TALLER DE ECUACIONES E IDENTIDADES TRIGONOMÉTRICAS

Demuestra las siguientes identidades:

1. $sen\,x\,(1 + cot\,x) = sen\,x + cos\,x$
2. $(1 + tan^2 x)\,cos\,x = sec\,x$
3. $\left(\frac{sen\,x}{tan\,x}\right)^2 + \left(\frac{1}{csc\,x}\right)^2 = 1$
4. $(sec\,x + sen^2 x + cos^2 x)(sec\,x - 1) = tan^2 x$
5. $csc\,\theta\,(1 - cos^2\theta) = sen\,\theta$
6. $\left[cos\left(\frac{\pi}{2} - x\right) - sen\,(\pi + x)\right] - \left[cos(\pi + x) + cos\left(\frac{\pi}{2} + x\right)\right] \equiv 3\,sen\,x + cos\,x$
7. $\frac{sen\left(\beta - \frac{3\pi}{2}\right)}{sec\,\beta} + \frac{cos\left(\frac{\pi}{2} - \beta\right)}{csc\,\beta} \equiv 1$
8. $tan(\pi - \alpha) \cdot sen\left(\alpha + \frac{3\pi}{2}\right) \cdot sen(\pi - \alpha) \equiv 1 - cos^2\,\alpha$
9. $[sen\,\alpha - sen\,\beta]^2 - 2\,cos(\alpha + \beta) + [cos\,\alpha + cos\,\beta]^2 \equiv 2$
10. Si $ctg\,\frac{\omega}{2} = -3$ y $\frac{3}{2}\pi \le \omega \le 2\pi$, halla las funciones trigonométricas de ω, 2ω y 4ω.

Demuestra las siguientes identidades:

11. $\frac{2}{1 + cos\,\alpha} = sec^2\frac{\alpha}{2}$
12. $[cos\,2x - sen\,2x]^2 - 1 = sen(-4x)$
13. $cos\,8x + cos\,4x = 2cos\,2x - 4sen^2\,3x \cdot cos\,2x$
14. $sen\,4x + sen\,6x = 2\,(sen\,5x \cdot cos\,x)$
15. $ctg\left(\frac{\pi}{4} - \omega\right) = \frac{1 + sen\,2\omega}{cos\,2\omega}$
16. $cos^8\beta - sen^8\beta = \frac{1}{4}\,cos\,2\beta \cdot (3 + cos\,4\beta)$
17. $\sqrt{2}\,sec\left(\alpha - \frac{\pi}{4}\right) = \frac{2\,(sen\,\alpha + cos\,\alpha)}{1 + sen\,2\alpha}$
18. $cos\,12° \,cos\,24° \,cos\,48° \,cos\,96° = -\frac{1}{16}$
19. $\frac{cos^3 x - sen^3 x}{cos\,2x} = cos\,x - \frac{sen\,2x}{2\,(sen\,x + cos\,x)} + sen\,x$

Resuelve las siguientes ecuaciones, tales que $0° \leq x \leq 360°$.

1. $sen\ x = sen\left(\frac{\pi}{2} - x\right)$
2. $cos\ x + 2\ sen\ x = 2$
3. $2\ cos\left(\frac{\pi}{4} - x\right) = 1$
4. $csc\ x = sec\ x$
5. $2\ cos\ x \cdot tan\ x - 1 = 0$
6. $4\ cos^2 x = 3 - 4\ cos\ x$
7. $3\ cos^2 x + sen^2 x = 3$
8. $2\ sen^2 x + sen\ x = 0$
9. $cos\ x + 9\ sen^2 x = 1$
10. $csc^2 x = 2\ cot^2 x$
11. $sen\ x \cdot tan\ x + 1 = sen\ x + tan\ x$
12. $2cos^2 x + 3sen\ x = 0$
13. $sen\ x - cos\ x = 0$
14. $3cos^2 x - sen^2 x = 0$
15. $cos\ x - \sqrt{3}\ sen\ x = 0$
16. $2sen\ x + csc\ x = 3$
17. $sen\ x \cdot ctg\ x - sen\ x = 0$
18. $2cos^3 x + cos^2 x - 2cos\ x - 1 = 0$
19. $4cos\ x - 2 = 2\ tan\ x \cdot ctg\ x - sec\ x$
20. $tan^5 x - 9\ tan\ x = 0$
21. $\frac{1}{ctg^2\ x} + \sqrt{3}\, tan\, x = 0$
22. $sen\ x \cdot sec\ x + \sqrt{2}\ sen\ x - \sqrt{2} = sec\ x$
23. $\left(2 - \sqrt{3}\right) sen\ x + \left(2 - \sqrt{3}\right) = 2cos^2\ x$
24. $\left(2 + \sqrt{5}\right) - \left(1 + 2\sqrt{5}\right) cos\ x = 2\ sen^2\ x$
25. $sec\ x(2sen\ x + 1) - 2(2sen\ x + 1) = 0$
26. $\frac{\sqrt{3}\, tan\, x}{sec\, x} - cos\, x = 0$
27. $\sqrt{2}\, cos\ x - \sqrt{2}\, sen\ x = -\sqrt{3}$
28. $5sen^2 x + cos^2 x = 2$
29. $\frac{5}{csc\ x} - 5\sqrt{3}\, cos\ x = 0$
30. $cos^2 x + cos\ x = sen^2 x$