Name _____ Date _____ Period _____

Trigonometric Identities

Do you know HOW?

Verify each identity.

1. $\tan\theta\csc\theta = \sec\theta$

2. $\csc^2\theta - \cot^2\theta = 1$

3. $\sin\theta\tan\theta = \sec\theta - \cos\theta$

4. Simplify $\tan\theta\cot\theta - \sin^2\theta$.

Do you UNDERSTAND? © **MATHEMATICAL PRACTICES**

© 5. **Vocabulary** How does the identity $\cos^2\theta + \sin^2\theta = 1$ relate to the Pythagorean Theorem?

© 6. **Error Analysis** A student simplified the expression $2 - \cos^2\theta$ to $1 - \sin^2\theta$. What error did the student make? What is the correct simplified expression?

Ⓐ **Practice**   Verify each identity. Give the domain of validity for each identity.

7. $\cos\theta\cot\theta = \dfrac{1}{\sin\theta} - \sin\theta$

8. $\sin\theta\cot\theta = \cos\theta$

9. $\cos\theta\tan\theta = \sin\theta$

10. $\sin\theta\sec\theta = \tan\theta$

11. $\cos\theta\sec\theta = 1$

12. $\tan\theta\cot\theta = 1$

13. $\sin\theta\csc\theta = 1$

14. $\cot\theta = \csc\theta\cos\theta$

15. $\csc\theta - \sin\theta = \cot\theta\cos\theta$

Simplify each trigonometric expression.

16. $\tan\theta\cot\theta$

17. $1 - \cos^2\theta$

18. $\sec^2\theta - 1$

19. $1 - \csc^2\theta$

20. $\sec^2\theta\cot^2\theta$

21. $\cos\theta\tan\theta$

22. $\sin\theta\cot\theta$

23. $\sin\theta\csc\theta$

24. $\sec\theta\cos\theta\sin\theta$

25. $\sin\theta\sec\theta\cot\theta$

26. $\sec^2\theta - \tan^2\theta$

27. $\dfrac{\sin\theta}{\cos\theta\tan\theta}$

Use the identity $\sin^2\theta + \cos^2\theta = 1$ and the basic identities to answer the following questions. Show all your work.

28. Given that $\sin\theta = 0.5$ and θ is in the first quadrant, what are $\cos\theta$ and $\tan\theta$?

29. Given that $\sin\theta = 0.5$ and θ is in the second quadrant, what are $\cos\theta$ and $\tan\theta$?

30. Given that $\cos\theta = -0.6$ and θ is in the third quadrant, what are $\sin\theta$ and $\tan\theta$?

31. Given that $\sin\theta = 0.48$ and θ is in the second quadrant, what are $\cos\theta$ and $\tan\theta$?

32. Given that $\tan\theta = 1.2$ and θ is in the first quadrant, what are $\sin\theta$ and $\cos\theta$?

33. Given that $\tan\theta = 3.6$ and θ is in the third quadrant, what are $\sin\theta$ and $\cos\theta$?

34. Given that $\sin\theta = 0.2$ and $\tan\theta < 0$, what is $\cos\theta$?