Precalculus **Name _____**
Quarter 3 Test Review #1

SHOW ALL WORK ON A SEPARATE SHEET OF PAPER!

Solve the following problems. Unless otherwise specified, round **final** answers to the nearest **tenth**.

Section 5.1

1. Use the fundamental identities to simplify the expression $\tan^2 x - \tan^2 x \sin^2 x$

2. Use trigonometric identities to simplify $\dfrac{\cos^4 x - \sin^4 x}{\cos^2 x - \sin^2 x}$.

3. Use trigonometric identities to simplify $\cos t\left(1 + \tan^2 t\right)$.

Section 5.2

4. Verify the identity: $\dfrac{\sec\theta}{\cos\theta} - \dfrac{\tan\theta}{\cot\theta} = 1$

5. Verify the identity: $\dfrac{1}{1-\sin\alpha} + \dfrac{1}{1+\sin\alpha} = 2\sec^2\alpha$

Section 5.3

Determine the number of solutions. Justify your answer.

6. a) $2\sin x + \sqrt{3} = 0$ b) $2\sin 3x + \sqrt{3} = 0$

Find all **exact** solutions of the following equations in the interval $[0, 2\pi)$:

7. a) $2\sin x + \sqrt{3} = 0$ b) $2\sin 3x + \sqrt{3} = 0$

8. $(3\tan^2 x + 1)(\tan^2 x - 3) = 0$

9. $\cos^3 x = \cos x$

Section 5.4

Use the appropriate sum or difference formula to find the **exact** values of the expressions in #10 – 11:

10. $\sin 255^\circ,\ \cos 255^\circ,\ \tan 255^\circ$

11. $\sin\frac{\pi}{12},\ \cos\frac{\pi}{12},\ \tan\frac{\pi}{12}$

12. Find the **exact** value for $\dfrac{\tan 325^\circ - \tan 25^\circ}{1+\tan 325^\circ \tan 25^\circ}$.

13. Simplify the expression $\cos 146^\circ \cos 11^\circ + \sin 146^\circ \sin 11^\circ$, and **evaluate**, if possible.

14. Given $\cot u = \frac{2}{5},\ 0 < u < \frac{\pi}{2}$, and $\cos v = -\frac{3}{5},\ \pi < v < \frac{3\pi}{2}$, find $\tan(u+v)$

Section 5.5

15. Given $\tan\theta = \frac{3}{4}$ and $\sin\theta < 0$, find $\sin 2\theta$, $\cos 2\theta$, and $\tan 2\theta$.

16. Find the **exact** solutions in the interval $[0, 2\pi)$ of $\sin 2x + \sin x = 0$.

17. Use a half-angle formula to find the **exact** value of $\cos 157^\circ 30'$.

18. Given $\tan u = -\frac{4}{3}$, and $\sin u < 0$, find $\sin\frac{u}{2}$, $\cos\frac{u}{2}$, and $\tan\frac{u}{2}$.

19. Simplify by expressing each as a function of a **single** angle:

i) $\dfrac{2\tan 47^o}{1-\tan^2 47^o}$ ii) $-\sqrt{\dfrac{1-\cos 10x}{2}}$ iii) $\dfrac{1-\cos 18^o}{\sin 18^o}$