

Math 202 – Quiz # 1

(Review for integration)

Name: Solution

ID. _____

Sr #: _____

Evaluate each one of the given integrals

1. $\int \frac{dt}{1+t^2}$

$$= \tan^{-1} t + C$$

3. $\int 4xe^x dx = 4 \int xe^x dx$

Let $u = x$, $dv = e^x dx$
 $du = dx$, $v = e^x$

$$\int u dv = uv - \int v du$$

$$\Rightarrow \int xe^x dx = xe^x - \int e^x dx = xe^x - e^x$$

$$\therefore \int 4xe^x dx = 4(xe^x - e^x) + C$$

$$= 4e^x(x-1) + C$$

2. $\int \csc 3\theta \cot 3\theta d\theta$

$$= -\frac{1}{3} \csc 3\theta + C$$

4. $\int \frac{dx}{x^2-1} = \int \frac{1}{(x-1)(x+1)} dx$

$$\frac{1}{(x-1)(x+1)} = \frac{A}{x-1} + \frac{B}{x+1} = \frac{A(x+1) + B(x-1)}{(x-1)(x+1)}$$

$$\Rightarrow A(x+1) + B(x-1) = 1$$

$$\left. \begin{array}{l} x=1 \Rightarrow A = \frac{1}{2} \\ x=-1 \Rightarrow B = -\frac{1}{2} \end{array} \right\}$$

$$\int \frac{dx}{x^2-1} = \int \left[\frac{\frac{1}{2}}{x-1} - \frac{\frac{1}{2}}{x+1} \right] dx = \frac{1}{2} \int \left[\frac{1}{x-1} - \frac{1}{x+1} \right] dx$$

$$= \frac{1}{2} [\ln|x-1| - \ln|x+1|] + C$$

$$= \frac{1}{2} \ln \left| \frac{x-1}{x+1} \right| + C$$