SECTION 5.5 CONTINUED

U-Substitution with definite integrals

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

Indefinite integral Solution is a family of antiderivatives

 $\int_{0}^{2} x(x^{2}+1)^{3} dx$

Definite integral Solution is a number

Both can be solved using u-substitution

FIRST WAY...

 $\int_{0}^{2} x(x^{2}+1)^{3} dx$

 $\int_{0}^{2} x(x^{2}+1)^{3} dx$

$$u = x^2 + 1$$

 $\frac{1}{2} \int_{u(0)}^{u(2)} u^3 du$

We could have left the integral in terms of u, but we would need to change the limits of integration.

ANOTHER EXAMPLE

 $\int_1^2 \frac{dx}{(3-5x)^2}$

EVEN AND ODD FUNCTIONS

• Let f be continuous on the closed interval [-a,a]

• If f is an even function, then

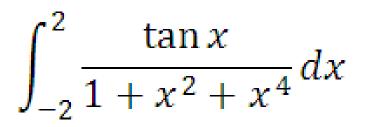
$$\int_{-a}^{a} f(x)dx = 2\int_{0}^{a} f(x)dx$$

• If f is an odd function then

$$\int_{-a}^{a} f(x) dx = 0$$

EXAMPLES

 $\int_{-2}^{2} (x^6 + 1) dx$



p. 366 #37 – 51 odd, 61,62