Honors Pre-Calculus Name: _____

Homework – Multiple Angle Identities + Sum & Difference

Find the exact value of the expression:

1. $\sin 15^\circ$ **2.** $\cos -112.5^\circ$ **3.** $\tan(\pi/12)$ **4.** $\sin(\pi/8)$

Find the exact values of $\sin\frac{u}{2}$, $\cos\frac{u}{2}$, and $\tan\frac{u}{2}$.

5. $\cos u = \frac{4}{5}, \quad \frac{3\pi}{2} < u < 2\pi$

6. $\sin u = \frac{7}{25}, \quad \frac{\pi}{2} < u < \pi$

Find the exact values of sin(2*x*), cos(2*x*), and tan (2*x*).

7. $\sin x = \frac{4}{5}, \quad 0 < x < \frac{\pi}{2}$

8. $\cos x = -\frac{1}{3}, \quad \frac{\pi}{2} < x < \pi$

Rewrite the expression without double angles or half angles, given that $0 < x < \frac{\pi}{2}$. Then simplify.

9. $\sin 4x$

10. $\frac{\cos 2x}{\cos x}$

11. $\cos 2x + \sin x$

Verify they following identities:

12. $\sin 10x = 2\sin 5x \cos 5x$

13. $\cos^2 3x - \sin^2 3x = \cos 6x$

14. $\sin 3x = \sin x(3 - 4\sin^2 x)$

Solve the equation over the interval [0, 2π):

15. $\cos 2x = -\sin x$

16. $\cos 2x + \cos x = 0$

17. $\sin 2x + \sqrt{2}\sin x = 0$

Evaluate the expression given sin*u* = $\frac{5}{13}$ **with** $\pi < u < \frac{3\pi}{2}$ **and *v* =** $\frac{\pi}{3}$

18. $\cos(u + v)$

19. $\tan(u - v)$

Simplify the expressions below (and for #23 & #24 EVALUATE)

20. $\sin(x + \pi/2)$

21. $\tan(x - \pi)$

22. $-\sin 40^\circ \cos 32^\circ + \sin 32^\circ \cos 40^\circ$

23. $-\cos\frac{5\pi}{3}\cos\frac{\pi}{3} + \sin\frac{\pi}{3}\sin\frac{5\pi}{3}$

24. $\frac{\tan 135^\circ - \tan 15^\circ}{1 + \tan 135^\circ \tan 15^\circ}$

Solve the equation for 0 ≤ *x* < 2π

25. $\sin\left(x + \frac{\pi}{3}\right) + \sin\left(x - \frac{\pi}{3}\right) = 1$

26. $\cos\left(x + \frac{\pi}{4}\right) + \cos\left(x - \frac{\pi}{4}\right) = 1$