MATH 101 V01 – ASSIGNMENT 2

There are two parts to this assignment. The first part is on WeBWorK — link to it using Canvas, and go to MATH 101 V01 (after 9:00 am Fri Jan 12). The second part consists of the questions on this page. You are expected to provide full solutions with complete justifications. You will be graded on the mathematical, logical and grammatical coherence and elegance of your solutions. Your solutions must be typed, with your name and student number at the top of the first page. If your solutions are on multiple pages, the pages must be stapled together.

Your written assignment must be handed in ***before your recitation on Friday, January 19****. The online assignment will close at* ***9:00 a.m. on Friday, January 19****.*

1. (a) Let $f(x)$ be continuous on an open interval that contains $x = 1$. Find an antiderivative $G(x)$ with $G(1) = 1$.

   (b) Solve the *integral equation*

   $$f(x) = 1 + 2\int_x^3 f(t)\,dt$$

   for $f(x)$; that is, find an expression for $f(x)$ in terms of elementary functions. After you have found $f(x)$, verify that it is indeed a solution, by substituting your expression for $f(x)$ into the integral equation and evaluating the integral.

2. There is a line $y = mx$ through the origin that divides the finite region, bounded by the curve $y = x - x^2$ and the x-axis $y = 0$, into two regions with equal area. Find the slope m of the line.