

MATH 105 – Written Homework #2

For this assignment, you are expected to provide full solutions with complete justifications. You will be graded on the mathematical, logical and grammatical coherence of your solutions. You are encouraged to work together, but your solutions must be written **independently**. Please write 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. This assignment is due at **1:00pm on Monday, July 24**. Late assignments will not be accepted.

1. Solve the following initial value problem

$$(x - 2) \frac{dy}{dx} = \frac{1}{2y(x^2 + 1)}, \quad y(0) = 1.$$

An implicit solution will be enough for full credit.

2. Evaluate $\int_{-1}^{\frac{5}{2}} g(s) ds$, where

$$g(s) = \begin{cases} -1, & -1 \leq s < 0 \\ e^{\sin(s)} \cos(s), & 0 \leq s < 2 \\ \frac{1}{\sqrt{27-3s^2}}, & 2 \leq s \leq \frac{5}{2} \end{cases}$$

3. Find all (non-negative) values of p for which the improper integral

$$\int_2^{+\infty} \frac{1}{x(\ln x)^p} dx$$

converges.