

Test 4 1007, Fall 2006

Last name:

First name:

Student no.:

Questions 1–3 are short answer questions. For these questions, only your final answer will be marked, and no part marks are possible. Put a box around your final answer.

1- [3 marks]: Find $\int e^{3x} dx$.

2-[3 marks]: What is $f'(x)$ if $f(x) = \int_0^{x^3} e^{t^2} dt$?

3-[3 marks]: Set up an integral for the volume of the solid obtained by rotating the area bounded by $y = x^3$ and $y = 0$ from $x = 0$ to $x = 1$ rotating about the x -axis.

Questions 4–9 are long answer questions. **SHOW ALL YOUR WORK** for these questions.

4-[6+6 marks]: Evaluate the following integrals:

$$\int \frac{e^{\frac{1}{x}}}{x^2} dx, \quad \int \frac{e^x}{e^x + 1} dx.$$

6-[7 marks]: Find the volume of a cone with radius r and height h using disk method.

7-[4+4 marks]: Set up an integral for the volume of the solid obtained by rotating the region bounded by the curves $y = x^2$, $y = 4$ and $x = 0$ about the y -axis,

a- using disk method,

b- using cylindrical shells method.

8-[4 marks]: Set up an integral for the volume of the solid obtained by rotating the region bounded by $y = e^{x^2}$, $y = 0$, $x = 0$ and $x = 1$ about the y -axis, using the method of cylindrical shells.