

Mathematics 1110H – Calculus I: Limits, derivatives, and Integrals

TRENT UNIVERSITY, Winter 2021

Quiz #4

Tuesday, 9 February.

Available on Blackboard at 12:00 a.m. Tuesday morning.

Due on Blackboard by 11:59 p.m. Tuesday night.

Solutions will be posted on Thursday, 11 February.

Submission: Scanned or photographed solutions are fine, so long as they are legible. Please try to make sure that they are oriented correctly – if they are sideways or upside down, they're rather harder to mark! Submission as a single pdf is strongly preferred, but multiple files and/or other common formats are probably OK in a pinch. Please submit your solutions via Blackboard's Assignments module; if Blackboard does not acknowledge a successful upload, please try again. As a *last* resort, email your solutions to the instructor at: sbilaniuk@trentu.ca

Reminder: Per the course outline, *all work submitted for credit must be written up entirely by yourself, giving due credit to all relevant sources of help and information.* For this quiz, you are permitted to use your textbook and all other course material, from this and any other mathematics course(s) you have taken or are taking now, but *you may not use any other sources or aids, nor give or receive any help*, except to ask the instructor to clarify questions and to use a calculator (any that you like).

Do *all three* of the following questions.* Show all your work! Simplify where you conveniently can.

1. Find $\frac{dy}{dx}$ if $y = \arctan\left(\frac{1}{x}\right)$. How is $\frac{dy}{dx}$ related to the derivative of $\arctan(x)$? [2]
2. Use implicit differentiation to find $\frac{dy}{dx}$ in terms of x and y if $\cos(y) = x \sin(y)$. [2]
3. Why do the derivatives $\frac{dy}{dx}$ from questions 1 and 2 have to be equal? [1]

[Total = 5]

* I was just going to have two questions but then I thought of a connected pair ... :-)