HPC Unit 5 Quiz 2

Name: ______________________

Teacher: ______________ Period: ______

U8LT3 I can solve and prove multiple angle identities.

Show Your Work. Find an exact value using angle sum and difference formulas.

1.. $\sin 105^o$ 1.________

$\sin(45+60) = \sin 45 \cos 60 + \cos 45 \sin 60$

$\frac{\sqrt{2}}{2} \cdot \frac{1}{2} + \frac{\sqrt{2}}{2} \frac{\sqrt{3}}{2} = \boxed{\frac{\sqrt{2}+\sqrt{6}}{4}}$

2. $\cos\frac{13\pi}{12}$ 2.________

$\cos\left(\frac{5\pi}{6}+\frac{\pi}{4}\right) = \cos\left(\frac{5\pi}{6}\right)\cos\left(\frac{\pi}{4}\right) - \sin\left(\frac{5\pi}{6}\right)\sin\left(\frac{\pi}{4}\right)$

$= -\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} - \frac{1}{2} \cdot \frac{\sqrt{2}}{2} = \boxed{\frac{-\sqrt{6}-\sqrt{2}}{4}}$

Write the express as the sine, cosine, or tangent of a single angle.

3. $\cos\frac{\pi}{5}\cos\frac{\pi}{7} + \sin\frac{\pi}{5}\sin\frac{\pi}{7}$ 3.________

$\cos\left(\frac{\pi}{5} - \frac{\pi}{7}\right) = \cos\left(\frac{7\pi - 5\pi}{35}\right) = \boxed{\cos\left(\frac{2\pi}{35}\right)}$

4. $\frac{\tan 45° - \tan 30°}{1 + \tan 45° \tan 30°} = \tan(45-30) = \boxed{\tan 15}$ 4.________

Prove the identity.

5. $\sin\left(x - \frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}(\sin x - \cos x)$

~~sinx·sin π/4~~

$\sin x \cos\frac{\pi}{4} - \cos x \sin\frac{\pi}{4}$

$\sin x \frac{\sqrt{2}}{2} - \cos x \frac{\sqrt{2}}{2}$

$\frac{\sqrt{2}}{2}(\sin x - \cos x)$ □

6. $\cos 4u = \cos^2 2u - \sin^2 2u$

$\cos 4u = \cos(2u+2u)$

$= \cos 2u \cos 2u - \sin 2u \sin 2u$

$= \boxed{\cos^2 2u - \sin^2 2u}$

□

Find all solutions to the equation in the interval [0,2π).

7. $sin2x = -sinx$ 7.________________

~~2sin 2x~~

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

$2\sin x\cos x + \sin x = 0$

$\sin x\,(2\cos x + 1) = 0$

$\sin x = 0$ $\qquad$ $2\cos x + 1 = 0$

$\boxed{x = 0, \pi}$ $\qquad$ $\cos x = -1/2$

$\boxed{x = +\frac{2\pi}{3}, \frac{4\pi}{3}}$

Find the exact value by using half-angle identity.

8. $sin22.5°$ 8.________________

$\Rightarrow \sin\left(\frac{45}{2}\right) = \pm\sqrt{\frac{1-\cos 45}{2}} = \boxed{\pm\sqrt{\frac{1-\frac{\sqrt{2}}{2}}{2}}}$ or $\pm\sqrt{\frac{2-\sqrt{2}}{4}}$

9. $tan\frac{7\pi}{8} = \tan\left(\frac{14\pi/8}{2}\right) = \tan\left(\frac{7\pi/4}{2}\right)$ 9.________________

$\Rightarrow \frac{1-\cos(7\pi/4)}{\sin(7\pi/4)} = \frac{1-\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} = \frac{2-\sqrt{2}}{\cancel{2}} \cdot \frac{\cancel{2}}{-\sqrt{2}}$

$= \boxed{-\frac{2-\sqrt{2}}{\sqrt{2}}}$ or $\frac{2\sqrt{2}-2}{2} = \boxed{-\sqrt{2}+1}$

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OR $\frac{\sin(7\pi/4)}{1+\cos(7\pi/4)} = \frac{-\frac{\sqrt{2}}{2}}{1+\frac{\sqrt{2}}{2}} = \frac{-\sqrt{2}}{2} \cdot \frac{2}{2+\sqrt{2}} = \boxed{\frac{-\sqrt{2}}{2+\sqrt{2}}}$