

Your Name:

Duration of the Quiz is 20 minutes. There are three problems, worth 20 points. Show all your work for full credit. Books, notes etc. are prohibited. Calculators are NOT permitted.

1. The density function

$$f(x) = \frac{e^{3-x}}{(1 + e^{3-x})^2}$$

is an example of a *logistic distribution*. Verify that f is a probability density function and compute $P(3 \leq X \leq 4)$.

2. Find the length of the arc of the curve $y = e^x$ that lies between the points $(0, 1)$ and $(2, e^2)$.

Hints: (i) Use the substitution $e^x = \tan \theta$ (ii) $1 + \tan^2 \theta = \sec^2 \theta$

3. **Set up** an integral to find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line.

$$y = x^2, \quad x = y^2; \quad \text{about } y = 1$$