

## Mathematics 1120H – Calculus II: Integrals and Series

TRENT UNIVERSITY, Winter 2022

### Assignment #4

#### A non-trigonometric integral reduction formula

*Due on Friday, 11 February. (May be submitted on paper or via Blackboard.\*)*

Please show all your work. As with all the assignments in this course, unless stated otherwise on the assignment, you are permitted to work together and look things up, so long as you acknowledge the sources you used and the people you worked with.

1. Suppose  $n > 1$ . Find an integral reduction formula for  $\int \frac{1}{(x^2 + 1)^n} dx$  with the help of a suitable trigonometric substitution. [5]
2. Suppose  $n > 1$ . Find the same integral reduction formula for  $\int \frac{1}{(x^2 + 1)^n} dx$  without using any trigonometric substitution. [5]

NOTE: Please do not use SageMath, except to check your answers.

#### For One Who Loves An Engineer

Sing not to me of silicon chips  
The chocolate kind are sweeter  
But sweeter still would be your lips –  
Put down that voltage meter!  
A jug of wine (viscosity 3),  
Loaf of bread (shear modulus 7)  
But me you cannot quantify –  
Oh, glory be to heaven!

By Miriam Nadel

---

\* All else failing, please email your solutions to the instructor at: [sbilaniuk@trentu.ca](mailto:sbilaniuk@trentu.ca)