$\frac{\sin\alpha}{\alpha} \cdot \frac{1+\cos\alpha}{1+\cos\alpha}$ LCD

Add numerators

$\frac{\alpha}{}$ Expand $(1+\cos\alpha)^2$

Pythagorean identity

Factor out a 2

Reduce

Reciprocal identity ■

$\frac{+\sin t}{\cos t} = \frac{\cos t}{1-\sin t}$.

identity requires that we multiply the numera-
e by $1+\sin t$. (This is similar to rationalizing

$\frac{\sin t}{\sin t}$ Multiply numerator and denominator by $1+\sin t$

Multiply out the denominator

Pythagorean identity

Reduce

easy for us to verify this identity by multiplying
ne left side by $1-\sin t$. ■

OR CLASS

ng section, respond in your own words and

ove an identity?

ing the expression $\frac{\cos^4 t - \sin^4 t}{\cos^2 t}$?

ng the expression $\frac{\sin\alpha}{1+\cos\alpha} + \frac{1+\cos\alpha}{\sin\alpha}$?

Prove that each of the following identities is true:

1. $\cos\theta\tan\theta = \sin\theta$
2. $\sec\theta\cot\theta = \csc\theta$
3. $\csc\theta\tan\theta = \sec\theta$
4. $\tan\theta\cot\theta = 1$
5. $\frac{\tan A}{\sec A} = \sin A$
6. $\frac{\cot A}{\csc A} = \cos A$
7. $\sec\theta\cot\theta\sin\theta = 1$
8. $\tan\theta\csc\theta\cos\theta = 1$
9. $\cos x(\csc x + \tan x) = \cot x + \sin x$
10. $\sin x(\sec x + \csc x) = \tan x + 1$
11. $\cot x - 1 = \cos x(\csc x - \sec x)$
12. $\tan x(\cos x + \cot x) = \sin x + 1$
13. $\cos^2 x(1+\tan^2 x) = 1$
14. $\sin^2 x(\cot^2 x + 1) = 1$
15. $(1-\sin x)(1+\sin x) = \cos^2 x$
16. $(1-\cos x)(1+\cos x) = \sin^2 x$
17. $\frac{\cos^4 t - \sin^4 t}{\sin^2 t} = \cot^2 t - 1$
18. $\frac{\sin^4 t - \cos^4 t}{\sin^2 t\cos^2 t} = \sec^2 t - \csc^2 t$
19. $1+\sin\theta = \frac{\cos^2\theta}{1-\sin\theta}$
20. $1-\sin\theta = \frac{\cos^2\theta}{1+\sin\theta}$
21. $\frac{1-\sin^4\theta}{1+\sin^2\theta} = \cos^2\theta$
22. $\frac{1-\cos^4\theta}{1+\cos^2\theta} = \sin^2\theta$
23. $\sec^2\theta - \tan^2\theta = 1$
24. $\csc^2\theta - \cot^2\theta = 1$
25. $\sec^4\theta - \tan^4\theta = \frac{1+\sin^2\theta}{\cos^2\theta}$
26. $\csc^4\theta - \cot^4\theta = \frac{1+\cos^2\theta}{\sin^2\theta}$
27. $\tan\theta - \cot\theta = \frac{\sin^2\theta - \cos^2\theta}{\sin\theta\cos\theta}$
28. $\sec\theta - \csc\theta = \frac{\sin\theta - \cos\theta}{\sin\theta\cos\theta}$
29. $\csc B - \sin B = \cot B\cos B$
30. $\sec B - \cos B = \tan B\sin B$
31. $\cot\theta\cos\theta + \sin\theta = \csc\theta$
32. $\tan\theta\sin\theta + \cos\theta = \sec\theta$
33. $\frac{\cos x}{1+\sin x} + \frac{1+\sin x}{\cos x} = 2\sec x$
34. $\frac{\cos x}{1+\sin x} - \frac{1-\sin x}{\cos x} = 0$
35. $\frac{1}{1+\cos x} + \frac{1}{1-\cos x} = 2\csc^2 x$
36. $\frac{1}{1-\sin x} + \frac{1}{1+\sin x} = 2\sec^2 x$
37. $\frac{1-\sec x}{1+\sec x} = \frac{\cos x - 1}{\cos x + 1}$
38. $\frac{\csc x - 1}{\csc x + 1} = \frac{1-\sin x}{1+\sin x}$
39. $\frac{\cos t}{1+\sin t} = \frac{1-\sin t}{\cos t}$
40. $\frac{\sin t}{1+\cos t} = \frac{1-\cos t}{\sin t}$
41. $\frac{(1-\sin t)^2}{\cos^2 t} = \frac{1-\sin t}{1+\sin t}$
42. $\frac{\sin^2 t}{(1-\cos t)^2} = \frac{1+\cos t}{1-\cos t}$
43. $\frac{\sec\theta + 1}{\tan\theta} = \frac{\tan\theta}{\sec\theta - 1}$
44. $\frac{\csc\theta - 1}{\cot\theta} = \frac{\cot\theta}{\csc\theta + 1}$
45. $\frac{1-\sin x}{1+\sin x} = (\sec x - \tan x)^2$
46. $\frac{1+\cos x}{1-\cos x} = (\csc x + \cot x)^2$
47. $\sec x + \tan x = \frac{1}{\sec x - \tan x}$
48. $\frac{1}{\csc x - \cot x} = \csc x + \cot x$
49. $\frac{\sin x + 1}{\cos x + \cot x} = \tan x$
50. $\frac{\cos x + 1}{\cot x} = \sin x + \tan x$
51. $\sin^4 A - \cos^4 A = 1 - 2\cos^2 A$
52. $\cos^4 A - \sin^4 A = 1 - 2\sin^2 A$