

1. Evaluate each of the following integrals:.

(a)  $\int x e^{4x} dx$

(b)  $\int e^{3x} \cos(8x) dx$

(c)  $\int x \sec^2 x dx$

(d)  $\int x \sec(x^2) dx$

$$(e) \int x5^x dx$$

$$(f) \int e^{\sqrt{x}} dx$$

$$(g) \int \sec^3 x dx$$

$$(h) \int \sin(\ln x) dx$$

$$(i) \int x^3(x^2 + 5)^{49} dx$$

$$(j) \int x^2(x^3 + 5)^{49} dx$$

2. Derive the following reduction formula:

$$\int \cos^n x dx = \frac{1}{n} \cos^{n-1} x \sin x + \frac{n-1}{n} \int \cos^{n-2} x dx$$

3. Find the volume of the solid generated by revolving the region in the first quadrant bounded by the coordinate axes, the curve  $y = e^{-x}$ , and the line  $x = 1$  about the line  $x = 1$