8.1 Fundamental Identities

SCORE:

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Name _____ Date _____ Period _____

Fill in the blank with the appropriate term (even or odd).

1. If f(x) = f(-x), then f is an _____ function.

2. If f(-x) = -f(x), then f is an _____ function.

3. Sine, cosecant, tangent, and cotangent are _____ functions.

4. Cosine and secant are _____ functions.

Write each expression in terms of sines and/or cosines, and then simplify.

5. $\dfrac{\sec x}{\tan x}$

6. $\dfrac{\sin x}{\csc x} + \dfrac{\cos x}{\sec x}$

7. $(1-\sin\alpha)(1+\sin\alpha)$

8. $(\cos\beta\tan\beta+1)(\sin\beta-1)$

9. $\dfrac{1 + \cos\alpha \tan\alpha \csc\alpha}{\csc\alpha}$

10. $\dfrac{(\cos\alpha \tan\alpha + 1)(\sin\alpha - 1)}{\cos^2\alpha}$

In each exercise, use identities (remember: $\sin\alpha = \dfrac{y}{r}$, $\cos\alpha = \dfrac{x}{r}$, $\tan\alpha = \dfrac{y}{x}$, *etc.*) to find the exact values at
α **for the remaining five trigonometric functions.**

11. $\tan\alpha = \dfrac{1}{2}$ *and* $0 < \alpha < \dfrac{\pi}{2}$

12. $\sin\alpha = \dfrac{3}{4}$ *and* $\dfrac{\pi}{2} < \alpha < \pi$

13. $\cos\alpha = \dfrac{-\sqrt{3}}{5}$ and α is in quadrant III

14. $\cot\alpha = \dfrac{-1}{3}$ and $\dfrac{-\pi}{2} < \alpha < 0$

Simplify each expression using the basic identities and even and odd identities.

15. $\sin(-x)\cot(-x)$

16. $\sec(-x)-\sec(x)$

17. $(1+\sin(\alpha))(1+\sin(-\alpha))$

18. $\sin(-\beta)\cos(-\beta)\csc(\beta)$

Use identities to simplify each expression.

19. $1-\dfrac{1}{\cos^2 x}$

20. $\dfrac{\sin^2\alpha-\cos^2\alpha}{1-2\cos^2\alpha}$

21. $\dfrac{1}{\sin^3 x}-\dfrac{\cot^2 x}{\sin x}$

22. $\sin^4 x-\cos^4 x$

Review Exercises

23. Find the smallest positive angle that is coterminal with $-35°$.

24. Convert each degree measure to radian measure.

a) $225°$ b) $-210°$ c) $270°$

25. Find the exact area of a sector of the circle with radius 6 feet and central angle $15°$.

Factor each polynomial completely. Show work!

26. $3k^2 - 24k - 60$ 27. $36xy + 48x - 6ky - 8k$

28. $6x^3 - 3x^2$ 29. $6x^2 + 23x + 20$

30. $4x^2 - 25$ 31. $6u^4 - 6u^2 - 540$

32. $r^2 - 100$ 33. $8x^3 + 125$