Precalculus Chapter 5 Review

Show ALL work.

1. Given $\sin x = \frac{4}{7}$ and $\cos x = -\frac{\sqrt{33}}{7}$, find $\cot x$.
2. Given $\cos\left(\frac{\pi}{2} - x\right) = \frac{2}{7}$, find $\sin x$.
3. Given $\csc x = -3$ and $\tan x > 0$, find $\cos x$.
4. Simplify: $\frac{\csc x}{\tan x + \cot x}$
5. Simplify: $\frac{sin^2 x}{sec^2 x - 1}$
6. Simplify: $\frac{\cos(-x)}{\sin(-x)}$
7. Factor and simplify: $cot^4 x + 2cot^2 x + 1$
8. Perform the addition and simplify: $\frac{\tan x}{\csc x} + \frac{\sin x}{\tan x}$
9. Simplify: $\frac{1 - \csc x}{\csc x}$
10. Simplify: $\frac{\cos x}{1 + \sin x}$
11. Verify the identity: $\frac{sec^2 x}{\cot x} - tan^3 x = \tan x$
12. Verify the identity: $tan^2 x cos^2 x + cot^2 x sin^2 x = 1$
13. Verify the identity: $\frac{\csc x}{\sin x} - \frac{\cot x}{\tan x} = 1$
14. Verify the identity: $\sin x \left(\frac{\sin x}{1 - \cos x} + \frac{1 - \cos x}{\sin x}\right) = 2$
15. Verify the identity: $\sec x csc^2 x - csc^2 x = \frac{\sec x}{1 + \cos x}$
16. Verify the identity: $\frac{\cos x}{1 - sin^2 x} = \sec x$
17. Verify the identity algebraically $\frac{csc^4 x - 1}{cot^2 x} = 2 + cot^2 x$
18. Find all the solutions: $2\cos x - \sqrt{3} = 0$
19. Find all the solutions: $\csc x + 2 = 0$
20. Find all the solutions in the interval $[0, 2\pi)$: $cot^2 x - tan^2 x = 0$
21. Find all the solutions in the interval $[0, 2\pi)$: $sec^2 x = \sec x + 2$
22. Find all the solutions in the interval $[0, 2\pi)$: $3tan^2 2x - 1 = 0$
23. Find all the solutions: $\tan\frac{x}{4} = \frac{\sqrt{3}}{3}$
24. Find all solutions in the interval $[0, 2\pi)$: $tan^2\theta csc\theta = tan^2\theta$
25. Evaluate: $\sin 255°$. (use the fact that $255° = 210° + 45°$.)
26. Evaluate: $\tan\frac{13\pi}{12}$. (use the fact that $\frac{13\pi}{12} = \frac{4\pi}{3} - \frac{\pi}{4}$.)
27. Simplify: $\frac{\tan 37° - \tan 13°}{1 + (tan37°)(tan13°)}$
28. Simplify: $\sin 8x \cos 2x + \cos 8x \sin 2x$
29. Given $\sin u = -\frac{5}{13}, 0 < u < \frac{3\pi}{2}$ and $\csc v = \frac{\sqrt{10}}{3}, \frac{\pi}{2} < v < \pi$, find $\cos(u - v)$.

30. Simplify: $\sin\left(x-\frac{\pi}{6}\right)$

31. Simplify: $\tan\left(\frac{\pi}{4}+\theta\right)$

32. Simplify: $\cos(2x-y)\cos y-\sin(2x-y)\sin y$

33. Simplify: $\sin\left(\frac{4\pi}{3}-x\right)+\cos\left(x+\frac{5\pi}{6}\right)$

34. Find all the solutions in the interval $[0,2\pi)$: $\cos 2x+\sin x=0$

35. Find all solutions in the interval $[0,2\pi)$: $cos^2x-\cos 2x=0$

36. Given $\cos\theta=\frac{3}{4}$ and $\sin\theta<0$, find $\tan 2\theta$.

Answers:

1. $-\frac{\sqrt{33}}{4}$
2. $\frac{2}{7}$
3. $-\frac{2\sqrt{2}}{3}$
4. $\cos x$
5. cos^2x
6. $-\cot x$
7. csc^4x
8. $\sec x$
9. $\sin x-1$
10. $\sec x-\tan x$
11. Answers Vary
12. Answers Vary
13. Answers Vary
14. Answers Vary
15. Answers Vary
16. Answers Vary
17. Answers Vary
18. $\frac{\pi}{6}+2\pi n,\frac{11\pi}{6}+2\pi n$
19. $\frac{7\pi}{6}+2\pi n,\frac{11\pi}{6}+2\pi n$
20. $\frac{\pi}{4},\frac{3\pi}{4},\frac{5\pi}{4},\frac{7\pi}{4}$
21. $\frac{\pi}{3},\pi,\frac{5\pi}{3}$
22. $\frac{\pi}{12},\frac{5\pi}{12},\frac{7\pi}{12},\frac{11\pi}{12},\frac{13\pi}{12},\frac{17\pi}{12},\frac{19\pi}{12},\frac{23\pi}{12}$
24. no solution
25. $\frac{-\sqrt{2}-\sqrt{6}}{4}$
26. $2-\sqrt{3}$
27. $\tan 24°$
28. $\sin 10x$
29. $-\frac{3\sqrt{10}}{130}$
30. $\frac{\sqrt{3}}{2}\sin x-\frac{1}{2}\cos x$
31. $\frac{1+\tan\theta}{1-\tan\theta}$
32. $\cos 2x$
33. $-\sqrt{3}\cos x$
34. $\frac{\pi}{2},\frac{7\pi}{6},\frac{11\pi}{6}$
35. $0,\pi$
36. $-3\sqrt{7}$