

1. Evaluate  $\int \frac{x^2}{(4-x^2)^{3/2}} dx$ .
2. Evaluate  $\int \cos^3 x \sin^2 x dx$
3. Evaluate  $\int x \sec x \tan x dx$
4. Evaluate  $\int \frac{x^2 + 8x - 3}{x^3 + 3x} dx$ .
5. Evaluate  $\int \frac{dx}{x^2 \sqrt{x^2 + 1}}$
6. Evaluate  $\int \tan^4 x \sec^2 x dx$
7. Evaluate  $\int \frac{x^3 + 4x^2}{x^2 + 4x + 3} dx$
8. Evaluate  $\int e^{-2x} \sin 3x dx$ .
9. Find the area of the surface generated by revolving the curve  $y = \ln x$  from  $x = 1$  to  $x = e$  about the  $y$ -axis.
10. The region in the first quadrant enclosed by the coordinate axis, the curve  $y = e^x$  and the line  $x = 1$  is revolved about the  $y$ -axis to generate a solid. Find the volume of the solid.
11. Let  $R$  be the region in the first quadrant that is bounded above by the line  $y = 1$ , below by the curve  $y = \ln x$  and on the left by  $x = 1$ . Find the volume of the solid generated by revolving the region  $R$  about the  $x$ -axis.
12. Solve the initial value problem  $x \frac{dy}{dx} = \sqrt{x^2 - 4}$  for  $x \geq 2$  where  $y(2) = 0$
13. Solve the initial value problem  $(3x^4 + 4x^2 + 1) \frac{dy}{dx} = 2\sqrt{3}$  where  $y(1) = -\frac{\pi\sqrt{3}}{4}$