# MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

ASSIGNMENT 8 **MATHEMATICS 1001** FALL 2019

**Due: Friday, November 22nd at 4:00pm. SHOW ALL WORK.**

> **Note:** You are encouraged to complete the WebAssign problem sets "Indefinite Integrals by Trigonometric Substitution", "Definite Integrals by Trigonometric Substitution", "Strategies for Indefinite Integrals", "Strategies for Definite Integrals" and the "Worksheet on Improper Integrals" before you work on this assignment.

1. Use the method of trigonometric substitution to evaluate each of the following.

   (a) $\displaystyle\int \frac{\sqrt{x^2+9}}{x}\,dx$

   (b) $\displaystyle\int \frac{x}{\sqrt{x^2-6x-7}}\,dx$

   (c) $\displaystyle\int x\sqrt{25-x^4}\,dx$

   (d) $\displaystyle\int_{\frac{\sqrt{2}}{2}}^{\frac{\sqrt{3}}{2}} \frac{x^3}{\sqrt{1-x^2}}\,dx$

2. Use any integration strategy introduced in this course to evaluate each of the following.

   (a) $\displaystyle\int x\cos^2(x)\,dx$

   (b) $\displaystyle\int \sin^3(x)\cos^2(x)\,dx$

   (c) $\displaystyle\int \frac{\sin(x)}{\cos^3(x)+\cos^2(x)}\,dx$

3. Evaluate each of the following improper integrals, or show that it is divergent.

   (a) $\displaystyle\int_1^{\infty} \frac{\ln(x)}{x^2}\,dx$

   (b) $\displaystyle\int_1^{e} \frac{1}{x\ln(x)}\,dx$

   (c) $\displaystyle\int_{-3}^{6} \frac{1}{\sqrt[3]{x-5}}\,dx$