

Calculus 081a
Quiz 4

August 4, 2006
Time: 40 mins

Name (Print): _____

Student Number: _____

Signature: _____

1 mark 1. Find the length of the curve $y = \frac{x^2}{2} - \frac{\ln x}{4}$ where $2 \leq x \leq 4$.

1 mark 2. Solve the initial value problem.
 $y' = x + y, \quad y(0) = 2.$

- 1 mark*
3. A tank contains 100 L of water. A solution with a salt concentration of 0.4 kg/L is added at a rate of 5 L/min. The solution is kept mixed and is drained from the tank at a rate of 2 L/min. If $f(t)$ is the amount of salt (in kilograms) after t minutes, set up the initial value problem (differential equation) for f . Indicate how would you solve this equation. (But do NOT solve it.)

- 1 mark*
4. Solve the differential equation.
 $y' = 2 + 2y^2 + x + y^2x.$