

## Clase por Discord- 6 de mayo

4) b - Final

$$3x - \frac{\pi}{30} = x + \frac{\pi}{9} \Rightarrow 2x = \frac{\pi}{9} + \frac{\pi}{30}$$

$$2x = \frac{10\pi + 3\pi}{90}$$

$$2x = \frac{13\pi}{90}$$

$$x = \frac{13\pi}{180}$$

$$3x - \frac{\pi}{30} + x + \frac{\pi}{9} = \pi$$

$$4x = \pi + \frac{\pi}{30} - \frac{\pi}{9}$$

$$4x = \frac{90\pi + 3\pi - 10\pi}{90}$$

$$4x = \frac{83\pi}{90}$$

$$x = \frac{83\pi}{360}$$

$$S = \left\{ \frac{13\pi}{180}, \frac{83\pi}{360} \right\}$$

2) a)  $1 + \frac{\cos^2 d}{\cos d} = \frac{\cos^2 d}{\cos d} + 1$

$1 + \frac{\cos^2 d}{\cos d} = \frac{\cos^2 d}{\cos d} + 1$  ✓

b)  $\frac{\operatorname{tg} 45 + \operatorname{tg} d}{1 - \operatorname{tg} 45 \cdot \operatorname{tg} d} = \frac{\operatorname{tg} 45 - \operatorname{tg} d}{1 + \operatorname{tg} 45 \cdot \operatorname{tg} d} = \frac{2 \cdot 2 \operatorname{tg} d}{1 - \operatorname{tg}^2 d}$

$\frac{1 + \operatorname{tg} d}{1 - \operatorname{tg} d} = \frac{1 - \operatorname{tg} d}{1 + \operatorname{tg} d} = \frac{4 \operatorname{tg} d}{1 - \operatorname{tg}^2 d}$

$(1 + \operatorname{tg} d)^2 = (1 - \operatorname{tg} d)^2 = 4 \operatorname{tg} d$

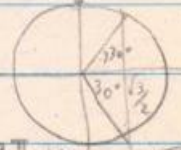
$1 + 2\operatorname{tg} d + \operatorname{tg}^2 d = 1 - 2\operatorname{tg} d - \operatorname{tg}^2 d = 4 \operatorname{tg} d$

$4 \operatorname{tg} d = 4 \operatorname{tg} d$  ✓

3) a)  $f(x) = 1 - \sin^2 x + 2 \sin x \cos x - \cos^2 x = |2 \sin x \cdot \cos x| = |\sin 2x|$

b)  $f(x) = \sin x \cdot \cos \pi + \sin \pi \cdot \cos x + \cos \pi \cdot \cos x + \sin \pi \cdot \sin x - x \sin x \cdot \cos \pi + \sin \pi \cdot \cos x + \cos x \cdot \cos \pi - \sin \pi \cdot \sin x = -\sin x \cdot \cos x - x \sin x - \cos x = -2(\sin x + \cos x)$

4) a)  $\cos x = \frac{\sqrt{3}}{2} \Rightarrow x = \frac{\pi}{6} + 2k\pi, x = \frac{11\pi}{6} + 2k\pi$



b)  $3x - \frac{\pi}{30} + 2k\pi = (x + \frac{\pi}{9}) \Rightarrow 2x = \frac{\pi}{9} + \frac{\pi}{30} - 2k\pi \Rightarrow x = \frac{90}{180} = \frac{13\pi}{180} - k\pi$

⊙  $3x - \frac{\pi}{30} = x + \frac{\pi}{9} + 2k\pi \Rightarrow 2x = \frac{39\pi}{90} + 2k\pi \Rightarrow x = \frac{13\pi}{180} + k\pi \Rightarrow x = \frac{13+k}{180}\pi$

⊙  $3x - \frac{\pi}{30} = \pi - (x + \frac{\pi}{9}) + 2k\pi \Rightarrow 4x = \pi - \frac{\pi}{9} + \frac{\pi}{30} + 2k\pi = \frac{90\pi + 10\pi + 3\pi + 180k\pi}{90} \Rightarrow x = \frac{13+180k}{360}\pi$

⊙  $3x - \frac{\pi}{30} + 2k\pi = \pi - (x + \frac{\pi}{9}) \Rightarrow 4x = \pi - \frac{\pi}{9} + \frac{\pi}{30} - 2k\pi \Rightarrow x = \frac{83-180k}{360}\pi$

c)  $11(1 - \sin^2 x) - 5 \sin^2 x + 1 = 0$

$11 - 11 \sin^2 x - 5 \sin^2 x + 1 = 0$

$-16 \sin^2 x + 12 = 0$

$\sin^2 x = \frac{-12}{-16} = \frac{3}{4} \Rightarrow \sin x = \frac{\sqrt{3}}{2} \Rightarrow x = \frac{\pi}{3} + 2k\pi$

$\Rightarrow \sin x = -\frac{\sqrt{3}}{2} \Rightarrow x = \frac{4\pi}{3} + 2k\pi$   
 $x = \frac{5\pi}{3} + 2k\pi$



d)  $9(1 - \cos x) = 3 \cdot \cos^2 x$

$3 - 3 \cos x = \cos^2 x$

$\cos^2 x + 3 \cos x - 3 = 0$

$\cos x = 2 \Rightarrow z^2 + 3z - 3 = 0 \Rightarrow z = \frac{-3 \pm \sqrt{9+12}}{2} = \frac{-3 \pm \sqrt{21}}{2}$

$\cos x = \frac{-3 + \sqrt{21}}{2} \Rightarrow x = \cos^{-1}\left(\frac{-3 + \sqrt{21}}{2}\right) \Rightarrow x \approx 37^\circ 41'$

$\cos x = \frac{-3 - \sqrt{21}}{2} < -1$

$180^\circ - \pi$   
 $37^\circ 41' \Rightarrow x = \frac{37^\circ 41'}{180^\circ} \pi \approx 0.65$

$\cos^{-1}\left(\frac{-3 + \sqrt{21}}{2}\right) \approx 0.65$  Si verifico ambas soluciones (Hay q'iversos no son raíces introducidos)

$x \approx 37^\circ 41' + 2k\pi \approx \frac{1}{5}\pi + 2k\pi$

$x \approx 322^\circ 19' + 2k\pi \approx \frac{179}{100}\pi + 2k\pi$



$\frac{180^\circ}{37^\circ 41'} = \frac{\pi}{x} \Rightarrow x = \frac{37^\circ 41'}{180^\circ} \pi \approx \frac{1}{5}\pi$

$\frac{180^\circ}{322^\circ 19'} = \frac{\pi}{x} \Rightarrow x = \frac{322^\circ 19'}{180^\circ} \pi \approx \frac{179}{100}\pi$

$\approx \frac{179}{100}\pi$



4d)

Verf.  $x = \cos^{-1}\left(\frac{-3 + \sqrt{21}}{2}\right)$   $\begin{cases} x \approx 37^\circ 41' \\ x \approx 322^\circ 19' \end{cases}$   $\underline{\underline{[0, 2\pi]}}$

$\boxed{x \approx 37^\circ 41'}$   $3 \cdot \frac{\sqrt{1 - \cos 37^\circ 41'}}{2} = \frac{\sqrt{3} \cdot \cos 37^\circ 41'}{1,37}$

$\boxed{x = 322^\circ 19'}$   $3 \cdot \frac{\sqrt{1 - \cos 322^\circ 19'}}{2} = \frac{\sqrt{3} \cdot \cos 322^\circ 19'}{1,37}$

$3 \cdot \sqrt{1 - \cos x} = \sqrt{3} \cdot \cos x$

$3 \cdot \sqrt{1 - \left(\frac{-3 + \sqrt{21}}{2}\right)} = \sqrt{3} \cdot \left(\frac{-3 + \sqrt{21}}{2}\right)$

$3 \cdot \sqrt{\frac{5 - \sqrt{21}}{2}} = \sqrt{3} \cdot \left(\frac{-3 + \sqrt{21}}{2}\right)$

$\frac{\sqrt{\frac{5 - \sqrt{21}}{2}}}{\sqrt{3}} = \frac{\frac{-3 + \sqrt{21}}{2}}{3}$   
 $\sqrt{\frac{5 - \sqrt{21}}{6}} = \frac{-3 + \sqrt{21}}{6}$

$\frac{5 - \sqrt{21}}{6} = \frac{9 + 21 - 6\sqrt{21}}{36}$

$\frac{30 - 6\sqrt{21}}{36} = \frac{30 - 6\sqrt{21}}{36}$  ✓