

MATH 2300 - Homework 1

Instructions: This homework is due on Friday, June 8th. You may work with other students, however each person is responsible for writing their own solutions. Please write the names of any students who helped you.

1. Integrate the following either by substitution, by parts, or using a table.

(a) $\int \ln(x)dx$

(b) $\int \sin^3(x) \cos^2(x)dx$

(c) $\int_0^\pi x^3 \sin(x)dx$

(d) $\int \frac{t}{\sqrt{1-t}}dt$

(e) $\int \frac{\sin(\ln(x))}{x}dx$

(f) $\int \frac{y^3 - 3y}{y - 1}dy$

(g) $\int e^x \cos(x)dx$

(h) $\int (x^3 + 5)\ln(x)dx$

(i) $\int r^5 \sqrt{1+r^3} \ln(r) dr$

(j) $\int \frac{1}{\cos(\theta)} d\theta$

(k) $\int \frac{1}{\sqrt{9-x^2}} dx$

2. Prove the following reduction formula:

$$\int x^n e^x dx = x^n e^x - n \int x^{n-1} e^x dx$$