

Answer all of the following questions. Calculators, pagers and mobile telephones are not allowed. All items are weighted equally at 5 points each.

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

$$x + y = 0, \quad x - y = 0 \quad \text{and} \quad x - 2y = 9.$$

2. The region bounded by  $x^2 + y^2 = 1$  is revolved about the line  $x = 1$ . Find the volume of the resulting solid.

3. Evaluate the following integrals

$$(a) \int e^{-x} \ln(1 + e^x) dx \quad (b) \int \frac{x^5 + 4x^3 + 11x}{(x^2 + 1)^2} dx \quad (c) \int (\sec x)^{\frac{4}{3}} \sin x dx$$

$$(d) \int \frac{\cot x}{\sin x - 1} dx \quad (e) \int \frac{x}{\sqrt{x^2 + 4x + 8}} dx$$

4. Evaluate  $\lim_{x \rightarrow 0^+} (1 + x)^{\frac{1}{\tan^{-1} x}}$ .

Good Luck