

Calculus II: Homework Solutions Guide

Lead Instructor Name

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Chapter 1

Integration Techniques

1.1 Integration by Parts

Problem 1.1.1. Evaluate the following indefinite integral:

$$\int x \cos(x) dx$$

Solution. Let $u = x$ and $dv = \cos(x) dx$. Then, $du = dx$ and $v = \sin(x)$. Using the integration by parts formula $\int u dv = uv - \int v du$:

$$\begin{aligned} \int x \cos(x) dx &= x \sin(x) - \int \sin(x) dx \\ &= x \sin(x) - (-\cos(x)) + C \\ &= x \sin(x) + \cos(x) + C \end{aligned}$$

where C is the constant of integration. □