Name: ____ Date: ___________________________ Pd.:_______________

Pre-Calculus **5.1-5.4 Test Review**

1. Simplify each expression.

a) $\sin x(\cot x+\tan x)$

b) $\tan^2 x\cos^2 x+\cot^2 x\sin^2 x$

c) $\dfrac{1+\sin\theta}{\cos\theta}+\dfrac{\cos\theta}{1+\sin\theta}$

d) $\dfrac{\sec x}{\cos x}-\dfrac{\tan x}{\cot x}$

e) $\dfrac{\sin x+\tan x}{1+\sec x}$

f) $\sec x-\tan x\sin x$

2. Prove each identity (5.1-5.2)

a) $2-\sec^2 z=1-\tan^2 z$

b) $\sec x-\cos x=\sin x\tan x$

c) $\sec^2 x\tan^2 x+\sec^2 x=\sec^4 x$

d) $\cot\beta+\tan\beta=\dfrac{\sec^2\beta}{\tan\beta}$

e) $\cos^2 x-\sin^2 x=2\cos^2 x-1$

f) $\dfrac{\cos x-\cos y}{\sin x+\sin y}+\dfrac{\sin x-\sin y}{\cos x+\cos y}=0$

g) $\dfrac{\cos\phi}{1-\sin\phi}=\dfrac{1+\sin\phi}{\cos\phi}$

h) $\dfrac{1+\cos x}{\sin x}=\csc x+\cot x$

3. Prove each identity (5.3-5.4)

a) $\cos\left(x-\dfrac{\pi}{2}\right)=\sin x$

b) $\tan\left(x-\dfrac{\pi}{2}\right)=-\cot x$

c) $\cos(x-y)+\cos(x+y)=2\cos x\cos y$

d) $\sin 4x+\sin 2x=2\sin 3x\cos x$

e) $(\sin x+\cos x)^2=1+\sin 2x$

f) $1+\cos 10x=2\cos^2 5x$

g) $\sin 4x=4\sin x\cos x(1-2\sin^2 x)$

h) $\cos x+2\sin^2\dfrac{x}{2}=1$

i) $\cos^3 x=\dfrac{1}{2}\cos x(1+\cos 2x)$

4. Use a sum or difference identity to find the exact value for each expression.

a) $\cos 75^\circ$ b) $\sin 195^\circ$ c) $\cos\dfrac{11\pi}{12}$ d) $\tan\dfrac{11\pi}{12}$

5. Use a half angle identity to find the exact value for each expression.

a) $\sin\dfrac{5\pi}{8}$ b) $\cos\dfrac{5\pi}{8}$ c) $\sin\dfrac{5\pi}{12}$

6. Write the expression as the sine, cosine, or tangent of an angle.

a) $\sin\dfrac{\pi}{3}\cos\dfrac{\pi}{7}-\sin\dfrac{\pi}{7}\cos\dfrac{\pi}{3}$

b) $\cos 7y\cos 3y-\sin 7y\sin 3y$

7. Solve each equation on the interval $[0,2\pi)$.

a) $2\cos^2 x-5\cos x+2=0$

b) $2\cos^2 x=-\cos x$

c) $\tan^2 x+\tan x=0$

d) $\cos 2x+\sin x=1$

e) $1+\cos^2 x=2\cos^2\dfrac{x}{2}$

f) $\cos^2 x=\sin^2\dfrac{x}{2}$

g) $\sin\dfrac{x}{2}+\cos x=1$

h) $\sin 2x=\sin x$