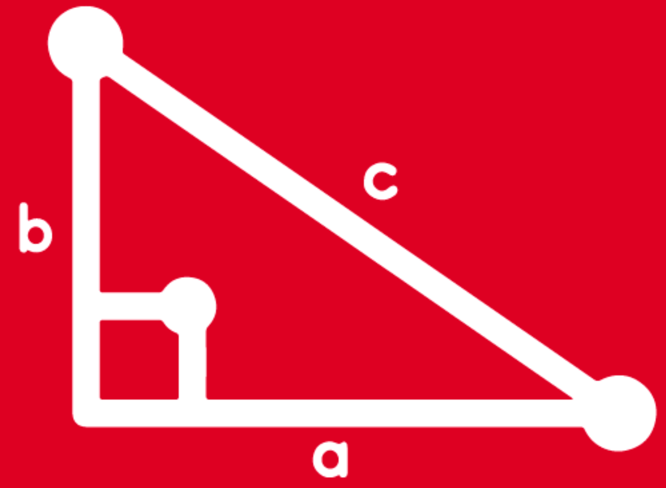
TRIGONOMETRY

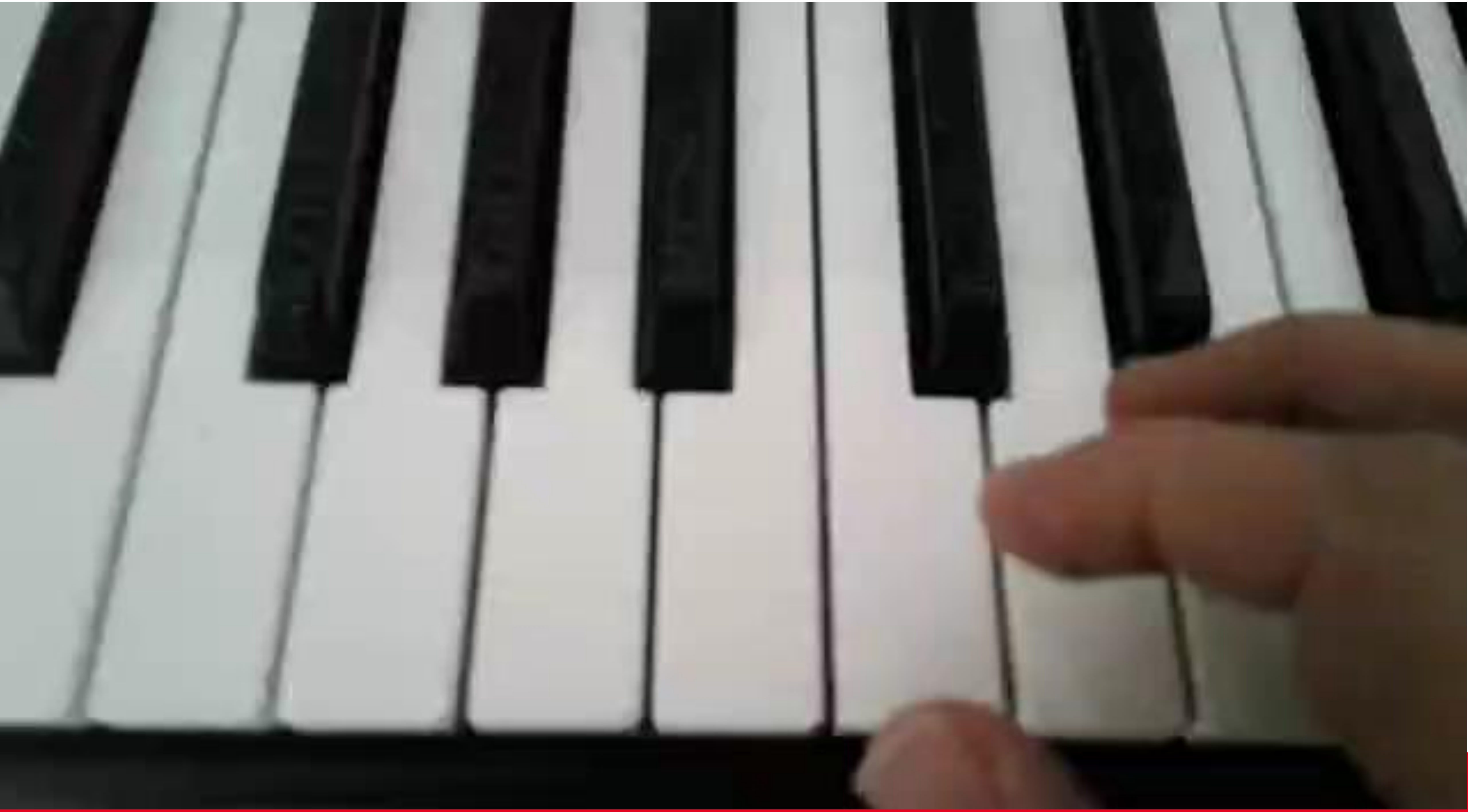
Chapter 21
Session 2



4th
SECONDARY

TRANSFORMACIONES TRIGONOMÉTRICAS II

SACO OLIVEROS



IDENTIDADES PARA TRANSFORMAR

PRODUCTOS DE SENOS Y COSENOS A SUMAS O DIFERENCIAS

$$2senx.cosy = sen(x+y) + sen(x-y)$$

$$2cosx.cosy = cos(x+y) + cos(x-y)$$

$$2senx.seny = cos(x-y) - cos(x+y)$$

1. Simplifica: $E = 2sen41°.cos19° - sen22°$

RESOLUCIÓN:

Recordar:

$$2senx.cosy = sen(x+y) + sen(x-y)$$

$$E = \underbrace{2sen41°.cos19°} - sen22°$$

$$E = sen(41°+19°) + sen(41°-19°) - sen22°$$

$$E = sen60° \cancel{+sen22°} \cancel{-sen22°}$$

$$\boxed{\therefore E = \frac{\sqrt{3}}{2}}$$

2. Reduce: $k = 2cos3x.cosx - cos4x$

RESOLUCIÓN:

Recordar:

$$2cosx.cosy = cos(x+y) + cos(x-y)$$

$$k = \underbrace{2cos3x.cosx}-cos4x$$

$$k = cos(3x+x)+cos(3x-x)-cos4x$$

$$k = \cancel{cos4x}+cos2x-\cancel{cos4x}$$

$$\boxed{\therefore K = cos2x}$$

3. Reduce: $Q=\dfrac{2\text{sen}10°.\cos 20°+\cos 80°}{2\text{sen}70°.\text{sen}10°+\text{sen}10°}$

RESOLUCIÓN:

Recordar:

$$2senx.cosy = sen(x+y)+sen(x-y)$$

$$2senx.seny = cos(x-y)-cos(x+y)$$

$$Q=\frac{\text{sen}(10°+20°)+\overbrace{\text{sen}(10°-20°)}^{\text{sen}10°}+\cos 80°}{\cos(70°-10°)-\cos(70°+10°)+\underbrace{\text{sen}10°}_{\cos 80°}}$$

$$Q=\frac{\text{sen}30°\cancel{-\text{sen}10°}\cancel{+\text{sen}10°}}{\cos 60°\cancel{-\cos 80°}\cancel{+\cos 80°}}$$

$$Q=\frac{\overbrace{\text{sen}30°}^{\cos 60°}}{\cos 60°}$$

$$Q=\frac{\cos 60°}{\cos 60°}$$

$$\boxed{\therefore Q = 1}$$

4. Halla el valor de α, siendo este agudo:

$$\underbrace{2\cos 35°\cos 15°} - \cos 20° = \operatorname{sen} 2\alpha$$

RESOLUCIÓN:

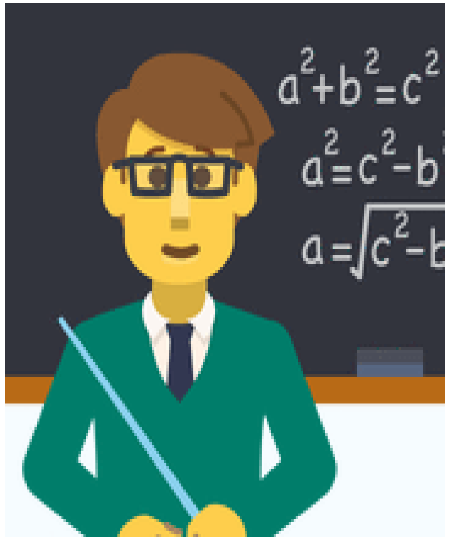
$$\cos(35°+15°)+\cos(35°-15°)-\cos 20° = \operatorname{sen} 2\alpha$$

$$\cos 50° + \cancel{\cos 20°} - \cancel{\cos 20°} = \operatorname{sen} 2\alpha$$

$$\cos 50° = \operatorname{sen} 2\alpha$$

$$\Rightarrow 50°+2\alpha=90°$$

$$\boxed{\therefore \alpha = 20°}$$



Recordar:

$$\boxed{2\cos x.\cos y = \cos(x+y) + \cos(x-y)}$$

5. Reduce: $Q=\dfrac{\overbrace{2\cos6\alpha.\cos2\alpha}-\cos4\alpha}{\operatorname{sen}16\alpha}$

Recordar:

$\boxed{2\cos x.\cos y=\cos(x+y)+\cos(x-y)}$

RESOLUCIÓN:

$$Q=\frac{\cos(6\alpha+2\alpha)+\cos(6\alpha-2\alpha)-\cos4\alpha}{\operatorname{sen}16\alpha}$$

$$Q=\frac{\cos8\alpha+\cancel{\cos4\alpha}-\cancel{\cos4\alpha}}{\operatorname{sen}16\alpha}$$

$$Q=\frac{\cancel{\cos8\alpha}}{2\operatorname{sen}8\alpha.\cancel{\cos8\alpha}}$$

$$Q=\frac{1}{2\operatorname{sen}8\alpha}$$

$$Q=\frac{1}{2}.\frac{1}{\operatorname{sen}8\alpha}$$

$$\boxed{\therefore Q=\frac{1}{2}.\csc8\alpha}$$

6. Reduce: $H = 4sen50°.cos10° - 2cos50°$

RESOLUCIÓN:

$$H = 2\underbrace{(2sen50°cos10°)}-2cos50°$$

$$H = 2(sen60°+sen40°)-2cos50°$$

$$H = 2sen60°+2sen40°-\underbrace{2cos50°}$$

$$H = 2sen60°+\cancel{2sen40°}-\cancel{2sen40°}$$

Recordar:

$$2senx.cosy = sen(x+y)+sen(x-y)$$

$$H = \cancel{2}\left(\frac{\sqrt{3}}{\cancel{2}}\right)$$

$$\boxed{\therefore H = \sqrt{3}}$$

7. Al copiar de la pizarra, la expresion sen55°.cos5°, Daniel cometio un error y escribio sen35°.sen5°. Calcule la suma de lo que estaba escrito en la pizarra y lo que copio Daniel.

Recordar:

$$2senx.cosy = sen(x+y) + sen(x-y)$$

$$2senx.seny = cos(x-y) - cos(x+y)$$

RESOLUCIÓN:

$$D = sen55°.cos5° + sen35°.sen5°$$

$$2D = \underbrace{2sen55°.cos5°} + \underbrace{2sen35°.sen5°}$$

$$2D = \cancel{sen60°} + sen50° + \cancel{cos30°} - cos40°$$

$$2D = sen60° + cos30°$$

$$2D = \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} \Rightarrow 2D = \sqrt{3}$$

$$\boxed{\therefore D = \frac{\sqrt{3}}{2}}$$

8. Halla el valor de θ, siendo este agudo.

$$\mathrm{sen}(\theta+25°).\cos(\theta-10°)=\cos 40°\cos 15°$$

Recordar:

$$2senx.cosy = sen(x+y) + sen(x-y)$$

$$2senx.seny = cos(x-y) - cos(x+y)$$

RESOLUCIÓN:

$$\underbrace{2\mathrm{sen}(\theta+25°).\cos(\theta-10°)}=\underbrace{2\cos 40°\cos 15°}$$

$$\mathrm{sen}(2\theta+15°) + \cancel{\mathrm{sen}35°} = \cancel{\cos 55°} + \cos 25°$$

$$\mathrm{sen}(2\theta+15°) = \cos 25°$$

$$2\theta + 15° + 25° = 90°$$

$$2\theta = 50°$$

$$\boxed{\therefore \theta = 25°}$$