Pre-Calculus **Chapter 7 Review** **Name**_____
Feb. 2014

For exercises 1-8, verify the identity.

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

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

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

4. $\frac{1+\sin\theta}{\sin\theta} + \frac{\cot\theta - \cos\theta}{\cos\theta} = 2\csc\theta$

5. $\cos\left(\frac{\pi}{2} - \theta\right) = \sin\theta$

6. $\sin\left(\theta + \frac{3\pi}{2}\right) + \sin\left(\theta - \frac{\pi}{2}\right) = -2\cos\theta$

7. $\frac{\cot\theta - \tan\theta}{\cot\theta + \tan\theta} = \cos 2\theta$

8. $\frac{2\tan\theta}{1 + \tan^2\theta} = \sin 2\theta$

Use an <u>addition</u> or <u>subtraction</u> formula to find the exact value of the expression.

9. $\sin 255°$

10. $\tan\frac{11\pi}{12}$

Use a half-angle identity to find the exact value of the expression.

11. $\sin 112.5°$

12. $\cos\frac{11\pi}{12}$

13. $\tan 75°$

Find $\sin 2\theta$, $\cos 2\theta$, and $\tan 2\theta$ using the given information.

14. $\cot\theta = \frac{4}{3}$; $\sin\theta > 0$

15. $\csc\theta = \frac{25}{7}$; $\tan\theta < 0$

Find $\sin\frac{\theta}{2}$, $\cos\frac{\theta}{2}$, and $\tan\frac{\theta}{2}$ using the given information.

16. $\cot\theta = \frac{12}{5}$; $180° < \theta < 270°$

17. $\cos\theta = -\frac{8}{17}$; $90° < \theta < 180°$

Find the <u>exact</u> <u>value</u> of the expression. Write your answers in radians when appropriate. Draw a picture for each!

18. $\sin^{-1}\frac{\sqrt{3}}{2}$

19. $\tan^{-1}\frac{\sqrt{3}}{3}$

20. $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

21. $\cos^{-1} 0$

22. $\sin^{-1}(-1)$

23. $\tan^{-1}(-1)$

24. $\cos\left(\cos^{-1}\frac{2}{3}\right)$

25. $\sin(\sin^{-1} 3)$

26. $\sin^{-1}\left(\sin\frac{2\pi}{3}\right)$

27. $\cos\left(\tan^{-1}\sqrt{3}\right)$

28. $\cos^{-1}\left(\sqrt{3}\sin\frac{\pi}{6}\right)$

29. $\csc\left(\cos^{-1}\frac{7}{25}\right)$

For exercises 30-33, find <u>all</u> solutions of the equation.

30. $\sin\theta + 1 = 0$

31. $\sqrt{2}\cos\theta + 1 = 0$

For exercises 30-33, find <u>all</u> solutions of the equation [continued].

32. $\csc^2\theta - 4 = 0$

33. $\tan\theta \sin\theta + \sin\theta = 0$

For exercises 34-41, find all solutions of the equation <u>in the interval</u> $[\mathbf{0}, \mathbf{2\pi})$**.**

34. $\sec\theta\left(2\cos\theta - \sqrt{2}\right) = 0$

35. $\cos\theta - 1 = 0$

36. $2\sin^2\theta - 5\sin\theta = -2$

37. $\tan^3\theta + \tan^2\theta - 3\tan\theta - 3 = 0$

For exercises 34-41, find all solutions of the equation <u>in the interval</u> $[0, 2\pi)$ [continued]

38. $2\sin^2\theta - \cos\theta = 1$

39. $\cos^2\theta = \cos\theta$

40. $\sin 2\theta = -\sin\theta$

41. $3\tan^2\theta - 1 = 0$

Answers:

1. – 8. See online key

9. $\frac{-\sqrt{2}-\sqrt{6}}{4}$ **10.** $\frac{1-\sqrt{3}}{1+\sqrt{3}}$ **11.** $\frac{\sqrt{2+\sqrt{2}}}{2}$ **12.** $-\frac{\sqrt{2+\sqrt{3}}}{2}$ **13.** $2+\sqrt{3}$

14. $\frac{24}{25}, \frac{7}{25}, \frac{24}{7}$ **15.** $-\frac{336}{625}, \frac{527}{625}, -\frac{336}{527}$ **16.** $\frac{5\sqrt{26}}{26}, \frac{-\sqrt{26}}{26}$, -5 **17.** $\frac{5\sqrt{34}}{34}, \frac{3\sqrt{34}}{34}, \frac{5}{3}$

18. $\frac{\pi}{3}$ **19.** $\frac{\pi}{6}$ **20.** $\frac{3\pi}{4}$ **21.** $\frac{\pi}{2}$ **22.** $-\frac{\pi}{2}$ **23.** $-\frac{\pi}{4}$

24. $\frac{2}{3}$ **25.** undefined **26.** $\frac{\pi}{3}$ **27.** $\frac{1}{2}$ **28.** $\frac{\pi}{6}$ **29.** $\frac{25}{24}$

30. $\frac{3\pi}{2}+2k\pi$ **31.** $\frac{3\pi}{4}+2k\pi, \frac{5\pi}{4}+2k\pi$ **32.** $\frac{\pi}{6}+k\pi, \frac{5\pi}{6}+k\pi$ **33.** $0\pi+k\pi, \frac{3\pi}{4}+k\pi$

34. $\frac{\pi}{4}, \frac{7\pi}{4}$ **35.** 0π **36.** $\frac{\pi}{6}, \frac{5\pi}{6}$ **37.** $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}, \frac{3\pi}{4}, \frac{7\pi}{4}$ **38.** $\frac{\pi}{3}, \frac{5\pi}{3}, \pi$

39. $0\pi, \frac{\pi}{2}, \frac{3\pi}{2}$ **40.** $0, \pi, \frac{2\pi}{3}, \frac{4\pi}{3}$ **41.** $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$