

Math 202 – Quiz # 1

(Review for integration)

Name: Solution Sec. _____ ID: _____

Evaluate each one of the given integrals

<p>1. $\int \sec 3\theta \tan 3\theta d\theta$</p> $= \frac{1}{3} \sec 3\theta + C$	<p>1. $\int \frac{du}{1+u^2}$</p> $= \tan^{-1} u + C$
<p>2. $\int 2xe^x dx$</p> $= 2 \int xe^x dx \quad [\text{integrate by parts}]$ <p>Let $u = x$, $dv = e^x dx$</p> $du = dx, \quad v = e^x$ $\int u dv = uv - \int v du$ $\Rightarrow \int xe^x dx = xe^x - \int e^x dx$ $= xe^x - e^x$ $\therefore \int 2xe^x dx = 2(xe^x - e^x) + C$ $= 2e^x(x-1) + C$	<p>4. $\int \frac{dx}{x^2-1} = \int \frac{1}{(x-1)(x+1)} dx$</p> $\frac{1}{(x-1)(x+1)} = \frac{A}{x-1} + \frac{B}{x+1} = \frac{A(x+1) + B(x-1)}{(x-1)(x+1)}$ $\Rightarrow A(x+1) + B(x-1) = 1$ $\left. \begin{array}{l} x=1 \Rightarrow A = \frac{1}{2} \\ x=-1 \Rightarrow B = -\frac{1}{2} \end{array} \right\}$ $\int \frac{dx}{x^2-1} = \int \left[\frac{\frac{1}{2}}{x-1} - \frac{\frac{1}{2}}{x+1} \right] dx = \frac{1}{2} \int \left[\frac{1}{x-1} - \frac{1}{x+1} \right] dx$ $= \frac{1}{2} \left[\ln x-1 - \ln x+1 \right] + C$ $= \frac{1}{2} \ln \left \frac{x-1}{x+1} \right + C$