

[77] 1. Evaluate.

a) $\int \frac{\ln x}{x^3} dx$

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

c) $\int \frac{dx}{\sqrt{x^2 - 4}}$

d) $\int \tan^3 x \sec^2 x \, dx$

e) $\int x e^{-x^2} \, dx$

f) $\int \frac{(4x^2 + 4x - 2)}{x(x+1)(x-1)} dx$

g) $\int \frac{2x^2 + x + 1}{x^3 + x} dx$

h) $\int \cos^2 4x \, dx$

i) $\int (x + 1) \sqrt{x^2 + 2x + 2} \, dx$

j) $\int \sqrt{x^2 + 2x + 2} \, dx$

k) $\int e^{\sqrt{x}} \, dx$

[25] 2. Find the following limits, if it exists. Clearly show work.

a) $\lim_{x \rightarrow \infty} (1 - \cos x)$

b) $\lim_{x \rightarrow 0} \frac{\cos 5x - 1}{x^2}$

c) $\lim_{x \rightarrow 0} (1 + 2x)^{3/x}$

d) $\lim_{x \rightarrow 1} \left(\frac{x^2}{x-2} - \frac{x^2+1}{x^2-1} \right)$

e) $\lim_{x \rightarrow 0^+} x \ln x$