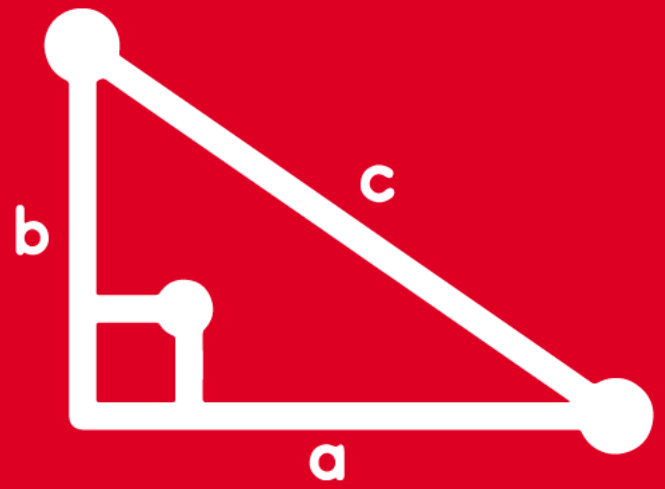
TRIGONOMETRY

Chapter 23



2nd
SECONDARY

IDENTIDADES TRIGONOMÉTRICAS FUNDAMENTALES II

SACO OLIVEROS

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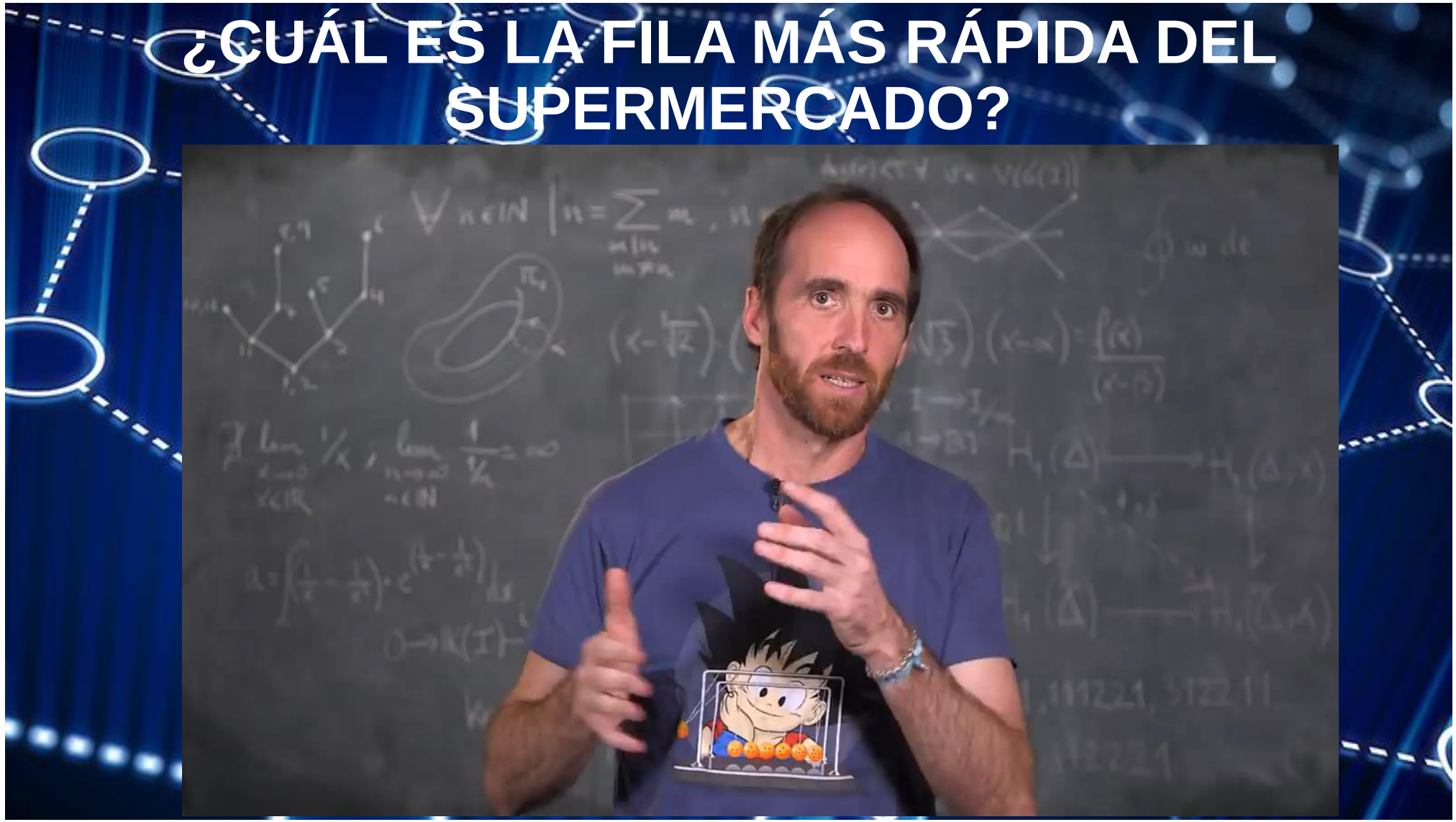


IDENTIDADES TRIGONOMÉTRICAS FUNDAMENTALES

Identidades pitagóricas:

$$sen^2x + cos^2x = 1$$

$$sen^2x = 1 - cos^2x$$

$$cos^2x = 1 - sen^2x$$

$$sec^2x - tan^2x = 1$$

$$sec^2x = 1 + tan^2x$$

$$tan^2x = sec^2x - 1$$

$$csc^2x - cot^2x = 1$$

$$csc^2x = 1 + cot^2x$$

$$cot^2x = csc^2x - 1$$

PROBLEMA 1

Reduzca: $\mathbf{M = sec^2x - tan^2x + 5}$

Resolución:

$$M = \underbrace{sec^2x - tan^2x}_{} + 5$$

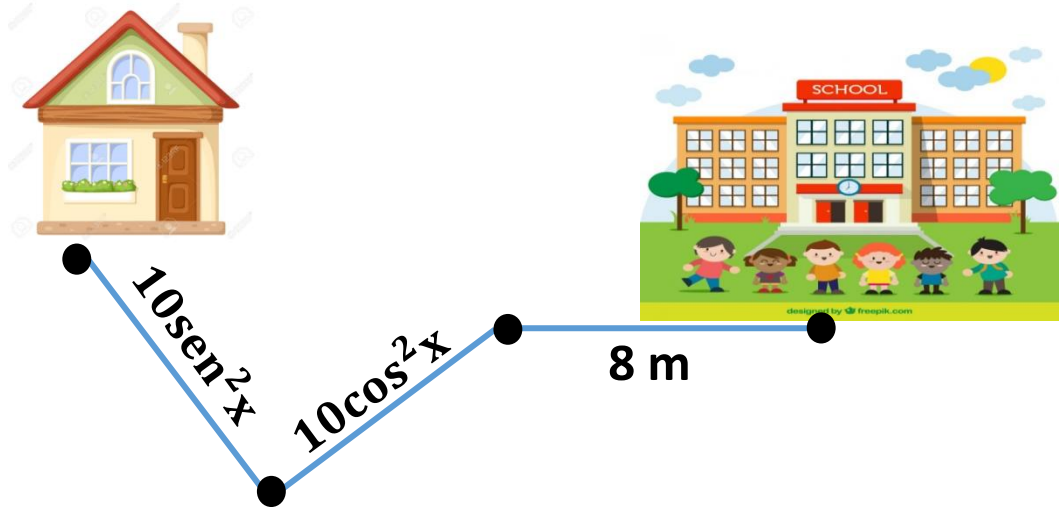
$$M = \quad (1) \quad + 5$$

$$\therefore \mathbf{M = 6}$$

$$sec^2x - tan^2x = 1$$

PROBLEMA 2

Luis recorre diariamente la siguiente ruta para dirigirse de su casa al colegio:



Determine la distancia que recorre diariamente de su casa al colegio.

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

Resolución:

Del gráfico, el recorrido total(R_t) es:

$$R_t = 10\text{sen}^2\text{x} + 10\cos^2\text{x} + 8$$

$$R_t = 10.\ (\text{sen}^2\text{x} + \cos^2 x\ ) + 8$$

$$R_t = 10.\quad (1)\quad + 8$$

$$\therefore R_t = 18\ \text{m}.$$

PROBLEMA 3

Simplifique: $\mathbf{K = sen^2x + cos^2\,x + cot^2\,x}$

Resolución:

$$K = \underbrace{sen^2x + cos^2\,x}_{1} + cot^2\,x$$

$$K = 1 + cot^2x$$

$$\therefore \mathbf{K = csc^2x}$$

$$sen^2x + cos^2x = 1$$

$$1 + cot^2x = csc^2x$$

PROBLEMA 4

Simplifique $\mathbf{A = cosx(secx - cosx)}$

Resolución:

$$A = cosx.(secx - cosx)$$

$$A = \underbrace{cosx.secx} - cos^2x$$

$$A = (1) - cos^2x$$

$$\therefore \mathbf{A = sen^2x}$$

$$cosx.secx = 1$$

$$1 - cos^2x = sen^2x$$

PROBLEMA 5

Reduzca: $\mathbf{I = \frac{(secx - 1)(secx + 1)}{\tan^2 x}}$

Resolución:

$$I = \frac{(secx - 1)(secx + 1)}{\tan^2 x}$$

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

$$I = \frac{\cancel{\tan^2 x}}{\cancel{\tan^2 x}}$$

$\therefore I = 1$

$$(a - b)(a + b) = a^2 - b^2$$

$$sec^2x - 1 = \tan^2x$$

PROBLEMA 6

Reduzca: $\mathbf{R = cosx + cosx.\ tan^2\ x}$

Resolución:

$$R = cosx + cosx.\ \mathbf{tan^2\ x}$$

$$R = cosx + \cancel{cosx}.\ \frac{\mathbf{sen^2 x}}{\mathbf{cos^{\cancel{2}} x}}$$

$$R = \frac{\mathbf{cos^2 x} + \mathbf{sen^2 x}}{cosx}$$

$$R = \frac{\mathbf{1}}{cosx}$$

$\therefore \mathbf{R = secx}$

$$\mathbf{tanx = \frac{senx}{cosx}}$$

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

$$\mathbf{\frac{1}{cosx} = secx}$$

PROBLEMA 7

Si: $\mathbf{senx.cosx} = \frac{1}{4}$;

Determine $N = (senx + cosx)^2$

Resolución:

Del dato:

$$\mathbf{senx.cosx} = \frac{1}{4}$$

Piden:

$$N = (senx + cosx)^2$$

$$N = \underbrace{sen^2x + cos^2x}_{1} + 2.\underbrace{senx.cosx}_{\left(\frac{1}{4}\right)}$$

$$N = 1 + 2.\left(\frac{1}{4}\right)$$

$$N = 1 + \frac{1}{2}$$

$$(a+b)^2 = a^2 + b^2 + 2ab$$

$$sen^2x + cos^2x = 1$$

$$\therefore N = \frac{3}{2}$$

PROBLEMA 8

Si:

$$\mathbf{M = (1 + senx)(1 - senx)}$$
$$\mathbf{N = (1 + cosx)(1 - cos\,x)}$$

Calcular M + N

$$(a+b)(a-b) = a^2 - b^2$$

$$sen^2x + cos^2x = 1$$

Resolución:

$$M = (1 + senx)(1 - senx)$$

$$\mathbf{M = \quad 1 - sen^2x}$$

$$N = (1 + cosx)(1 - cosx)$$

$$\mathbf{N = \quad 1 - cos^2x}$$

Piden:

$$\mathbf{M + N = \quad 1 - sen^2x + \quad 1 - cos^2x}$$

$$M + N = \quad 2 \quad - \underbrace{(\mathbf{sen^2x + cos^2x})}$$

$$M + N = \quad 2 \quad - \quad \mathbf{1}$$

$$\therefore \boldsymbol{M + N = 1}$$


SI NO FUERA DURO
TODO EL MUNDO
LO HARÍA
ES LA
DUREZA
LO QUE LO
HACE GRANDE