MATH 170 – Section 006 – Quiz 4

You may work with other class members on this quiz, but you may not receive assistance from people not in your MATH 170 section. You must show all of your work to receive full credit. Do all your work on other sheets of paper and be sure to staple all the pieces of paper together or YOU WILL GET A ‘ZERO’ ON THE QUIZ. Do not use decimal approximations unless asked to do so. Your work on this quiz must be handed in by the beginning of class on Friday, 5 October 2007. GOOD LUCK!

1) The text gives one proof of the Quotient Rule. Here is another: Let

\[ f(x) = \frac{u(x)}{v(x)}. \]

Prove that

\[ f'(x) = \frac{v(x)u'(x) - u(x)v'(x)}{[v(x)]^2} \]

by applying the Product Rule to the function

\[ u(x) = f(x) v(x). \]

2) Differentiate the following functions. Factor and simplify your answers.

a) \( f(x) = \frac{e^x}{\sqrt{x} + \cos x} \)

b) \( g(x) = \frac{e^x \tan x}{x^2} \)

3) Find an equation for each line that passes through the origin that is also tangent to the graph of \( y = x^2 - 2x + 2 \). (Hint: write the slope of the tangent line in two different ways.) And simplify your answers.