{r|l} 1320° & 360° \\ \hline 1080° & 3 \\ \hline 240° & \end{array}$$

$$E = tan315° + sec240°$$

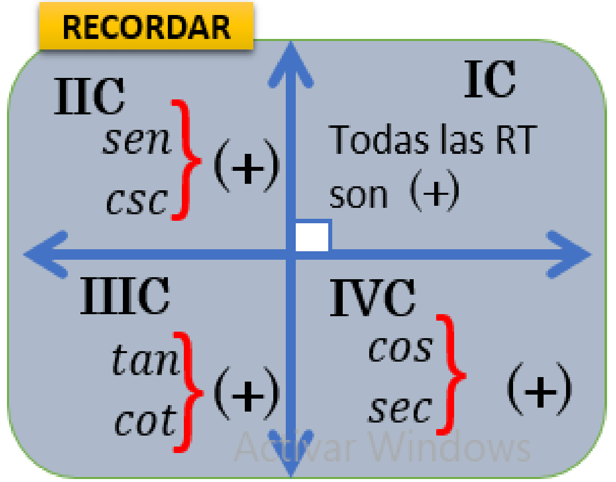
$$E = \underbrace{tan(360° - 45°)}_{IVC} + \underbrace{sec(180° + 60°)}_{IIIC}$$

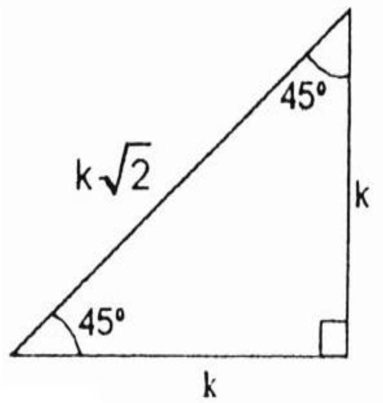
$$E = (-tan45) + (-sec60)$$

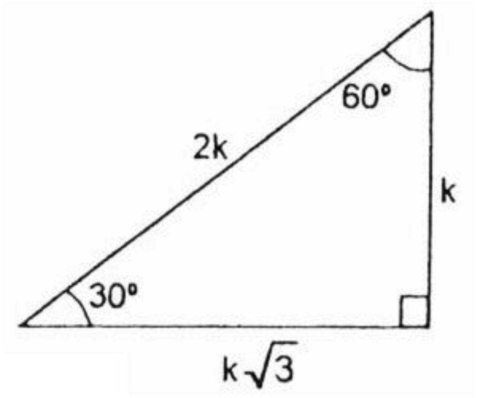
$$E = (-1) + (-2)$$

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

RECORDAR







8. Si $x + y = 51\pi$, reduzca: $M = \dfrac{senx}{seny} + \dfrac{cscx}{cscy}$

Resolución:

Dato:

$$x + y = 51\pi$$

IMPAR

$$x + y = \pi$$

$$\boxed{y = \pi - x}$$

***Calculamos*:**

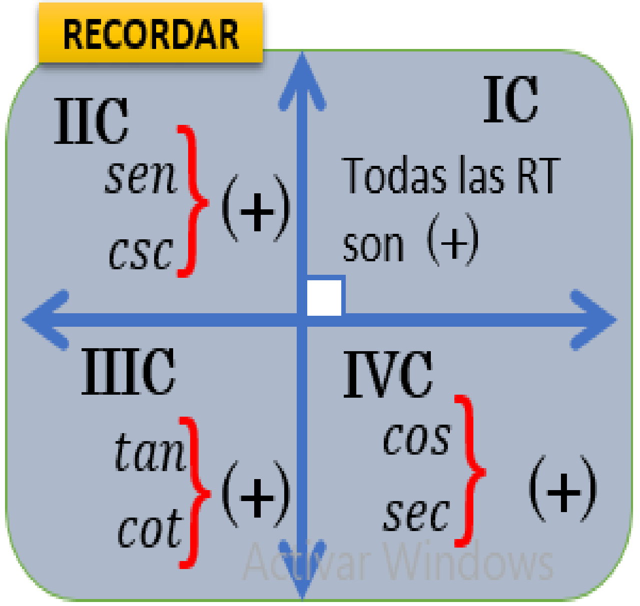
$$M = \frac{senx}{seny} + \frac{cscx}{cscy}$$

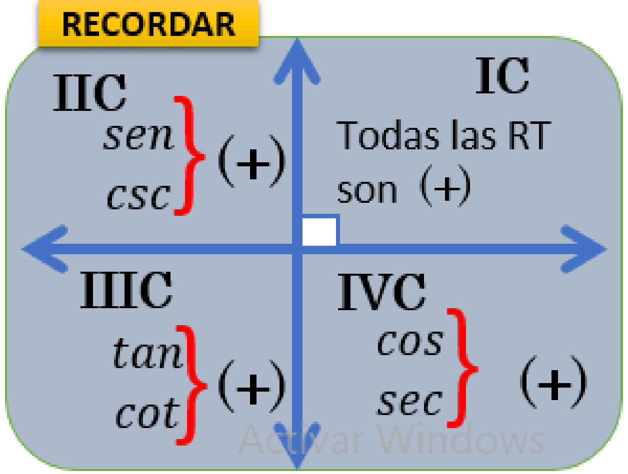
$$M = \frac{senx}{\underbrace{sen(\pi - x)}_{IIC}} + \frac{cscx}{\underbrace{csc(\pi - x)}_{IIC}}$$

$$M = \underbrace{\frac{\cancel{senx}}{\cancel{senx}}}_{1} + \underbrace{\frac{\cancel{cscx}}{\cancel{cscx}}}_{1}$$

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

$\pi = 180°$





9. Simplifique:

$$L = \frac{tan\,(31\frac{\pi}{2} - x)}{cot(18\pi + x)} + sec60°$$

Resolución:

- $\tan\left(31\frac{\pi}{2} - x\right) = \tan\left(\overbrace{3\frac{\pi}{2} - x}^{IIIC}\right) = cotx$

$$\begin{array}{r|l} 31 & 4 \\ \hline 28 & 7 \\ \hline 3 & \end{array}$$

$$\frac{3\pi}{2} = 270°$$

- $\cot(18\pi + x) = \cot(x)$

PAR

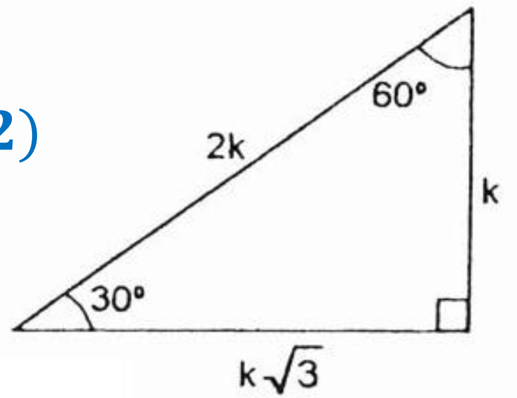
Calculamos:

$$L = \frac{\tan\left(31\frac{\pi}{2} - x\right)}{\cot(18\pi + x)} + \sec 60°$$

$$L = \frac{\cancel{cotx}}{\cancel{cotx}} + (2)$$

$$L = 1 + 2$$

$$\therefore L = 3$$



10. La empresa “MIL OFICIOS” desea invertir en un proyecto donde pueda producir la mayor utilidad posible. El ingeniero a cargo deberá elegir entre 2 proyectos. Se sabe que la empresa esta dispuesta a desembolsar “A” soles, y cada proyecto ofrece una utilidad de B% y C% de la cantidad invertida. ¿Qué proyecto generará mayor utilidad? ¿Cuánta utilidad generará?

$$A = 5000.\,csc1230°$$
$$B = 12sen90° + sec180°$$
$$C = 7cos360° - 5csc270°$$

Resolución:

$$A = 5000.\,csc1230° \quad = 5000.\,csc(\mathbf{150°})$$

$$\begin{array}{r|l} 1230° & 360° \\ \hline \underline{1080} & 3 \\ 150° & \end{array}$$

$$A = 5000.\,csc(\mathbf{180°} - \mathbf{30°})$$
$$A = 5000.\,csc(\mathbf{30°}) = 5000.\,(\mathbf{2})$$
$$A = \ 10000$$

$$B = 12sen90° + sec180°$$
$$B = 12\ (\mathbf{1})\ +\ (\mathbf{-1}) \quad \Rightarrow \quad \boxed{B = 11\%}$$
$$C = 7cos360° - 5csc270°$$
$$C = \ 7(\mathbf{1})\ \ -5\ (\mathbf{-1}) \quad \Rightarrow \quad \boxed{C = 12\%}$$

R.T	0° ; 360°	90°	180°	270°
SEN	O	1	0	-1
COS	1	0	-1	0
TAN	0	N.D	0	N.D
COT	N.D	0	[illegible]	[illegible]
SEC	1	N.D	[illegible]	[illegible]
CSC	N	1	N.D	-1

Calculando la utilidad del proyecto:

$$U_{total} = A * C = 10000 * 12\%$$
$$U_{total} = \cancel{10000}^{\,100} * \frac{12}{\cancel{100}}$$

$$= \mathbf{1200\ soles}$$