

Name: Key
September 9, 2014
MAC 2312.5885
Cyr

Quiz 1

You must show all work to receive full credit!!

Problem 1. (3 pts) Evaluate $\int 25 \sin(\ln x) dx$.

$$\begin{aligned} & 25 \int \sin(\ln x) dx && \text{IBP} \quad u = \sin(\ln x) \quad dv = dx \\ & && du = \frac{\cos(\ln x)}{x} dx \quad v = x \\ & = 25 \left[x \sin(\ln x) - \int \cos(\ln x) dx \right] && \text{IBP} \quad u = \cos(\ln x) \quad dv = dx \\ & && du = \frac{-\sin(\ln x)}{x} dx \quad v = x \\ & = 25x \sin(\ln x) - 25 \left[x \cos(\ln x) + \int \sin(\ln x) dx \right] \\ \Rightarrow & 25 \int \sin(\ln x) dx = 25x \sin(\ln x) - 25x \cos(\ln x) - 25 \int \sin(\ln x) dx \\ \Rightarrow & 50 \int \sin(\ln x) dx = 25x \sin(\ln x) - 25x \cos(\ln x) \\ \Rightarrow & 25 \int \sin(\ln x) dx = \boxed{\frac{25}{2} x \sin(\ln x) - \frac{25}{2} x \cos(\ln x) + C} \end{aligned}$$

Problem 2. (2 pts) Evaluate $\int_0^{\pi/2} 23 \sin^2(2x) dx$.

$$\begin{aligned} 23 \int_0^{\pi/2} \sin^2(2x) dx &= 23 \int_0^{\pi/2} \frac{1}{2} (1 - \cos 4x) dx \\ &= \frac{23}{2} \left[x - \frac{1}{4} \sin 4x \right]_0^{\pi/2} = \frac{23}{2} \left[\left(\frac{\pi}{2} - 0 \right) - (0 - 0) \right] = \boxed{\frac{23\pi}{4}} \end{aligned}$$