Name: ______________________

1. Class notes for this week: This week we have covered Sections 5.5 and 4.5. Next week we will cover Section 5.1 and have two review periods.

2. Compute the integrals.

   (a) (2 points)

$$\int \frac{\sec(12x)\tan(12x)}{\sqrt{\sec(12x)}}dx$$

   (b) (1 point)

$$\int_{-5\pi}^{5\pi} \frac{\tan x}{x^4+2}dx$$

(a) $\int \frac{\sec(12x)\tan(12x)}{\sqrt{\sec(12x)}}dx$ $u = \sec(12x)$

$du = 12\sec(12x)\tan(12x)$

$= \int \frac{\frac{1}{12}du}{\sqrt{u}}$

$= \frac{1}{12}\int u^{-1/2}du$

$= \frac{1}{12}(2)u^{1/2} + c$

$= \frac{1}{6}\sqrt{\sec(12x)} + c$

(b) Note that $\frac{\tan(-x)}{(-x)^4+2} = \frac{-\tan(x)}{x^4+2} = -\left(\frac{\tan x}{x^4+2}\right)$. So the function is odd and the symmetric integral over $[-5\pi, 5\pi]$ is zero.

Question 3 is on the back

3. (a) (2 points) What is the average value of the function $f(x) = x^2 + \sin(\frac{\pi}{4}x)$ over the interval $[0, 2]$?

(a) $F_{ave} = \frac{1}{2-0} \int_0^2 \left[x^2 + \sin\left(\frac{\pi}{4}x\right)\right] dx$

$= \frac{1}{2}\left[\frac{1}{3}x^3\right]_0^2 + \frac{1}{2}\int_0^2 \sin\left(\frac{\pi}{4}x\right)dx$

$u = \frac{\pi}{4}x$

$du = \frac{\pi}{4}dx$

$\frac{4}{\pi}du = dx$

$= \frac{1}{2}\left(\frac{8}{3} - 0\right) + \frac{1}{2}\int_0^{\pi/2} \sin(u) \cdot \frac{4}{\pi} du$

$= \frac{4}{3} + \frac{2}{\pi}\left[-\cos u\right]_0^{\pi/2}$

$= \frac{4}{3} + \frac{2}{\pi}\left[0 + 1\right]$

$= \frac{4}{3} + \frac{2}{\pi}$