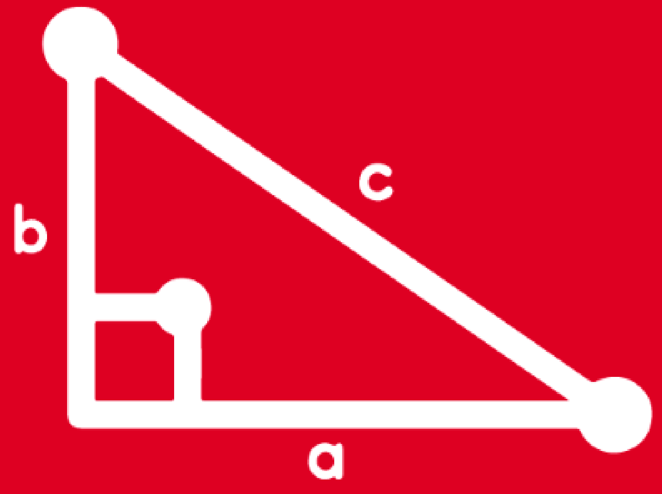
TRIGONOMETRY

VOLUME VIII

3rd
SECONDARY



FEEDBACK

SACO OLIVEROS

1) Calcule sen75°.

Resolución:

Recordar

$$\text{sen}(\alpha + \beta) = \text{sen}\alpha\cos\beta + \cos\alpha\,\text{sen}\beta$$

$$\text{sen}(45° + 30°) = \text{sen}45°\cos30° + \cos45°\text{sen}30°$$

$$\text{sen}75° = \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{1}{2}$$

$$\therefore \quad \text{sen}75° = \frac{\sqrt{6} + \sqrt{2}}{4}$$

2) Determine el valor de

$$P = \frac{\text{sen}50°\cdot\cos 12° - \cos 50°\cdot\text{sen}12°}{\cos 27°\cdot\cos 25° - \text{sen}27°\cdot\text{sen}25°}$$

Resolución:

Recordar

$$\text{sen}\alpha\cos\beta - \cos\alpha\,\text{sen}\beta = \text{sen}(\alpha - \beta)$$
$$\cos\alpha\cos\beta - \text{sen}\alpha\,\text{sen}\beta = \cos(\alpha + \beta)$$

$$P = \frac{\text{sen}(50° - 12°)}{\cos(27° + 25°)} = \frac{\text{sen}38°}{\cos 52°} = \frac{\cancel{\text{sen}38°}}{\cancel{\text{sen}38°}} = 1$$

3) Si $\tan x = \frac{1}{5}$ y $\tan y = 2$, calcule $\tan(x + y)$.

Resolución:

$$\tan(x+y) = \frac{\frac{1}{5}+2}{1-\left(\frac{1}{5}\right)(2)}$$

Recordar

$$\tan(x+y) = \frac{\tan x+\tan y}{1-\tan x.\tan y}$$

$$\tan(x+y) = \frac{\frac{11}{5}}{1-\frac{2}{5}} = \frac{\frac{11}{\cancel{5}}}{\frac{3}{\cancel{5}}} = \frac{11}{3}$$

4) Calcule M si

$$M = 10.\text{sen}18°30'.\cos18°30'$$

Resolución:

$$M = 5.2\text{sen}18°30'.\cos18°30'$$

$$M = 5\text{sen}2(18°30')$$

$$M = 5\text{sen}37°$$

$$M = \cancel{5}\left(\frac{3}{\cancel{5}}\right)$$

$$M = 3$$

Recordar

$$\text{sen}(2\alpha) = 2\text{sen}\alpha\ \cos\alpha$$

5) **Si θ es un ángulo agudo, tal que $\cos\theta = \frac{1}{\sqrt{10}}$, calcule $\cos 2\theta$.**

Resolución:

$$\cos 2\theta = 2\left(\frac{1}{\sqrt{10}}\right)^2 - 1$$

$$\cos 2\theta = 2\left(\frac{1}{10}\right) - 1$$

$$\cos 2\theta = \frac{1}{5} - 1 = -\frac{4}{5}$$

Recordar

$$\cos 2\theta = 2\cos^2\theta - 1$$

6) Siendo β un ángulo agudo, tal que $\tan\beta = \frac{1}{5}$, calcule $\tan 2\beta$.

Recordar

$$\tan 2\beta = \frac{2\tan\beta}{1 - \tan^2\beta}$$

Resolución:

$$\tan 2\beta = \frac{2\left(\frac{1}{5}\right)}{1 - \left(\frac{1}{5}\right)^2}$$

$$\tan 2\beta = \frac{\frac{2}{5}}{1 - \frac{1}{25}} = \frac{\frac{2}{5}}{\frac{24}{25}} = \frac{\cancel{50}}{\cancel{120}}$$

$$\therefore \tan 2\beta = \frac{5}{12}$$

7) Reduzca $E = \dfrac{\boxed{1 - \cos 2\alpha}}{\text{sen}2\alpha}$.

Resolución:

$$E = \frac{\cancel{2}\text{sen}^{\cancel{2}}\alpha}{\cancel{2}\cancel{\text{sen}\alpha}.\cos\alpha}$$

$$E = \frac{\text{sen}\alpha}{\cos\alpha}$$

$\therefore$ $E = \tan\alpha$

Recordar

$$2\text{sen}^2\alpha = 1 - \cos 2\alpha$$

8) Efectúe $T = \boxed{(\cot 18° - \tan 18°)} \tan 36°$.

Resolución:

Recordar

$$\cot\alpha - \tan\alpha = 2\cot 2\alpha$$

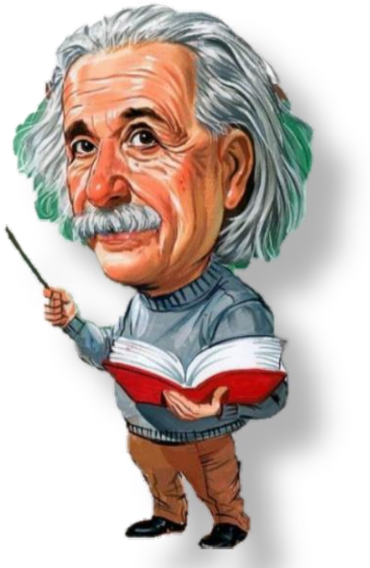
$$\tan\alpha . \cot\alpha = 1$$

$T = 2\cot 2(18°). \tan 36°$

$T = 2\ \underbrace{\cot 36°. \tan 36°}$

$T = 2(1)$

$\therefore\ T = 2$



9) Siendo $\operatorname{sen}x + \cos x = \sqrt{\frac{3}{7}}$; calcule sen2x.

Resolución:

$$\underbrace{(\operatorname{sen}x + \cos x)^2}_{} = \left(\sqrt{\frac{3}{7}}\right)^2$$

$$1 + \operatorname{sen}2x = \frac{3}{7}$$

$$\operatorname{sen}2x = \frac{3}{7} - 1$$

$$\therefore \operatorname{sen}2x = -\frac{4}{7}$$

Recordar

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

10) Al copiar de la pizarra la expresión $1 + \tan^2 8°$, Luis cometió un error y escribió $1 - \tan^2 8°$. Determine la razón entre lo que estaba escrito en la pizarra y lo que escribió Luis.

Resolución:

$$E = \frac{1 + \tan^2 8°}{1 - \tan^2 8°}$$

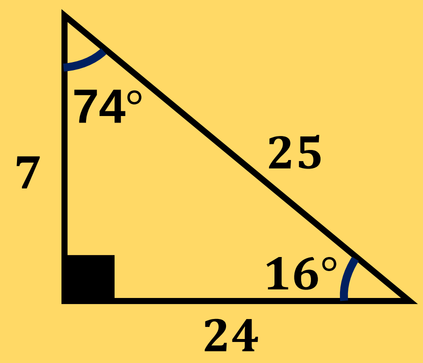
$$E = \sec 2(8°)$$

$$E = \sec(16°)$$

$$\therefore E = \frac{25}{24}$$

Recordar

$$\sec 2x = \frac{1 + \tan^2 x}{1 - \tan^2 x}$$



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