

1. Evaluate the integral: $\int \frac{x^2}{(x^2 - a^2)^{3/2}} dx$

2. Evaluate the integral: $\int \frac{1}{x^2 \sqrt{9 + x^2}} dx$

3. Evaluate the integral: $\int_0^{a/2} \frac{x^2}{\sqrt{a^2 - x^2}} dx$

4. Evaluate the integral: $\int \frac{1}{x^2 - 4x + 5} dx$

5. Use trigonometric substitution to show that $\int \frac{1}{\sqrt{x^2 - a^2}} dx = \ln(x + \sqrt{x^2 - a^2}) + C$

6. Find the volume of the solid obtained by rotating about the line $x = 3$ the region under the curve $y = x\sqrt{4 - x^2}$, $0 \leq x \leq 2$

7. Use a hyperbolic trigonometric substitution to evaluate $\int \frac{1}{\sqrt{4 + x^2}} dx$