MA 227-5D Spring 2003 Test 4
Name _____

1. Compute

$$\int_C (e^x \sin(y) - y)dx + (e^x \cos(y) - x - 2)dy$$

where C consists of the straight line segment from $(0, 0)$ to $(1, 4)$, then the line segment from $(1, 4)$ to $(16, 493)$, then the line segment from $(16, 493)$ to $(1, 1)$.

2. Compute

$$\iint_S z dS,$$

where S is the part of the paraboloid $z = x^2 + y^2$ lying under the plane $z = 6$.

3. Evaluate

$$\iint_S curl(\mathbf{F}) \cdot d\mathbf{S},$$

where

$$\mathbf{F}(x, y, z) = yz\mathbf{i} + xyz^2\mathbf{j} + z^3 e^{xy}\mathbf{k}$$

and S is the part of the sphere $x^2 + y^2 + z^2 = 5$ that lies above the plane $z = 1$. Orient S upward (take an outer normal on S).