Name _____ Class _____ Date _____

Practice 14-7

Double-Angle and Half-Angle Identities

Given $\sin\theta = \frac{7}{25}$ and $90° < \theta < 180°$, find the exact value of each expression.

1. $\cos\frac{\theta}{2}$ **2.** $\sin\frac{\theta}{2}$ **3.** $\tan\frac{\theta}{2}$

4. $\sec\frac{\theta}{2}$ **5.** $\csc\frac{\theta}{2}$ **6.** $\cot\frac{\theta}{2}$

Given $\cos\theta = -\frac{8}{17}$ and $180° < \theta < 270°$, find the exact value of each expression.

7. $\sin\frac{\theta}{2}$ **8.** $\cos\frac{\theta}{2}$ **9.** $\cot\frac{\theta}{2}$

10. $\tan\frac{\theta}{2}$ **11.** $\csc\frac{\theta}{2}$ **12.** $\sec\frac{\theta}{2}$

Use an angle sum identity to verify each identity.

13. $\cos 2\theta = \cos^2\theta - \sin^2\theta$ **14.** $\cos 2\theta = 2\cos^2\theta - 1$

15. $\cos 2\theta = 1 - 2\sin^2\theta$ **16.** $\sin 2\theta = 2\sin\theta\cos\theta$

Verify each identity.

17. $\cos^2\theta = \frac{1 + \cos 2\theta}{2}$ **18.** $\cot\theta = \frac{\sin 2\theta}{1 - \cos 2\theta}$

19. $\tan\theta + \cot\theta = 2\csc 2\theta$ **20.** $\frac{\cos 2\theta}{\sin\theta\cos\theta} = \cot\theta - \tan\theta$

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

21. $\sin 120°$ **22.** $\tan 600°$ **23.** $\sin 660°$

24. $\cos 660°$ **25.** $\tan 90°$ **26.** $\cos 90°$

27. $\tan 660°$ **28.** $\sin 240°$ **29.** $\tan 120°$

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

30. $\cos 15°$ **31.** $\cos 7.5°$ **32.** $\tan 7.5°$

33. $\sin 7.5°$ **34.** $\cos 45°$ **35.** $\tan 22.5°$

36. $\cos 22.5°$ **37.** $\sin 90°$ **38.** $\cos 90°$