

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 $x = 1$