Math 1211: Recitation #2 **Winter 2014**

Name:	**A#:**	**Section:**

1. $\int x^3(1+2x^4)^2\,dx$

2. $\int \frac{dx}{x\,\ln x}$

3. $\int \tan 2x\,\sec^3 2x\,dx$

4. $\int x\sqrt[3]{x+2}\,dx$

5. $\int \frac{dz}{1+2\sqrt{z}}$

6. $\int \frac{x+4}{x^2+4}\,dx$

7. $\int e^z\cot(e^z)\,dz$

8. Evaluate $\displaystyle\int_0^{1/4} \frac{(x+1)\,dx}{\sqrt{1-4x^2}}$

9. Carefully consider the following evaluation of $\displaystyle\int_{-1}^{1} \frac{dx}{1+x^4}$.

Let $u = x^2$. so that $du = 2x\,dx$.

Since $x = \sqrt{u}$ we get $dx = \dfrac{1}{2\sqrt{u}}\,du$.

Notice that when $x = -1$ we have $u = 1$, and when $x = 1$ we also have $u = 1$. Therefore

$$\int_{-1}^{1} \frac{dx}{1+x^4} = \frac{1}{2}\int_{1}^{1} \frac{du}{\sqrt{u}(1+u^2)}.$$

But the integral on the right-hand side must evaluate to zero because we are integrating from 1 to 1. Therefore

$$\int_{-1}^{1} \frac{dx}{1+x^4} = 0.$$

(a) How do you know that the integral *cannot* truly evaluate to 0.

(b) What is wrong with the given argument?