

Pre-Calculus

Test 5

Mr. Klar

1. Fill in the blanks for the identities (on next page).
2. Use the fundamental identities to simplify $\sec^2 \alpha (1 - \sin^2 \alpha)$.
3. Factor and simplify $\frac{\sec^4 \beta - \tan^4 \beta}{\sec^2 \beta + \tan^2 \beta}$.
4. Add and simplify $\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}$.

In problems 5-9, verify the identity.

5. $\sin \theta + \cos \theta \cot \theta = \csc \theta$
6. $\tan \alpha = \sin \alpha \sec \alpha$
7. $\sec^2 \beta \tan^2 \beta + \sec^2 \beta = \sec^4 \beta$
8. $\frac{\csc x + \sec x}{\sin x + \cos x} = \cot x + \tan x$ (Hint: Use the "transcontinental railroad". Simplify the left and the right, they should be the same.)
9. $(\sin \phi + \cos \phi)^2 = 1 + \sin 2\phi$

In problems 10-12, do what the problem says.

10. Find the exact value of $\tan 105^\circ$.
11. Rewrite $\sin^4 x \tan^2 x$ in terms of the first power of the cosine.
12. Write $4 \cos 2\theta \sin 4\theta$ as a sum or difference.

In problems 13-16, find all solutions of the equation in the interval $[0, 2\pi)$.

13. $\cot^2 x + \cot x = 0$
14. $\sin 2\alpha - \cos \alpha = 0$
15. $4 \cos^2 x - 3 = 0$
16. $\csc^2 x - \csc x - 2 = 0$