

1. Evaluate the following integrals

b. $\int x^3 \ln x dx$

c. $\int e^{2x} \sin 3x dx$

d. $\int_0^{\frac{\pi}{2}} x \sin^2 x dx$

e. $\int_1^2 \sec^{-1} x dx$

f. $\int_0^4 \sqrt{x} e^{\sqrt{x}} dx$

2. Show $\int (\ln x)^n dx = x(\ln x)^n - n \int (\ln x)^{n-1} dx$ for $n \geq 1$.

Use the above to find $\int (\ln x)^4 dx$

3. Evaluate the following integrals

a. $\int \sin^3 x \cos^3 x dx$

b. $\int \tan^2 x \sec^2 x dx$

c. $\int \cot^3 x \csc x dx$

d. $\int \sin^3 x \cos^3 x dx$

e. $\int \tan^2 x \sec x dx$