

Math 260 – Quiz # 1a

(Review for integration)

Name: _____ Sec. _____ ID: _____

Evaluate each one of the given integrals

1. $\int \csc 5\theta \cot 5\theta d\theta$

$$= -\frac{1}{5} \csc 5\theta + C$$

2. $\int 9xe^x dx = 9 \int xe^x dx$ [integrating by parts]

$$\left. \begin{array}{l} \text{let } u=x, \quad dv=e^x dx \\ du=dx, \quad v=e^x \end{array} \right\} \therefore \int 9xe^x dx = 9(xe^x - e^x) + C$$

$$= 9e^x(x-1) + C$$

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

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

3. $\int \frac{dt}{1+t^2} = \tan^{-1} t + C$

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

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

$$A(x+1) + B(x-1) = 1 \Rightarrow \begin{cases} x=1 \Rightarrow A = \frac{1}{2} \\ x=-1 \Rightarrow B = -\frac{1}{2} \end{cases}$$

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

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

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