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In Problems 19–98, establish each identity.

19. $\csc \theta \cdot \cos \theta = \cot \theta$

22. $1 + \cot^2(-\theta) = \csc^2 \theta$

25. $\tan u \cot u - \cos^2 u = \sin^2 u$

28. $(\csc \theta - 1)(\csc \theta + 1) = \cot^2 \theta$

31. $\cos^2 \theta (1 + \tan^2 \theta) = 1$

34. $\tan^2 \theta \cos^2 \theta + \cot^2 \theta \sin^2 \theta = 1$

37. $\sec u - \tan u = \frac{\cos u}{1 + \sin u}$

40. $9 \sec^2 \theta - 5 \tan^2 \theta = 5 + 4 \sec^2 \theta$

20. $\sec \theta \cdot \sin \theta = \tan \theta$

23. $\cos \theta (\tan \theta + \cot \theta) = \csc \theta$

26. $\sin u \csc u - \cos^2 u = \sin^2 u$

29. $(\sec \theta + \tan \theta)(\sec \theta - \tan \theta) = 1$

32. $(1 - \cos^2 \theta)(1 + \cot^2 \theta) = 1$

35. $\sec^4 \theta - \sec^2 \theta = \tan^4 \theta + \tan^2 \theta$

38. $\csc u - \cot u = \frac{\sin u}{1 + \cos u}$

41. $1 - \frac{\cos^2 \theta}{1 + \sin \theta} = \sin \theta$

21. $1 + \tan^2(-\theta) = \sec^2 \theta$

24. $\sin \theta (\cot \theta + \tan \theta) = \sec \theta$

27. $(\sec \theta - 1)(\sec \theta + 1) = \tan^2 \theta$

30. $(\csc \theta + \cot \theta)(\csc \theta - \cot \theta) = 1$

33. $(\sin \theta + \cos \theta)^2 + (\sin \theta - \cos \theta)^2 = 2$

36. $\csc^4 \theta - \csc^2 \theta = \cot^4 \theta + \cot^2 \theta$

39. $3 \sin^2 \theta + 4 \cos^2 \theta = 3 + \cos^2 \theta$

42. $1 - \frac{\sin^2 \theta}{1 - \cos \theta} = -\cos \theta$