Unit 9 Test Review

1. QII, QIV 2. QI, QIV 3. QII 4. QIV 5. QII 6. QII 7. QIV 8. QIV

9. 1 10. $-\frac{1}{2}$ 11. 1 12. undefined 13. $-\frac{2\sqrt{3}}{3}$ 14. -1 15. $-\frac{\sqrt{2}}{2}$ 16. $\frac{1}{2}$

17. undefined 18. $\theta = 60°$ 19. $\theta = 45°$ 20. $\theta = 60°$ 21. $\theta = 30°$ 22. $\theta = 30°$

23. $\theta = 45°$ 24. positive: $140°$ or $860°$
negative: $-220°$ 25. positive: $240°$
negative: $-120°$ or $-840°$

26. $87°$ 27. $33°$ 28. $\cos^2\theta$ 29. 2 30. $\sec\theta$ 31. $\csc y$ 32. $\sec^2 x$

33. $\sec x \csc x$ 34. $-\cos x$ 35. 1 36. $\cos x$ 37. $\tan^2\theta$ 38. 1 39. $\cos\theta$

Verify. There are many ways to correctly verify trig identities. This is just one possible solution.

40. $\cos(\theta - 90°) = \cos\theta \tan\theta$

$\cos(\theta - 90°) = \cos\theta\cos 90 + \sin\theta\sin 90$
$= \cos\theta(0) + \sin\theta(1)$
$= \sin\theta$

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

41. $1 + \sec x \sin x \tan x = \sec^2 x$

$1 + \sec x \sin x \tan x = 1 + \left(\frac{1}{\cos x}\right)\left(\frac{\sin x}{1}\right)\left(\frac{\sin x}{\cos x}\right) = 1 + \frac{\sin^2 x}{\cos^2 x} = 1 + \tan^2 x = \sec^2 x$

42. $\tan x \cos x + \csc x \sin^2 x = 2\sin x$

$\tan x \cos x + \csc x \sin^2 x = \left(\frac{\sin x}{\cos x}\right)\left(\frac{\cos x}{1}\right) + \left(\frac{1}{\sin x}\right)\left(\frac{\sin^2 x}{1}\right) = \sin x + \sin x = 2\sin x$

43. $\frac{\cos^2 y + \tan^2 y + \sin^2 y}{\sec^2 y} = 1$

$\frac{\cos^2 y + \tan^2 y + \sin^2 y}{\sec^2 y} = \frac{\sin^2 y + \cos^2 y + \tan^2 y}{\sec^2 y} = \frac{1 + \tan^2 y}{\sec^2 y} = \frac{\sec^2 y}{\sec^2 y} = 1$

44. $\frac{\sin\theta}{1 - \sin\theta} + \frac{\sin\theta}{1 + \sin\theta} = 2\tan\theta\sec\theta$

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

$= \frac{2\sin\theta}{\cos^2\theta} = 2\left(\frac{\sin\theta}{\cos\theta}\right)\left(\frac{1}{\cos\theta}\right) = 2\tan\theta\sec\theta$

Unit 9 Test Review (cont.)

45. $\sec x(\sec x - \cos x) = \tan^2 x$

$\sec x(\sec x - \cos x) = \frac{1}{\cos x}\left(\frac{1}{\cos x} - \cos x\right) = \frac{1}{\cos^2 x} - 1 = \sec^2 x - 1 = \tan^2 x$

46. $\sec y + \tan y = \frac{\cos y}{1 - \sin y}$

$\sec y + \tan y = \frac{1}{\cos y} + \frac{\sin y}{\cos y} = \frac{1 + \sin y}{\cos y} \cdot \frac{\cos y}{\cos y} = \frac{\cos y(1 + \sin y)}{\cos^2 y}$

$= \frac{\cos y(1 + \sin y)}{1 - \sin^2 y} = \frac{\cos y(1 + \sin y)}{(1 - \sin y)(1 + \sin y)} = \frac{\cos y}{1 - \sin y}$

47. $x = 120°, 240°$ 48. $\theta = 240°, 300°$ 49. $\theta = 30°, 90°, 150°$

50. NO SOLUTION 51. $\frac{\sqrt{6} - \sqrt{2}}{4}$ 52. $\frac{\sqrt{6} - \sqrt{2}}{4}$ 53. $\frac{\sqrt{6} - \sqrt{2}}{4}$ 54. $-2 - \sqrt{3}$

55. $-\cos 150°$ 56. $\sin 38°$ 57. $-\sin\theta$ 58. $\sin\theta$

59. $\sin A = 0.866$
$\cos A = \frac{1}{2} = 0.5$
$\tan A = 1.732$

60. hypotenuse $= 4\sqrt{5}$
$\sin A = \frac{2\sqrt{5}}{5}$ $\sin B = \frac{\sqrt{5}}{5}$
$\cos A = \frac{\sqrt{5}}{5}$ $\cos B = \frac{2\sqrt{5}}{5}$
$\tan A = 2$ $\tan B = \frac{1}{2}$

61. $\angle A = 30°$ $\sin A = \frac{1}{2}$ $\sin B = \frac{\sqrt{3}}{2}$
$\angle B = 60°$ $\cos A = \frac{\sqrt{3}}{2}$ $\cos B = \frac{1}{2}$
$\tan A = \frac{\sqrt{3}}{3}$ $\tan B = \sqrt{3}$

63. The observer is about 103.229 meters away from the base of the building

64. The worm is about 64.335 meters from the base of the flagpole.

BONUS: The Pythagorean Identity is: $\sin^2 x + \cos^2 x = 1$

If $\sin\theta = \frac{2}{9}$

$\left(\frac{2}{9}\right)^2 + \cos^2\theta = 1$

$\frac{4}{81} + \cos^2\theta = 1$

$\cos^2\theta = \frac{77}{81}$

$\boxed{\cos\theta = \frac{\sqrt{77}}{9}}$