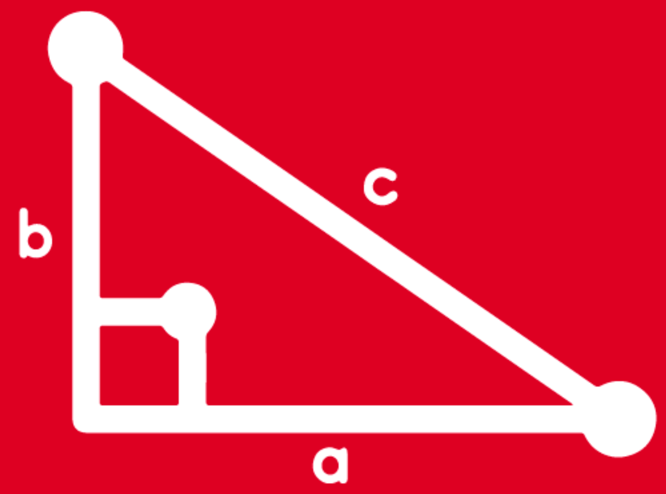
TRIGONOMETRY

Sesion I



4th
SECONDARY

Advisory

SACO OLIVEROS

1. Si $x \in [-4; 2]$, determine la suma del máximo y mínimo valor de:

$$S = \frac{5x + 2}{3}$$

Resolución

Del dato: $x \in [-4; 2] \Rightarrow -4 \leq x \leq 2 \quad \times (5)$

$$-20 \leq 5x \leq 10 \quad +(2)$$

$$-18 \leq 5x + 2 \leq 12 \quad \div (3)$$

$$\underset{S_{mín}}{-6} \leq \underbrace{\frac{5x+2}{3}}_{S} \leq \underset{S_{máx}}{4}$$

Piden:

$$E = S_{mín} + S_{máx}$$

$$E = -6 + 4$$

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

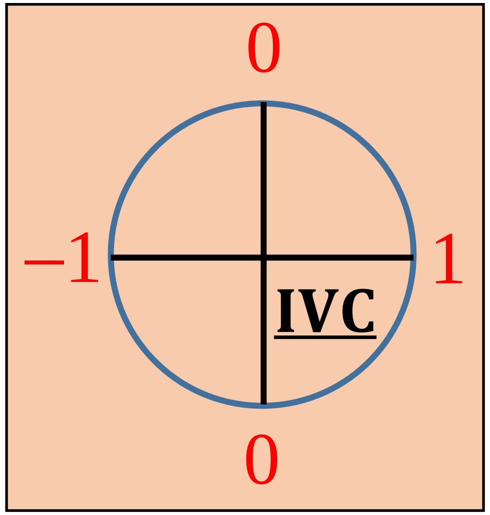
2. Si $\theta \in \mathrm{IVC}$, determine el intervalo de n:

$$\cos\theta = \frac{3n+5}{4}$$

Resolución

Como $\theta \in \mathrm{IVC}$: $\Rightarrow$ $0 < \cos\theta < 1$

Coseno



$$0 < \frac{3n+5}{4} < 1 \qquad \times(4)$$

$$0 < 3n+5 < 4 \qquad -(5)$$

$$-5 < 3n < -1 \qquad \div(3)$$

$$-\frac{5}{3} < n < -\frac{1}{3}$$

$$\therefore\ \boxed{n \in \left\langle -\frac{5}{3}; -\frac{1}{3} \right\rangle}$$

3. Si $\beta \in \mathrm{IIC}$, determine el menor valor entero de:

$$\mathbf{S = 4tan^2\beta + 11}$$

RESOLUCIÓN

Como $\beta \in \mathrm{IIC}$: $\Rightarrow$

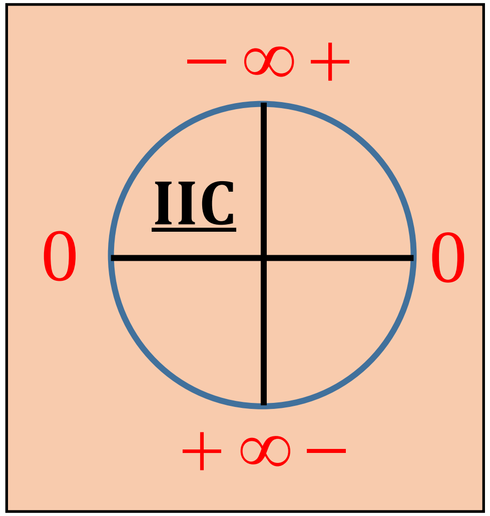
$$\tan\beta < 0 \qquad (\quad)^2$$

$$\tan^2\beta > 0 \qquad \times(4)$$

$$4\tan^2\beta > 0 \qquad +(11)$$

$$\underbrace{4\tan^2\beta + 11}_{\mathbf{S}} > 11$$

Tangente



$$\therefore \boxed{\mathbf{S_{mín\ entero} = 12}}$$

4. Si se cumple que $\sec x + \tan x = 3$. Calcule $\tan x$.

RESOLUCIÓN

Por dato:

$$\sec x + \tan x = 3 \quad \ldots (i)$$

Si

$$\sec x + \tan x = a$$

entonces

$$\sec x - \tan x = \frac{1}{a}$$

$$\longrightarrow \sec x - \tan x = \frac{1}{3} \quad \ldots (ii)$$

$$\cancel{\sec x} + \tan x = 3$$

$$\cancel{\sec x} - \tan x = \frac{1}{3}$$

$(-)$

$$2\tan x = 3 - \frac{1}{3}$$

$$\cancel{2}^{1}\tan x = \frac{\cancel{8}^{4}}{3}$$

$$\therefore \boxed{\tan x = \frac{4}{3}}$$

5. Reducir $W = \dfrac{(\cos\theta - \operatorname{sen}\theta)(\sec\theta + \csc\theta)}{\tan\theta - \cot\theta}$

RESOLUCIÓN

$$W = \frac{(\cos\theta - \operatorname{sen}\theta)(\sec\theta + \csc\theta)}{(\tan\theta - \cot\theta)}$$

$$W = \frac{(\cos\theta - \operatorname{sen}\theta)\left(\dfrac{1}{\cos\theta} + \dfrac{1}{\operatorname{sen}\theta}\right)}{\left(\dfrac{\operatorname{sen}\theta}{\cos\theta} - \dfrac{\cos\theta}{\operatorname{sen}\theta}\right)}$$

$$W = \frac{(\cos\theta - \operatorname{sen}\theta)\left(\dfrac{\operatorname{sen}\theta + \cos\theta}{\cancel{\operatorname{sen}\theta.\cos\theta}}\right)}{\left(\dfrac{\operatorname{sen}^2\theta - \cos^2\theta}{\cancel{\operatorname{sen}\theta.\cos\theta}}\right)}$$

$$W = \frac{(\cos\theta - \operatorname{sen}\theta)(\operatorname{sen}\theta + \cos\theta)}{(\operatorname{sen}^2\theta - \cos^2\theta)}$$

$$W = \frac{(\cos^2\theta - \operatorname{sen}^2\theta)}{(\operatorname{sen}^2\theta - \cos^2\theta)}$$

$$W = \frac{-\cancel{(\operatorname{sen}^2\theta - \cos^2\theta)}}{\cancel{(\operatorname{sen}^2\theta - \cos^2\theta)}}$$

$$\boxed{W = -1}$$

6. Reducir $D = \dfrac{1}{\dfrac{\cos x}{1+\operatorname{sen} x} + \tan x}$

RESOLUCIÓN

$$D = \frac{1}{\dfrac{\cos x}{1+\operatorname{sen} x} + \tan x}$$

$$D = \frac{1}{\dfrac{1-\operatorname{sen} x}{\cos x} + \dfrac{\operatorname{sen} x}{\cos x}}$$

$$\frac{\cos x}{1+\operatorname{sen} x} = \frac{1-\operatorname{sen} x}{\cos x}$$

$$\tan x = \frac{\operatorname{sen} x}{\cos x}$$

$$D = \frac{1}{\dfrac{1-\cancel{\operatorname{sen} x}+\cancel{\operatorname{sen} x}}{\cos x}}$$

$$D = \frac{1}{\dfrac{1}{\cos x}}$$

$$\therefore \boxed{D = \cos x}$$

7. Si se cumple $\tan x + \cot x = 4$. Calcule $E = \operatorname{sen}^6 x + \cos^6 x$.

RESOLUCIÓN

$\tan x + \cot x = \sec x . \csc x$

$\operatorname{sen}^6 x + \cos^6 x = 1 - 3\operatorname{sen}^2 x . \cos^2 x$

Del dato:

$$\underbrace{\tan x + \cot x} = 4$$

$$\underbrace{\sec x} . \underbrace{\csc x} = 4$$

$$\frac{1}{\cos x} . \frac{1}{\operatorname{sen} x} = 4$$

$$\operatorname{sen} x . \cos x = \frac{1}{4}$$

Piden:

$$E = \underbrace{\operatorname{sen}^6 x + \cos^6 x}$$

$$E = 1 - 3\,\underbrace{\operatorname{sen}^2 x . \cos^2 x}$$

$$E = 1 - 3\left(\frac{1}{4}\right)^2$$

$$E = 1 - \frac{3}{16}$$

$$\therefore \boxed{E = \frac{13}{16}}$$

8. Sabiendo que $\mathbf{sen(\alpha + x) = 8sen(\alpha - x)}$. Calcule

$$\mathbf{N = \frac{tan\alpha}{tanx}}$$

RESOLUCIÓN

$$\mathbf{sen(\alpha \pm \beta) = sen\alpha.cos\beta \pm cos\alpha.sen\beta}$$

Del dato: $\mathbf{sen(\alpha + x)} = 8.\mathbf{sen(\alpha - x)}$

$$\mathbf{sen\alpha.cosx + cos\alpha.senx} = 8\ \mathbf{(sen\alpha.cosx - cos\alpha.senx)}$$

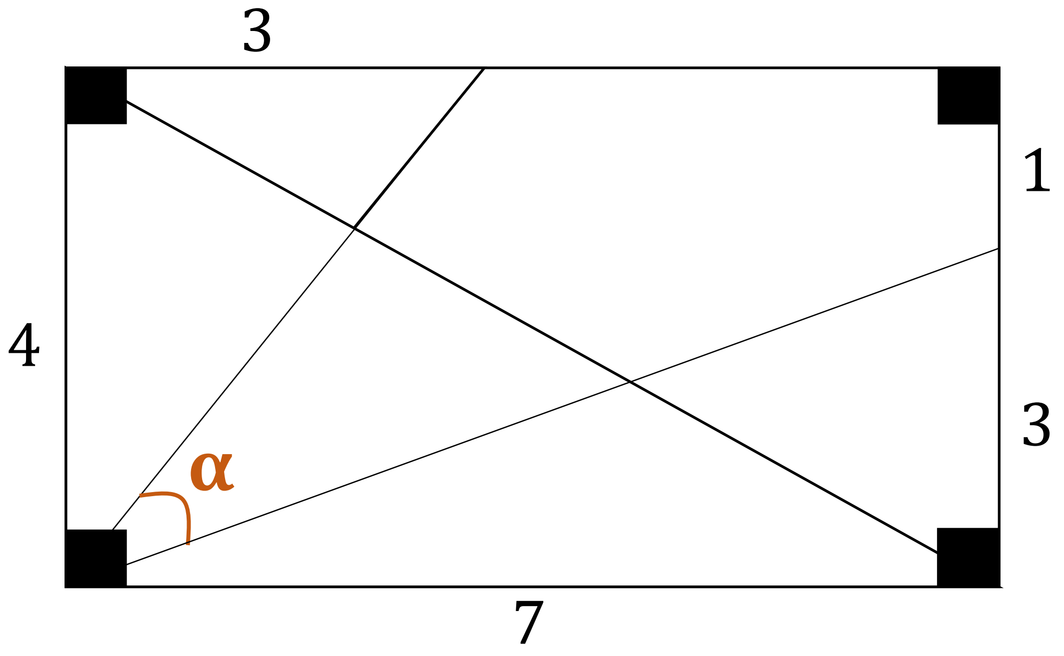
$$\mathbf{sen\alpha.cosx + cos\alpha.senx} = \mathbf{8sen\alpha.cosx - 8cos\alpha.senx}$$

$$9cos\alpha.senx = 7sen\alpha.cosx$$

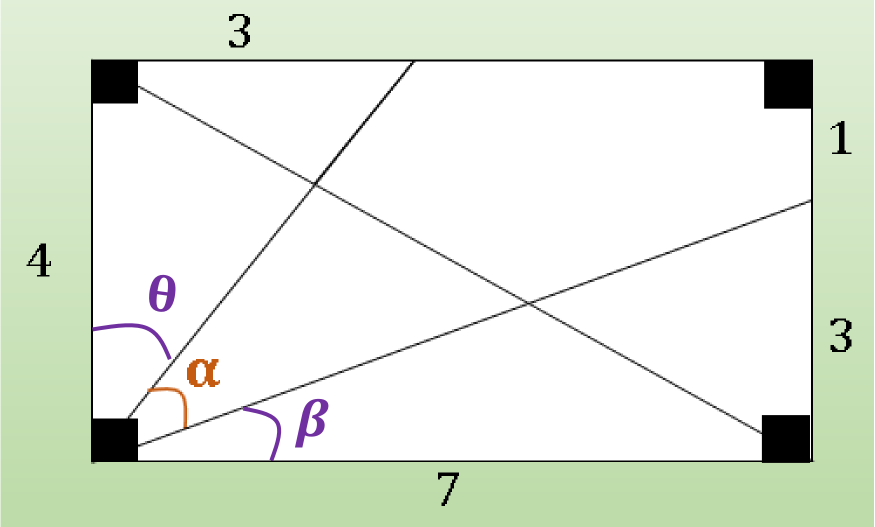
$$9.\underbrace{\mathbf{\frac{senx}{cosx}}}_{\mathbf{tanx}} = 7.\underbrace{\mathbf{\frac{sen\alpha}{cos\alpha}}}_{\mathbf{tan\alpha}} \rightarrow \frac{9}{7} = \left.\frac{tan\alpha}{tanx}\right\} \mathbf{N}$$

$$\therefore \boxed{\mathbf{N = \frac{9}{7}}}$$

9. De la figura mostrada, calcule $\tan\alpha$.



Si $\theta + \alpha + \beta = 90°$, entonces:
$\tan\theta.\tan\alpha + \tan\alpha.\tan\beta + \tan\theta.\tan\beta = 1$



$\tan\theta = \dfrac{3}{4}$

$\tan\beta = \dfrac{3}{7}$

Del gráfico: $\theta + \alpha + \beta = 90°$

$$\frac{3}{4}.\tan\alpha + \tan\alpha.\frac{3}{7} + \frac{3}{7}.\frac{3}{4} = 1 \times (28)$$

$$21.\tan\alpha + 12.\tan\alpha + 9 = 28$$

$\Rightarrow 33\tan\alpha = 19 \quad \therefore \boxed{\tan\alpha = \dfrac{19}{33}}$

10. Si se cumple $\dfrac{\mathbf{sen^3x+cos^3x}}{\mathbf{senx+cosx}} = \dfrac{7}{8}$. Calcule $\mathbf{N = tanx + cotx}$

$$\boxed{\mathbf{a^3 + b^3 = (a+b)(a^2+b^2-ab)}}$$

RESOLUCIÓN

Del dato: $\dfrac{\text{sen}^3\text{x} + \cos^3\text{x}}{\text{senx} + \cos\text{x}} = \dfrac{7}{8}$

$$\frac{\cancel{(\mathbf{senx + cosx})}(\mathbf{sen^2x + cos^2x - senx.\,cosx})}{\cancel{(\text{senx} + \cos\text{x})}} = \frac{7}{8}$$

$$(\underbrace{\mathbf{sen^2x + cos^2x}} - \text{senx}.\cos\text{x}) = \frac{7}{8}$$

$$\mathbf{1} \quad - \text{senx}.\cos\text{x} = \frac{7}{8}$$

$$\Rightarrow \mathbf{senx\,.\,cosx} = \frac{\mathbf{1}}{\mathbf{8}}$$

Piden:

$$\text{N} = \underbrace{\tan\text{x} + \cot\text{x}}$$

$$\text{N} = \mathbf{cscx \cdot secx}$$

$$\text{N} = \frac{\mathbf{1}}{\mathbf{senx \cdot cosx}} = \frac{1}{\frac{1}{8}}$$

$$\therefore \boxed{\mathbf{N = 8}}$$

COLEGIOS
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SISTEMA HELICOIDAL

MUCHAS GRACIAS POR TU ATENCIÓN

Tu curso amigo
Trigonometría