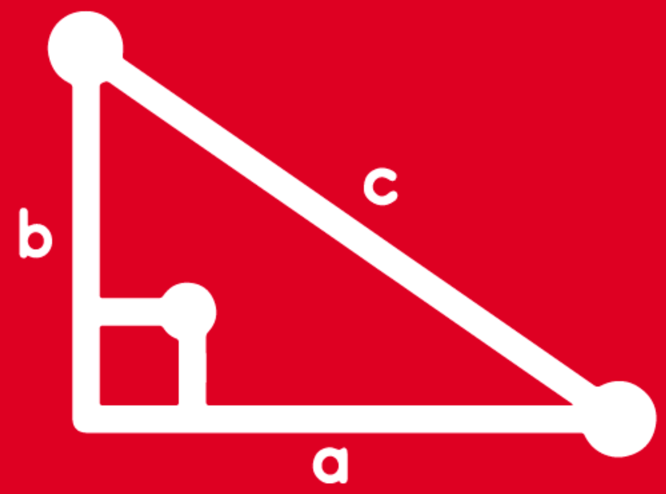
TRIGONOMETRY

Sesion 2



4th
SECONDARY

Advisory

SACO OLIVEROS

1) Calcule el producto del máximo y el mínimo valor de la tan β, si |4tan β−3|=|tan β +12|

RESOLUCIÓN

$$4\tan\beta - 3 = \tan\beta + 12$$

$$3\tan\beta = 15$$

$$\boxed{\tan\beta = 5}$$

Máximo

$$4\tan\beta - 3 = -(\tan\beta + 12)$$

$$4\tan\beta - 3 = -\tan\beta - 12$$

$$5\tan\beta = -9$$

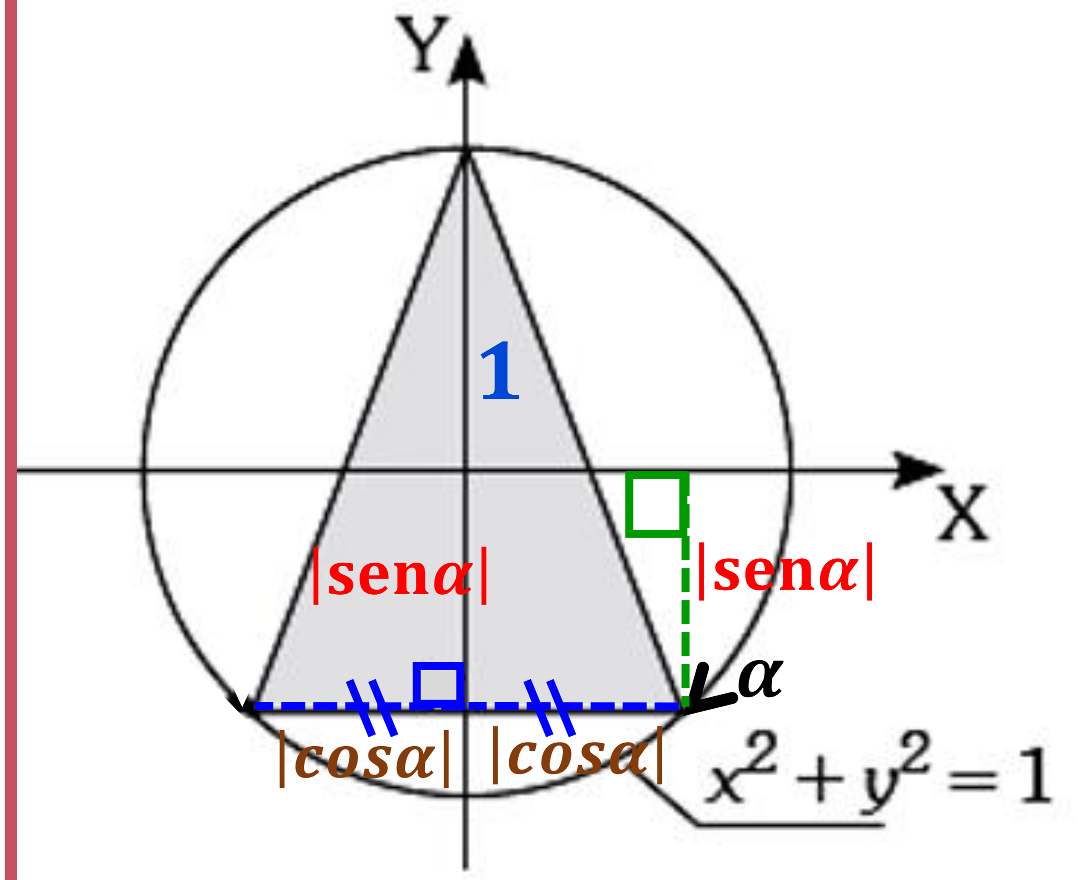
$$\boxed{\tan\beta = -\frac{9}{5}}$$

Mínimo

$$\tan\beta_{max}\cdot\tan\beta_{min} = \boxed{-9}$$

2) Del gráfico, determine el área de la región sombreada.

RESOLUCIÓN



Recordar:

$$S = \frac{b \times h}{2}$$

$$S = \frac{(\cancel{2}|cos\alpha|)(1 + |sen\alpha|)}{\cancel{2}}$$

como: $\alpha \in IVC$

$|cos\alpha| = cos\alpha$

$|sen\alpha| = -sen\alpha$

$$S = (cos\alpha)(1 - sen\alpha)$$

$$\boxed{S = cos\alpha(1 - sen\alpha)\ u^2}$$

3)Si $\phi \in IVC$, determinar la variación de "k" que verifica la igualdad.

$$\tan\phi = \frac{5k-7}{11}$$

RESOLUCIÓN

Como $\phi \in IVC$ entonces:

$$tan\phi < 0$$

$$\frac{5k-7}{11} < 0$$

$$5k - 7 < 0$$

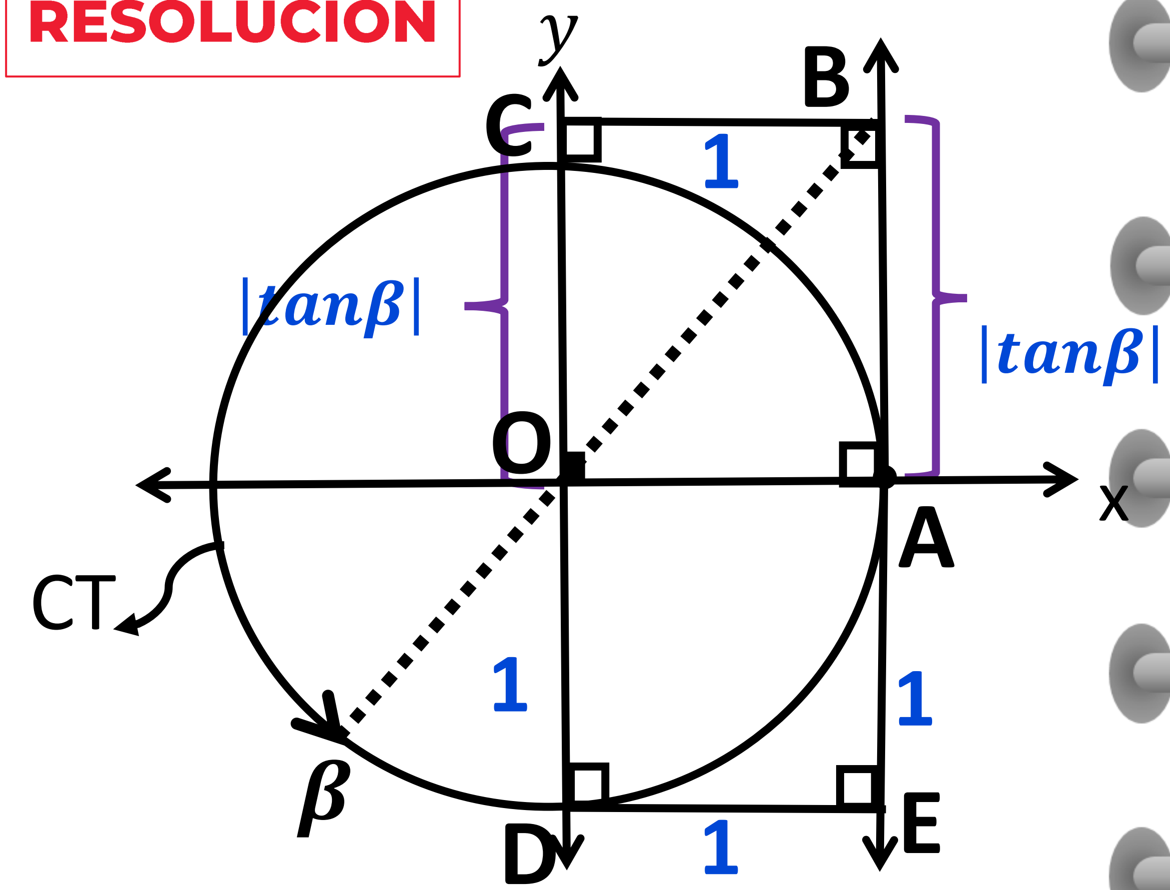
$$5k < 7$$

$$k < \frac{7}{5}$$

$$\boldsymbol{m \in \left\langle -\infty; \frac{7}{5} \right\rangle}$$

4)Del gráfico, calcular el perímetro del rectángulo BCDE

RESOLUCIÓN



$AE = OD = 1$ $DE = BC = 1$

$AB = |tan\beta| = OC$

Nos piden el perímetro:

$$\boldsymbol{2p = BC + CO + OD + DE + EA + AB}$$

$$2p = 1 + |tan\beta| + 1 + 1 + 1 + |tan\beta|$$

$$2p = 4 + 2|tan\beta|$$

$$\beta \epsilon IIIC \rightarrow |tan\beta| = tan\beta$$

$$2p = 4 + 2(tan\beta)$$

$$\boxed{2p = (4 + 2tan\beta)\ u}$$

5) Si: $\sec\beta - \tan\beta = \frac{1}{2}$,
calcule: $F = 20(\text{sen}\beta + \cos\beta)$

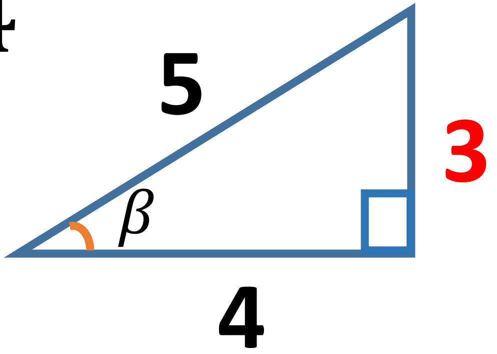
RESOLUCIÓN

Dato: $\sec\beta - \cancel{\tan\beta} = \frac{1}{2}$

Propiedad: $\sec\beta + \cancel{\tan\beta} = 2$ +

$$2\sec\beta = \frac{5}{2}$$

$$\Rightarrow \sec\beta = \frac{5}{4}$$



Piden:

$$F = 20(\text{sen}\beta + \cos\beta)$$

$$F = 20\left(\frac{3}{5} + \frac{4}{5}\right) = 20\left(\frac{7}{5}\right)$$

$$\boxed{F = 28}$$

6) Si: senx – cosx = $\frac{\sqrt{7}}{5}$
Reduzca: K = secx. cscx + 11/9

RESOLUCIÓN

Del dato: $senx - cosx = \frac{\sqrt{7}}{5}$

ELEVAMOS AL CUADRADO

$$\underbrace{sen^2x + cos^2x}\ - 2senx.cosx = \frac{7}{25}$$

$$1 - 2senx.cosx = \frac{7}{25}$$

$$\boxed{sen^2x + cos^2x = 1}$$

$$\frac{18}{25} = 2senx.cosx$$

$$\frac{9}{25} = senx.cosx$$

$$\frac{25}{9} = secx.cscx$$

Piden: $K = secx.cscx + \frac{11}{9}$

$$K = \frac{25}{9} + \frac{11}{9} = \frac{36}{9}$$

$$\boxed{K = 4}$$

7)Si: tanα + cotα = 7 , reduzca:

$K = \sec^2\alpha + \csc^2\alpha + 1$

RESOLUCIÓN

$$\boldsymbol{tan\alpha + cot\alpha = sec\alpha . csc\alpha}$$

$$\boldsymbol{sec^2\alpha + csc^2\alpha = sec^2\alpha . csc^2\alpha}$$

Por condición tenemos:

$$tan\alpha + cot\alpha = 7$$

Por identidad: $sec\alpha . csc\alpha = 7$

Al cuadrado: $sec^2\alpha . csc^2\alpha = 49$

Por identidad: $sec^2\alpha + csc^2\alpha = 49$

Nos piden: $\boldsymbol{K = \underbrace{sec^2\alpha + csc^2\alpha} + 1}$

$$K = 49 + 1$$

$$\boxed{\boldsymbol{K = 50}}$$

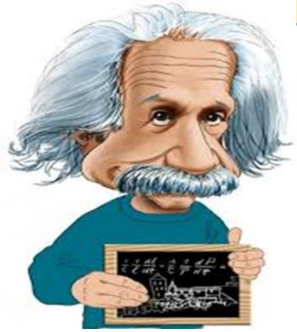
8)Reduzca:

M=√3tan40°+√3tan20°+3tan40°.tan20°

RESOLUCIÓN

Recordar:

$$\boldsymbol{tanx + tany + tan(x+y).tanx.tany = tan(x+y)}$$



Nos piden reducir:

$$\boldsymbol{M = \sqrt{3}tan40° + \sqrt{3}tan20° + 3tan40°.tan20°}$$

Factorizamos $\boldsymbol{\sqrt{3}}$

$$M = \sqrt{3}\left(tan40° + tan20° + \sqrt{3}tan40°.tan20°\right)$$

$$tan60° = tan(40° + 20°)$$

$$M = \sqrt{3}[tan(40° + 20°)]$$

$$M = \sqrt{3}.\sqrt{3}$$

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

9)En el triángulo ABC se cumple que tanB = $\frac{5}{3}$ y tanC = 6, calcular cotA

RESOLUCIÓN

$$Como\ ABC\ es\ un\ triángulo, entonces:$$

$$A + B + C = 180°$$

Recordar:

Si: $\boldsymbol{A + B + C = 180°}$

$$\boldsymbol{tanA + tanB + tanC = tanA.tanB.tanC}$$

$$\boldsymbol{Se\ cumple}:$$

$$tanA + tanB + tanC = tanA.tanB.tanC$$

$$tanA + \frac{5}{3} + 6 = tanA.\frac{5}{3}.6$$

$$tanA + \frac{23}{3} = \frac{30}{3}tanA$$

Multiplicar por 3

$$3tanA + 23 = 30tanA$$

$$23 = 27tanA$$

$$\frac{\boldsymbol{23}}{\boldsymbol{27}} = tanA$$

$$\boxed{\boldsymbol{cotA = \frac{27}{23}}}$$

10)Juan gasta diario en la cafetería s/.(4E). ¿ Cuánto gastará en total a la semana?

$E = (1 + sen^2\alpha)(1 + cos^2\alpha)$

Si: $sen^6\alpha + cos^6\alpha = \frac{1}{4}$

RESOLUCIÓN

Del dato: $\underbrace{sen^6\alpha + cos^6\alpha} = \frac{1}{4}$

Por identidad: $1 - 3sen^2\alpha cos^2\alpha = \frac{1}{4}$

$$\frac{3}{4} = 3sen^2\alpha cos^2\alpha$$

$$\frac{1}{4} = sen^2\alpha cos^2\alpha$$

Sabemos que:

$$\boldsymbol{E = (1 + sen^2\alpha)(1 + cos^2\alpha)}$$

$$E = 1 + \underbrace{cos^2\alpha + sen^2\alpha}_{\mathbf{1}} + \underbrace{sen^2\alpha cos^2\alpha}_{\frac{\mathbf{1}}{\mathbf{4}}}$$

$$E = 1 + 1 + \frac{1}{4} \Rightarrow \boldsymbol{E = \frac{9}{4}}$$

Gasto diario: $4E = 4\frac{9}{4} = \boxed{9}$

Nos piden gasto semanal: $7(9)$

$$\boldsymbol{s/63}$$