

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) $\int 2t \sin(t^2) dt$

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

Problem 2 Compute the following integrals:

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

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

Problem 3 Evaluate the following integrals:

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

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