

Tougaloo College
MAT222 - Calculus II
Howework 09 - Spring, 2025

7.3 Exercises

1. Evaluate the integral.

(a) $\int \frac{x^2}{\sqrt{9-x^2}} dx$

Solution: Use the substitution $x = 3 \sin \theta$

$$\frac{9}{2} \left\{ \sin^{-1}(x/3) - \frac{x\sqrt{9-x^2}}{9} \right\} + C$$

(b) $\int_0^{1/2} x\sqrt{1-4x^2} dx$

Solution: Use the substitution $x = 2 \sin \theta$. Then we have $\frac{1}{12}$

(c) (Problem 12) $\int_0^2 \frac{dt}{\sqrt{4+t^2}}$

Solution: Use $t = 2 \tan \theta$ or $t = 2 \sinh u$

(d) (Problem 13) $\int \frac{\sqrt{x^2-9}}{x^3} dx$

Solution: Use $x = 3 \sec \theta$