Kuwait University | Math102 | December 18 1995

Dept of Math & Comp Sci | Makeup Examination | Duration 75 minutes

Answer all of the following questions. Calculators, mobile telephones and pagers are NOT allowed

1. Find the area of the region bounded by the curves

$$y = 1 - x^2, \quad \text{and} \quad y = \cos\frac{\pi x}{2}$$

2. Find the volume generated by revolving the region in the first quadrant bounded by $x = y - y^3$, $x = 1$, and $y = 1$, about the line $y = 1$.

3. Evaluate the following integrals

(a) $\int (\sin^2 3x) \sin 7x \, dx$ (b) $\int \frac{3x^4 - x^3 + 3x^2 - x + 1}{3x^3 - x^2 + 3x - 1} dx$

(c) $\int \sqrt{\frac{1+x}{1-x}} dx$ (d) $\int \frac{x}{\sqrt{-x^4 + 10x^2 - 21}} dx$

(e) $\int \frac{\tan^{-1}(\frac{1}{x})}{x^2} dx$

4. Evaluate $\lim_{x \to -\infty} (1 - e^x)^{\frac{1}{\sin^{-1}(e^x)}}$

Good Luck