

pg. 766 # 3-48 x 3

3. $\cos\theta \tan\theta = \sin\theta$ (use definition of $\tan = \frac{\sin}{\cos}$)

$$\cancel{\cos\theta} \cdot \frac{\sin\theta}{\cancel{\cos\theta}} = \sin\theta$$

$$\sin\theta = \sin\theta$$

9. simplify: only use 1 trig word or number
 $\tan\theta \cot\theta$ (use definitions)

$$\frac{\cancel{\sin\theta}}{\cancel{\cos\theta}} \cdot \frac{\cancel{\cos\theta}}{\cancel{\sin\theta}} = 1$$

21. $\cos\theta + \sin\theta \tan\theta$
 $= \cos\theta + \sin\theta \cdot \frac{\sin\theta}{\cos\theta}$ (definition)

$$= \frac{\cos\theta}{1} + \frac{\sin^2\theta}{\cos\theta}$$
 (get a common denominator)

$$= \frac{\cos^2\theta}{\cos\theta} + \frac{\sin^2\theta}{\cos\theta} = \frac{\cos^2\theta + \sin^2\theta}{\cos\theta}$$
 substitute

$$= \frac{1}{\cos\theta} = \sec\theta$$

39. express $\sin\theta$ using $\cos\theta$
use pythagorean identity

$$\sin^2\theta + \cos^2\theta = 1 \quad (\text{solve for } \sin\theta)$$

$$\sqrt{\sin^2\theta} = \sqrt{1 - \cos^2\theta}$$

$$\sin\theta = \pm \sqrt{1 - \cos^2\theta}$$

$$\begin{aligned} 45. \sin^2\theta \tan^2\theta &= \tan^2\theta - \sin^2\theta \\ &= \frac{\sin^2\theta}{\cos^2\theta} - \sin^2\theta \quad (\text{factor out GCF}) \\ &= \sin^2\theta \left(\frac{1}{\cos^2\theta} - 1 \right) \\ &= \sin^2\theta (\sec^2\theta - 1) \quad \left. \begin{array}{l} \text{substitute} \\ \text{Pythagorean Identity} \end{array} \right\} \\ &= \sin^2\theta \tan^2\theta \end{aligned}$$

Answers for Lesson 14-1, pp. 766–768 Exercises

$$1. \cos \theta \cot \theta = \cos \theta \left(\frac{\cos \theta}{\sin \theta} \right) = \frac{1 - \sin^2 \theta}{\sin \theta} = \frac{1}{\sin \theta} - \sin \theta$$

$$2. \sin \theta \cot \theta = \sin \theta \left(\frac{\cos \theta}{\sin \theta} \right) = \cos \theta$$

$$3. \cos \theta \tan \theta = \cos \theta \left(\frac{\sin \theta}{\cos \theta} \right) = \sin \theta$$

$$4. \sin \theta \sec \theta = \sin \theta \left(\frac{1}{\cos \theta} \right) = \frac{\sin \theta}{\cos \theta} = \tan \theta$$

$$5. \cos \theta \sec \theta = \cos \theta \left(\frac{1}{\cos \theta} \right) = 1$$

$$6. \tan \theta \cot \theta = \left(\frac{\sin \theta}{\cos \theta} \right) \left(\frac{\cos \theta}{\sin \theta} \right) = 1$$

$$7. \sin \theta \csc \theta = \sin \theta \left(\frac{1}{\sin \theta} \right) = \frac{\sin \theta}{\sin \theta} = 1$$

$$8. \cot \theta = \frac{\cos \theta}{\sin \theta} = \frac{1}{\sin \theta} \cdot \frac{\cos \theta}{1} = \frac{1}{\sin \theta} \div \frac{1}{\cos \theta} = \frac{\csc \theta}{\sec \theta}$$

$$9. 1$$

$$10. \sin^2 \theta$$

$$11. \tan^2 \theta$$

$$12. -\cot^2 \theta$$

$$13. \csc \theta$$

$$14. \sin \theta$$

$$15. \cos \theta$$

$$16. 1$$

$$17. \sin \theta$$

$$18. 1$$

$$19. 1$$

$$20. 1$$

$$21. \sec \theta$$

$$22. 1$$

$$23. \sec^2 \theta$$

$$24. \sec^2 \theta$$

$$25. \cot \theta$$

$$26. \csc \theta$$

$$27. -\tan^2 \theta$$

$$28. \tan \theta$$

$$29. \sec \theta$$

$$30. \csc \theta$$

$$31. \sin^2 \theta$$

$$32. \sin^2 \theta$$

$$33. \sin \theta$$

$$34. \sec \theta$$

$$35. \sec \theta \csc^2 \theta$$

$$36. 1$$

$$37. 1$$

$$38. 1$$

$$39. \pm \sqrt{1 - \cos^2 \theta}$$

$$40. \frac{\pm \sqrt{1 - \cos^2 \theta}}{\cos \theta}$$

$$41. \frac{\pm \sqrt{1 - \sin^2 \theta}}{\sin \theta}$$

$$42. \pm \sqrt{1 + \cot^2 \theta}$$

$$43. \pm \sqrt{\csc^2 \theta - 1}$$

$$44. \pm \sqrt{1 + \tan^2 \theta}$$

$$45. \tan^2 \theta - \sin^2 \theta = \frac{\sin^2 \theta}{\cos^2 \theta} - \sin^2 \theta \left(\frac{\cos^2 \theta}{\cos^2 \theta} \right) = \frac{\sin^2 \theta - \sin^2 \theta \cos^2 \theta}{\cos^2 \theta}$$

Algebra 2

Chapter 14 420

$$= \frac{\sin^2 \theta (1 - \cos^2 \theta)}{\cos^2 \theta} = \sin^2 \theta \cdot \frac{\sin^2 \theta}{\cos^2 \theta} = \sin^2 \theta \tan^2 \theta$$

$$18. \frac{1 - \sin \theta}{\cos \theta} \cdot \frac{\cos \theta}{\cos \theta}$$

$$\frac{(1 - \sin \theta) \cos \theta}{\cos^2 \theta}$$

$$\frac{(1 - \sin \theta) \cos \theta}{(1 - \sin \theta)(1 + \sin \theta)} = \frac{\cos \theta}{1 + \sin \theta}$$