Quiz 4

 $\begin{array}{ll} \star \mbox{ Answer and mark clearly the questions in the provided answer sheets.} \\ \mbox{Write down your name and student's ID on the each answer sheet you used.} \\ \star \mbox{ Note: No points will be given if no arguments are provided for an answer.} \\ \mbox{ Good Luck!} & \sim \sim Yuling \\ \end{array}$

1. (10 points) R is the region under the curve

$$y = \frac{1}{\sqrt{x}}$$

from x = 1 to $x = e^2$. Find the volume of the solid formed by rotating the region R about the x axis.

2. (70 points) Find

(a)
$$\int_0^1 \frac{x}{e^{2x}} dx$$
 (b) $\int_1^{e^2} x \ln \sqrt[3]{x} dx$ (c) $\int \frac{\ln x}{x^2} dx$ (d) $\int x^3 e^{x^2} dx$
(e) $\int \frac{1}{16 - 3u^2} du$ (f) $\int (\ln x)^3 dx$ (g) $\int x \cos(2x) dx$

- 3. (10 points) Find the function whose tangent line has slope $(x + 1)e^{-x}$ for each value of x and whose graph passes through the point (1, 5).
- 4. (10 points) Solve the given initial value problem:

$$\frac{dx}{dt} = x^2 \cos t; \quad x(\pi) = 1.$$