

Math 202 – Quiz # 1

(Review for integration)

Name: Solution

Sec. _____

ID: _____

Evaluate each one of the given integrals

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|---|--|
| <p>1. $\int \frac{du}{1+u^2}$</p> $= \tan^{-1} u + C$ | <p>3. $\int 2xe^x dx$ [integrating by parts]</p> $= 2 \int x e^x dx$ <p>Let $u = x$, $dv = e^x dx$ $du = dx$, $v = e^x$</p> $\int u dv = uv - \int v du$ $\Rightarrow \int x e^x dx = x e^x - \int e^x dx = x e^x - e^x$ $\therefore \int 2x e^x dx = 2(x e^x - e^x) + C$ $= 2e^x(x-1) + C$ |
| <p>2. $\int \csc 5\theta \cot 5\theta d\theta$</p> $= -\frac{1}{5} \csc 5\theta + C$ | <p>4. $\int \frac{dx}{x^2-1} = \int \frac{1}{(x-1)(x+1)} dx$</p> $\frac{1}{(x-1)(x+1)} = \frac{A}{x-1} + \frac{B}{x+1} = \frac{A(x+1) + B(x-1)}{(x-1)(x+1)}$ $\Rightarrow A(x+1) + B(x-1) = 1$ $\left. \begin{array}{l} x=1 \Rightarrow A = \frac{1}{2} \\ x=-1 \Rightarrow B = -\frac{1}{2} \end{array} \right\}$ $\int \frac{dx}{x^2-1} = \int \left[\frac{\frac{1}{2}}{x-1} - \frac{\frac{1}{2}}{x+1} \right] dx = \frac{1}{2} \int \left[\frac{1}{x-1} - \frac{1}{x+1} \right] dx$ $= \frac{1}{2} [\ln x-1 - \ln x+1] + C$ $= \frac{1}{2} \ln \left \frac{x-1}{x+1} \right + C$ |