Question 1

Suppose that a bank account starts with \$0, and for a period of three years, $\$10,000$ is deposited into the account per year continuously. After the three year period the deposits abruptly stop. The account grows at a rate of 5% per year, compounded continuously. Measure t in years, and use $A(t)$ to denote the amount of money in the account at time t.

1. (3) Write a differential equation that describes the amount of money in the bank account.

$$\frac{dy}{dt} = 0.05y + f(t)$$

$$f(t) = \begin{cases} 10,000 & t < 3 \\ 0 & t > 3 \end{cases}$$

2. (3) Solve the differential equation with appropriate initial conditions to find the amount of money in the back account at time t.