
Trigonometric Substitution

Solutions should show all of your work, not just a single final answer.

In each of the following trigonometric substitution problems, draw a triangle and label an angle and all three sides corresponding to the trigonometric substitution you select.

1. Compute $\int \frac{dx}{\sqrt{9-x^2}}$.

2. Compute $\int \frac{dx}{(9+x^2)^{3/2}}$.

3. Compute $\int \frac{\sqrt{x^2-9}}{x^3} dx$.

4. Compute $\int_0^3 \frac{x^2}{\sqrt{9-x^2}} dx$. (Hint: When you make a trigonometric substitution, include the bounds of integration in the substitution.)

5. Compute $\int_0^1 \frac{dx}{(x^2+1)^2}$.

6. T/F (with justification): To compute $\int \frac{dx}{x^2\sqrt{x^2+2}}$ by trigonometric substitution, use $x = 2 \tan \theta$.