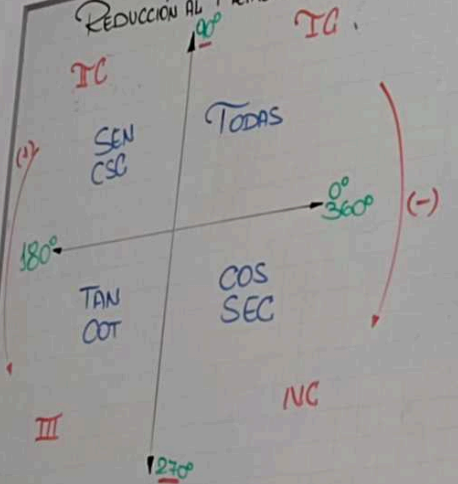
Reducción al Primer Cuadrante



01

$$\operatorname{SEN} 150° - \cos 120° + \operatorname{TAN} 135°$$

$$\operatorname{SEN} 30° + \cos 60° - \operatorname{TAN} 45°$$

$$\frac{1}{2} + \frac{1}{2} - 1$$

$$0$$

02

$$\frac{\operatorname{SEN}(\pi + x)}{\operatorname{SEC}\left(\frac{\pi}{2} + x\right)} - \frac{\cos(\cancel{2}\pi - x)}{\operatorname{SEC}(\pi + x)}$$

$$\frac{\operatorname{SEN} x}{\operatorname{CSC} x} + \frac{\cos(-x)}{\operatorname{SEC}(x)}$$

$$\frac{\operatorname{SEN} x}{\frac{1}{\operatorname{SEN} x}} + \frac{\cos(x)}{\frac{1}{\cos x}}$$

$$\operatorname{SEN}^2 x + \cos^2 x$$

$$1$$

03

$$\frac{\operatorname{SEN}(\pi + x) \cdot \operatorname{TAN}\left(\frac{\pi}{2} - x\right)}{\operatorname{COT}(\cancel{2}\pi - x) \cdot \operatorname{SEN}(\cancel{2\pi} + x)}$$

$$\frac{-\cancel{\operatorname{SEN} x} \cdot \cancel{\operatorname{COT} x}}{-\cancel{\operatorname{COT} x} \cdot \cancel{\operatorname{SEN} x}} = 1$$

04

$$\frac{\operatorname{TAN}(\pi + x) \cdot \cos\left(\frac{3\pi}{2} - x\right) \cdot \operatorname{SEC}(\cancel{2}\pi - x)}{\operatorname{COT}\left(\frac{3\pi}{2} + x\right) \cdot \operatorname{SEN}(\cancel{2}\pi - x) \cdot \operatorname{CSC}\left(\frac{\pi}{2} + x\right)}$$

$$\frac{-\cancel{\operatorname{TAN} x} \cdot \cancel{\operatorname{SEN} x} \cdot \cancel{\operatorname{SEC}(x)}}{\cancel{\operatorname{TAN} x} \cdot \cancel{\operatorname{SEN} x} \cdot \cancel{\operatorname{SEC} x}}$$

$$-1$$

Ángulos Negativos

$$\operatorname{SEN}(-x) = -\operatorname{SEN}(x)$$
$$\to \cos(-x) = \cos(x)$$
$$\operatorname{TAN}(-x) = -\operatorname{TAN}(x)$$
$$\operatorname{COT}(-x) = -\operatorname{COT}(x)$$
$$\to \operatorname{SEC}(-x) = \operatorname{SEC}(x)$$
$$\operatorname{CSC}(-x) = -\operatorname{CSC}(x)$$

$$\operatorname{SEC}(x) = \frac{1}{\cos x}$$

05) $(\cos 810° + \cot 405°) \cdot \operatorname{sen} 450°$

$810° \,|\, \underline{360°}$ → residuo $90°$, cociente 2 ; $405° \,|\, \underline{360°}$ → residuo $45°$, cociente 1

$(\cos 90° + \cot 45°) \cdot \operatorname{sen} 90°$

$(0 + 1)(1) = \underline{1}$

06) $\tan^2 1140° + \cot 765°$

$\tan^2 60° + \cot 45°$

$(\sqrt{3})^2 + 1$

$3 + 1$

$\underline{4}$

07) $16 \cdot \tan^2 397° - 9 \cdot \sec^4 210° - (2 \cdot \cot 315°)^3$

$16 \cdot \tan^2 37° - 9 \sec^4 30° - [2 \cdot (-\cot 45°)]^3$

$\cancel{16} \cdot \dfrac{9}{\cancel{16}} - \cancel{9} \cdot \dfrac{16}{\cancel{9}} + 8 = \underline{1}$

08) $\dfrac{7 \cdot \operatorname{sen} 40° - 3 \cdot \dfrac{\operatorname{sen} 40°}{\cos 50°}}{\operatorname{sen} 140°}$

$\dfrac{4 \cdot \cancel{\operatorname{sen} 40°}}{\cancel{\operatorname{sen} 40°}} = \underline{4}$

09) $x - y = \dfrac{3\pi}{2} \rightsquigarrow x = \dfrac{3\pi}{2} + y$

$\dfrac{\tan\left(\frac{3\pi}{2} + y\right)}{\cot y} + \dfrac{\operatorname{sen}\left(\frac{3\pi}{2} + y\right)}{\cos y}$

$-\dfrac{\cancel{\cot y}}{\cancel{\cot y}} - \dfrac{\cancel{\cos y}}{\cancel{\cos y}}$

$\underline{-2}$

Co-Razones

$\operatorname{sen}\theta = \cos(90° - \theta)$

$\tan\theta = \cot(90° - \theta)$

$\sec\theta = \csc(90° - \theta)$

10) $\dfrac{3 \cdot \operatorname{sen} 20° - 2 \cdot \cos 110°}{\cos 70°}$

$\dfrac{3 \cdot \cancel{\operatorname{sen} 20°} + 2 \cdot \cancel{\operatorname{sen} 20°}}{\cancel{\operatorname{sen} 20°}}$

$\underline{5}$

11) Si: $x + y = \dfrac{\pi}{2} \rightsquigarrow x = \dfrac{\pi}{2} - y$

$2x = \pi - 2y$

$\dfrac{\operatorname{sen}(\pi - 2y)}{\operatorname{sen} 2y} + \dfrac{\cos 2y}{\cos(\pi - 2y)}$

$\dfrac{\cancel{\operatorname{sen} 2y}}{\cancel{\operatorname{sen} 2y}} - \dfrac{\cancel{\cos 2y}}{\cancel{\cos 2y}} = \underline{0}$

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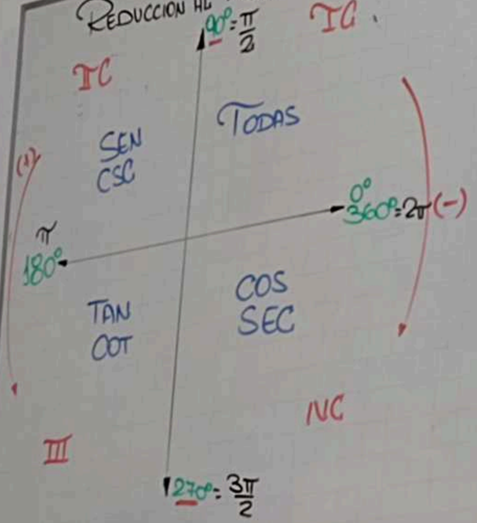


12) $\alpha + \beta = 270° \rightarrow \beta = 270° - \alpha$

$$\frac{\mathrm{SEN}\,\alpha}{\cos(270°-\alpha)} + \mathrm{TAN}\,\alpha \cdot \mathrm{TAN}(270°-\alpha)$$

$$-\frac{\cancel{\mathrm{SEN}\,\alpha}}{\cancel{\mathrm{SEN}\,\alpha}} + \underbrace{\mathrm{TAN}\,\alpha \cdot \mathrm{COT}\,\alpha}_{(1)}$$

0 //

13) $\cancel{\mathrm{TAN}\,10°} + \cancel{\mathrm{TAN}\,40°} + \cancel{\mathrm{TAN}\,70°} + \mathrm{TAN}\,110° + \mathrm{TAN}\,140° + \mathrm{TAN}\,170°$

$-\cancel{\mathrm{TAN}\,70°} - \cancel{\mathrm{TAN}\,40°} - \cancel{\mathrm{TAN}\,10°}$

0 //

$\beta + \theta = 180° \rightarrow \theta = 180° - \beta$

14) $\beta + \theta = 180°$

$\rightarrow \mathrm{SEN}\,\beta + \underbrace{\mathrm{SEN}(180°-\beta)}_{\mathrm{SEN}\,\beta} + \cancel{\mathrm{COS}\,\beta} + \underbrace{\mathrm{COS}(180°-\beta)}_{-\cancel{\mathrm{COS}\,\beta}} + \cancel{\mathrm{TAN}\,\beta} + \underbrace{\mathrm{TAN}(180°-\beta)}_{-\cancel{\mathrm{TAN}\,\beta}}$

$2\,\mathrm{SEN}\,\beta$ //

20) $\mathrm{TAN}\frac{\pi}{12} - \mathrm{TAN}\frac{7\pi}{12} + \mathrm{TAN}\frac{5\pi}{12} - \mathrm{TAN}\frac{11\pi}{12}$

$-\mathrm{TAN}\left(\pi - \frac{5\pi}{12}\right)$ $\quad$ $-\mathrm{TAN}\left(\pi - \frac{\pi}{12}\right)$

$\mathrm{TAN}\frac{\pi}{12} + \mathrm{TAN}\frac{5\pi}{12} + \mathrm{TAN}\frac{5\pi}{12} + \mathrm{TAN}\frac{\pi}{12}$

$2\mathrm{TAN}\frac{\pi}{12} + 2\mathrm{TAN}\frac{5\pi}{12} \rightarrow 2\mathrm{TAN}\,15° + 2\mathrm{TAN}\,75° \rightarrow 2\left(\frac{\sqrt{6}-\sqrt{2}}{\sqrt{6}+\sqrt{2}} + \frac{\sqrt{6}+\sqrt{2}}{\sqrt{6}-\sqrt{2}}\right)$

Ángulos Negativos

$\mathrm{SEN}(-x) = -\mathrm{SEN}(x)$

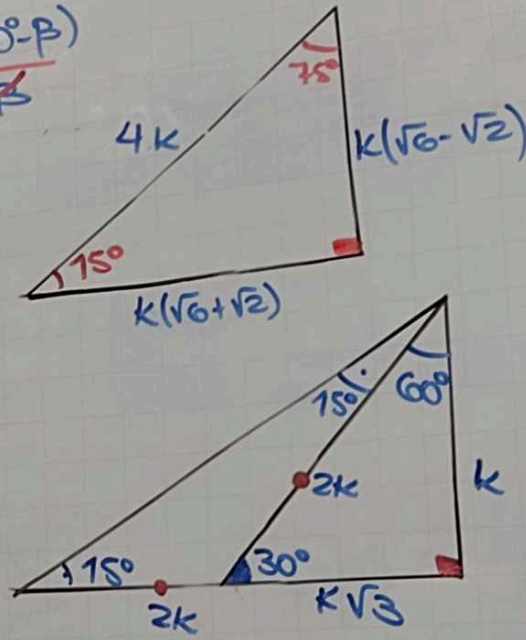
$\rightarrow \mathrm{COS}(-x) = \mathrm{COS}(x)$

$\mathrm{TAN}(-x) = -\mathrm{TAN}(x)$

$\mathrm{COT}(-x) = -\mathrm{COT}(x)$

$\rightarrow \mathrm{SEC}(-x) = \mathrm{SEC}(x)$

$\mathrm{CSC}(-x) = -\mathrm{CSC}(x)$



21) $A + B = 90^\circ \left\{ \begin{array}{l} \text{SEN}\,A = \text{COS}\,B \\ \text{TAN}\,B = \text{COT}\,A \end{array} \right.$

$$\frac{\text{SEN}(A + \overbrace{2B}^{B+B}) \cdot \text{TAN}(2A + \overbrace{3B}^{2B+B})}{\text{COS}(\underbrace{2A}_{A+A} + B) \cdot \text{TAN}(\underbrace{4A}_{3A+A} + 3B)}$$

$$\frac{\text{SEN}(90^\circ + B) \cdot \text{TAN}(180^\circ + B)}{\text{COS}(90^\circ + A) \cdot \text{TAN}(270^\circ + A)}$$

$$\frac{\text{COS}\,\cancel{B} \cdot \text{TAN}\,\cancel{B}}{\text{SEN}\,A \cdot \text{COT}\,A} = 1$$

22) $M \cdot \text{SEN}\left(\frac{55\pi}{2} - \theta\right) \cdot \text{COS}\left(\frac{77\pi}{2} + \theta\right) = 1$

$M \cdot \text{SEN}\left(\cancel{26\pi} + \frac{3\pi}{2} - \theta\right) \cdot \text{COS}\left(\cancel{38\pi} + \frac{\pi}{2} + \theta\right) = 1$

$M \cdot \text{COS}\,\theta \cdot \text{SEN}\,\theta = 1$

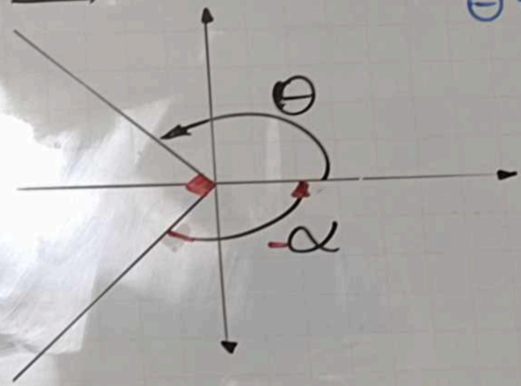
$\text{SEN}\,\theta \cdot \text{COS}\,\theta = \frac{1}{M}$

$\hookrightarrow \text{TAN}\,\theta + \text{COT}\,\theta = \frac{\text{SEN}\,\theta}{\text{COS}\,\theta} + \frac{\text{COS}\,\theta}{\text{SEN}\,\theta} = \frac{\text{SEN}^2\theta + \text{COS}^2\theta}{\text{SEN}\,\theta \cdot \text{COS}\,\theta} = \frac{1}{\frac{1}{M}} = M$

$\sim \overset{1}{\cancel{2}}\left[\frac{(\sqrt{6} - \sqrt{2})^2 + (\sqrt{6} + \sqrt{2})^2}{\cancel{4}\,2}\right] = \frac{12 + 4}{2} = 8$

26) $\theta - \alpha = 270^\circ$

$\theta = 270^\circ + \alpha$



$$\frac{\text{TAN}\,\theta + \text{COT}\,\alpha}{\text{TAN}\,\alpha}$$

$$\frac{\text{TAN}(270^\circ + \alpha) + \text{COT}\,\alpha}{\text{TAN}\,\alpha}$$

$$\frac{-\text{COT}\,\alpha + \text{COT}\,\alpha}{\text{TAN}\,\alpha} = 0$$