Name: _____

Verifying Trigonometric Identities

1) Verify that each trigonometric equation is an identity

1) $\dfrac{\tan^2 x + 1}{\sec x} = \sec x$

2) $\dfrac{\sin^2 x}{\cos x} = \sec x - \cos x$

3) $\dfrac{1 - \sin^2 x}{\cos x} = \cos x$

4) $\dfrac{\cos x}{\sec x} + \dfrac{\sin x}{\csc x} = \sec^2 x - \tan^2 x$

5) $\sin^2 x + \tan^2 x + \cos^2 x = \sec^2 x$

6) $\dfrac{\cos x}{\sin x \cot x} = 1$

7) $\sin^2 x \left(1 + \cot^2 x\right) = 1$

8) $\cot s + \tan s = \sec s \csc s$

9) $\cos^2 x \left(\tan^2 x + 1\right) = 1$

10) $\sin^4 x - \cos^4 x = 2\sin^2 x - 1$

11) $\tan^2 z \sin^2 z = \tan^2 z + \cos^2 z - 1$

12) $\dfrac{\cos x + 1}{\tan^2 x} = \dfrac{\cos x}{\sec x - 1}$

13) $\dfrac{1}{1 - \sin x} + \dfrac{1}{1 - \sin x} = 2\sec^2 x$

14) $\dfrac{1}{\sec y - \tan y} = \sec y + \tan y$

15) $\dfrac{\cot y + 1}{\cot y - 1} = \dfrac{1 + \tan y}{1 - \tan y}$

16) $\dfrac{1 - \cos x}{1 + \cos x} = \left(\cot x - \csc x\right)^2$

17) $\dfrac{\csc x + \cot x}{\tan x + \sin x} = \cot x \csc x$

18) $\sec^4 x - \sec^2 x = \tan^4 x + \tan^2 x$

19) $\dfrac{\tan^2 t - 1}{\sec^2 t} = \dfrac{\tan t - \cot t}{\tan t + \cot t}$

20) $\dfrac{1 + \cos x}{1 - \cos x} - \dfrac{1 - \cos x}{1 + \cos x} = 4\cot x \csc x$

21) $\dfrac{\sec^4 s - \tan^4 s}{\sec^2 s + \tan^2 s} = \sec^2 s - \tan^2 s$

22) $\left(\sec a - \tan a\right)^2 = \dfrac{1 - \sin a}{1 + \sin a}$

23) $\dfrac{\cot^2 t - 1}{1 + \cot^2 t} = 1 - 2\sin^2 t$

24) $\dfrac{\sin^4 x - \cos^4 x}{\sin^2 x - \cos^2 x} = 1$

2)

25) $(1+\sin x + \cos x)^2 = 2(1+\sin x)(1+\cos x)$

26) $(\sec x - \csc x)(\cos x - \sin x) = \cot x - \tan x$

27) $(1-\cos^2 y)(1+\cos^2 y) = 2\sin^2 y - \sin^4 y$

28) $\dfrac{\tan y}{1+\cos y} + \dfrac{\sin y}{1-\cos y} = \cot y + \sec y \csc y$

29) $\dfrac{(\sec x - \tan x)^2 + 1}{\sec x \csc x - \tan x \csc x} = 2\tan x$

30) $\dfrac{1-\sin x}{1+\sin x} = \sec^2 x - 2\sec x \tan x + \tan^2 x$

31) $\sin x + \cos x = \dfrac{\sin x}{1-\dfrac{\cos x}{\sin x}} + \dfrac{\cos x}{1-\dfrac{\sin x}{\cos x}}$

32) $\dfrac{\sin x}{1-\cos x} - \dfrac{\sin x \cos x}{1+\cos x} = \csc x \left(1+\cos^2 x\right)$

33) $\dfrac{1}{\tan u - \sec u} + \dfrac{1}{\tan u + \sec u} = -2\tan u$

34) $\sin^2 a \sec^2 a + \sin^2 a \csc^2 a = \sec^2 a$