Recitation #1 - Review of Substitution

Warm up:

Find the error in the following "solution":

Find $\int_{-2}^{2} \frac{1}{x^8 - 1}\, dx$

let $u = x^4$

then $du = 4x^3 dx$

$\frac{du}{4x^3} = dx$

and $u^{1/4} = x$

$u = 2^4 = 16$

$u = (-2)^4 = 16$

$= \int_{16}^{16} \frac{1}{(u^2-1)} \cdot \frac{du}{4u^{3/4}}$

but an integral $\int_a^a f(x)dx = 0$

so $\int_{-2}^{2} \frac{1}{x^8-1} dx = 0$

Group work:

Problem 1 *Compute the following integrals:*

(a) $\int 2t \sin\left(t^2\right)\, dt$

(b) $\displaystyle\int \sec^2(x)\tan(x)\,dx$

Problem 2 *Compute the following integrals:*

(a) $\displaystyle\int \frac{x^2}{1+x^2}\,dx$

(b) $\displaystyle\int \frac{1+3x}{4+4x^2}\,dx$

Problem 3 *Evaluate the following integrals:*

(a) $\displaystyle\int \frac{13x^7}{\sqrt{3x^4-5}}\,dx$

(b) $\displaystyle\int \frac{x^3}{x^2-3}\,dx$
