

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECTION 3.3

Math 1001 Worksheet

FALL 2025

For practice only. Not to be submitted.

1. Evaluate each of the following integrals using the method of trigonometric substitution.

(a) $\int \frac{1}{\sqrt{x^2 - 36}} dx$

(b) $\int \frac{1}{(2 - x^2)^{\frac{3}{2}}} dx$

(c) $\int_0^2 \sqrt{16 - x^2} dx$

2. Trigonometric substitution can be a consequence of u -substitution. Use this approach to evaluate

$$\int \sqrt{e^{6x} - 4} dx.$$

3. Trigonometric substitution can be a consequence of completing the square. Use this approach to evaluate

$$\int \frac{x^2}{\sqrt{4x - x^2}} dx.$$

4. The following integrals could use any of the techniques that we've introduced in this course. Determine the appropriate technique, and evaluate the integral.

(a) $\int \frac{x}{\sqrt{x^2 + 4}} dx$

(b) $\int \frac{\sqrt{4 - x^2}}{x} dx$

(c) $\int \frac{1}{4x^2 - 12x + 13} dx$

(d) $\int \frac{1}{4x^2 - 4x - 3} dx$

(e) $\int \frac{1}{x[\ln(x)]^2} dx$

(f) $\int x[\ln(x)]^2 dx$

(g) $\int \sin^3(x) \cos^3(x) \, dx$

(h) $\int \sin^3(x) \csc^3(x) \, dx$

(i) $\int x \tan^2(x) \, dx$