LESSON 14.3

NAME ______________________ DATE ____________

Challenge: Skills and Applications

For use with pages 848–854

In Exercises 1 and 2, write each expression in terms of a single trigonometric function.

1. $\dfrac{\tan x}{1 - \cos x} - \dfrac{\tan x}{1 + \cos x}$

2. $\dfrac{\sec x}{\cos x} - \dfrac{\sec x - \cos x}{\sin x \tan x}$

In Exercises 3–11, verify each identity.

3. $\dfrac{\cos x}{1 - \sin x} = \sec x + \tan x$

4. $\tan^2 x - \sin^2 x = \tan^2 x \sin^2 x$

5. $\sec^2 x + \csc^2 x = \sec^2 x \csc^2 x$

6. $\cos^4 x - \sin^4 x = 1 - 2\sin^2 x$

7. $(\tan x + \cot x)^2 = \csc^2 x \sec^2 x$

8. $\dfrac{\sin x}{1 - \sin x} - \dfrac{\sin x}{1 + \sin x} = 2\tan^2 x$

9. $\dfrac{\sec x - 1}{\tan x} + \dfrac{\tan x}{\sec x + 1} = \dfrac{2\sin x}{1 + \cos x}$

10. $\sec x(\cos x + \sin x)^2 = \sec x + 2\sin x$

11. $\dfrac{\sec x - \tan x}{\cos x} - \dfrac{\cos x}{\sec x + \tan x} = \dfrac{\sin^2 x}{1 + \sin x}$

12. Verify the following identity by simplifying each side separately to the same expression.

$$\sec x(\sec x - \cos x) = (\sec x \csc x - \cot x)^2$$

13. Suppose $x = \cos t$ and $y = 2 + \sin^2 t$ are parametric equations, for $0 \le t \le 2\pi$.

a. State the range of x and the range of y.

b. Using a trigonometric identity, rewrite the expression for y in terms of $\cos t$.

c. Using substitution, eliminate the parameter t.

d. Sketch the graph defined by the parametric equations. Identify the type of graph defined.

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