

#1-7: Simplify to a trig function of a single angle and find the exact value, in simplest form.

$$\begin{array}{llll}
 1. \ 2\sin 105^\circ \cos 105^\circ & 2. \ \cos^2 \frac{5\pi}{12} - \sin^2 \frac{5\pi}{12} & 3. \ 2\cos^2 \frac{\pi}{8} - 1 & 4. \ \frac{2 \tan 75^\circ}{1 - \tan^2 75^\circ} \\
 5. \ 2\sin 67.5^\circ \cos 67.5^\circ & 6. \ 1 - 2\sin^2 165^\circ & 7. \ \frac{2 \tan 157.5^\circ}{1 - \tan^2 157.5^\circ} & \\
 8. \ \sqrt{\frac{1 - \cos 120^\circ}{2}} & 9. \ -\sqrt{\frac{1 + \cos 480^\circ}{2}} & 10. \ \frac{\sin 600^\circ}{1 + \cos 600^\circ} & 11. \ \frac{1 - \cos \frac{7\pi}{3}}{\sin \frac{7\pi}{3}}
 \end{array}$$

#12-15: Use a half-angle identity to find exact values, in simplest form.

$$12. \ \sin 22.5^\circ \qquad 13. \ \cos 165^\circ \qquad 14. \ \tan 67.5^\circ \qquad 15. \ \tan 165^\circ$$

#16-27: Given that $\csc A = \frac{13}{5}$, where $\frac{\pi}{2} \leq A < \pi$ and $\cos B = \frac{3}{5}$, where $\frac{3\pi}{2} < B \leq 2\pi$.

Find exact values in simplest form.

$$\begin{array}{llllll}
 16. \ \sin(A - B) & 17. \ \tan(A - B) & 18. \ \sin 2A & 19. \ \cos 2A & 20. \ \tan 2A & \\
 21. \ \sin 2B & 22. \ \cos 2B & 23. \ \tan 2B & 24. \ \cos \frac{B}{2} & 25. \ \sin \frac{A}{2} & \\
 26. \ \tan \frac{B}{2} & 27. \ \sec 2A & & & &
 \end{array}$$

#28-29: Solve for x , if $0 \leq x < 2\pi$.

$$28. \ \sin 2x \cos x = \sin x \qquad 29. \ \cot x = \tan 2x$$

(hint: check their graphs to get all solutions)

#30-31: Prove each identity.

$$30. \ (\sin x + \cos x)^2 \equiv \sin 2x + 1 \qquad 31. \ \cos^2 x - 2\cos 2x + 1 \equiv 3\sin^2 x$$

$$\begin{array}{llllll}
 \text{Answers: } 1. \ \sin 210^\circ; \frac{-1}{2} & 2. \ \cos \frac{5\pi}{6}; \frac{-\sqrt{3}}{2} & 3. \ \cos \frac{\pi}{4}; \frac{\sqrt{2}}{2} & 4. \ \tan 150^\circ; \frac{-\sqrt{3}}{3} & 5. \ \sin 135^\circ; \frac{\sqrt{2}}{2} \\
 6. \ \cos 330^\circ; \frac{\sqrt{3}}{2} & 7. \ \tan 315^\circ; -1 & 8. \ \sin 60^\circ; \frac{\sqrt{3}}{2} & 9. \ \cos 240^\circ; \frac{-1}{2} & 10. \ \tan 300^\circ; -\sqrt{3} \\
 11. \ \tan \frac{7\pi}{6}; \frac{\sqrt{3}}{3} & 12. \ \frac{\sqrt{2-\sqrt{2}}}{2} & 13. \ \frac{-\sqrt{2+\sqrt{3}}}{2} & 14. \ \sqrt{2}+1 & 15. \ -\sqrt{2}+3 & 16. \ \frac{-33}{65} & 17. \ \frac{33}{56} \\
 18. \ \frac{-120}{169} & 19. \ \frac{119}{169} & 20. \ \frac{-120}{119} & 21. \ \frac{-24}{25} & 22. \ \frac{-7}{25} & 23. \ \frac{24}{7} & 24. \ \frac{-2\sqrt{5}}{5} & 25. \ \frac{5\sqrt{26}}{26} \\
 26. \ \frac{-1}{2} & 27. \ \frac{169}{119} & 28. \ 0, \pi, \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4} & 29. \ \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}, \frac{\pi}{2}, \frac{3\pi}{2}
 \end{array}$$