

Trigonometric Substitutions. You are encouraged to work together on these problems.

1. Show that $\sin^5 x \cos^2 x$ is an odd function.

2. Compute $\int_{-\pi}^{\pi} \sin^5 x \cos^2 x \, dx$.

3. Evaluate $\int x^2 \sqrt{x^2 - a^2} \, dx$ in two ways:

(a) using $x = a \sec \theta$

(b) using $x = a \cosh t$

4. Evaluate $\frac{dx}{x^2 - 4x + 13}$

5. Evaluate $\int \frac{x}{x^2 + 4} dx$ using a trigonometric substitution.

(Note: a simple substitution gives $\frac{1}{2} \ln |x^2 + 4| + C$ as a solution. Show that your solution is equivalent to this one.)