**Quiz6** Name: Evan O'Neill

**Show all work and necessary steps. Answers without sufficient work will not be graded.**

1. (4pts) Use the definition of even and odd functions to rewrite the following expression such that each argument, $x$, is positive:

$$\cos(-x) + \tan(-x)\sin(-x)$$

$$\cos(x) - \tan(x)(-\sin(x))$$

$$\boxed{\cos(x) + (\tan(x)\sin(x))}$$

2. Give the **period** and **domain** (in set notation) of:

(a) $f(x) = \tan(2x)$

$\frac{\pi}{|2|} = P$

$2 \cdot B = 2\pi$

$B = \pi$

(2pts) Period:

$\frac{\pi}{2}$

(3pts) Domain:

$\{x \mid x \neq \frac{\pi}{4} + \frac{\pi}{2}k\}$

(b) $g(x) = \csc(2x)$

(2pts) Period: $\frac{2\pi}{2} = \pi$

$\boxed{\pi}$

(3pts) Domain:

$\{x \mid x \neq \frac{\pi}{2}k\}$

3. Give the exact value of:

(a) (4pts) $\cos^{-1}\left(\sin\left(-\frac{\pi}{3}\right)\right)$

$\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

$\cos(x) = -\frac{\sqrt{3}}{2}$

$\boxed{x = \frac{5\pi}{6}}$

(b) (4pts) $g(x) = cos\left(\tan^{-1}\left(\frac{6}{5}\right)\right)$

$\cos(\arctan(\frac{6}{5}))$

$\downarrow$

$\tan^{-1}(x) = \frac{6}{5}$

$\boxed{\cos(\tan(x)) = \frac{6}{5}}$

4. (6pts) Simplify fully (your answer should be a single term using sin or cos):

$$(1+\cos(x))(1-\cot(x)\sin(x))$$

$(1+\cos(x))(1-\cot(x)\sin(x))$

$(1+\cos(x))(1-\frac{\cos(x)}{\cancel{\sin(x)}}\cancel{\sin(x)})$

$(1+\cos(x))(1-\cos(x))$

$(1-\cos^2(x))$

$\boxed{\sin^2(x)}$

5. Verify the following using identities:

(a) (6pts) $\frac{\cos^2(x)}{\sin(x)} - \sin(-x) = \csc(x)$

$\frac{\cos^2(x)}{\sin(x)} - \sin(-x) = \csc(x)$

$\frac{\cos^2(x)}{\sin(x)} + \sin(x) = \csc(x)$

$\frac{\cos^2(x) + \sin(x)}{\sin(x)} = \csc(x)$

$\frac{\cos^2(x) + \sin(x)}{\sin(x)} = \frac{1}{\sin(x)}$

$\frac{\cos^2(x) + \sin^2(x)}{\sin(x)}$

$\frac{1}{\sin(x)} = \boxed{\csc(x)}$

(b) (6pts) $\frac{4\sec^2(x)+4\sec(x)+1}{2\sec(x)+1} = \frac{2}{\cos(x)} + 1$

$\frac{4\sec^2(x)+4\sec(x)+1}{2\sec(x)+1}$

$\frac{(2\sec(x)+1)^2}{2\sec(x)+1}$

$\frac{(2\sec(x)+1)\cancel{(2\sec(x)+1)}}{\cancel{2\sec(x)+1}}$

$2\sec(x)+1$

$2\cdot\frac{1}{\cos(x)}+1$

$\boxed{\frac{2}{\cos(x)}+1}$