1. (25) (**Show all work**) The double integral $\iint_D y\, e^{x^5} dA = \iint_D y\, exp(x^5) dA$ can be expressed as the iterated integral $\int_{-1}^{1} \int_{0}^{2x^2} y\, e^{x^5}\, dydx$.

   (a) Evaluate this iterated integral.

   (b) Draw (and shade) the region D corresponding to $\iint_D y\, e^{x^5} dA$.

   (c) Express the double integral $\iint_D y\, e^{x^5} dA$ as iterated integral(s) in which the order of integration is reversed from part (a). **Do not evaluate.**

2. (30) (**Show all work**) Consider the function $f(x, y) = xye^{x+2y}$.

   (a) Find all critical points of this function.

   (b) You may assume that a computation shows that the second partials of f are given by: $f_{xx} = y(2 + x)e^{x+2y}$, $f_{xy} = (1 + 2y + x + 2xy)e^{x+2y}$, $f_{yy} = 4x(1 + y)e^{x+2y}$. Classify the above critical points.

(continued on next page)

(c) Find the absolute maximum and minimum of f on the triangular region containing the points $(0, 0)$, $(0, 1)$, and $(2, 0)$. Also indicate the points at which the absolute extrema occur.

3. (15) (**Show all work**) Let W be the wedge (depicted below) in the first octant bounded by $x^2+y^2=4$ and $y+z=2$. Let f be a continuous function on W and set $I=\iiint_W f\,dV$.

   (a) Express the triple integral I as an iterated integral $\iiint f\,dz\,dx\,dy$.

   (b) Express the triple integral I as an iterated integral $\iiint f\,dx\,dy\,dz$.

   (c) Express the triple integral $\iiint_W (x+y+z)\,dV$ in cylindrical coordinates. **Do not evaluate.**

4. (15) (**Show all work**) Evaluate $\iint_D e^{x^2+y^2}\, dA$ where D is the region in the third quadrant bounded by $x^2 + y^2 = 7$.

5. (15) (**Show all work**) Compute the surface area of that part of the paraboloid $z = 9 - x^2 - y^2$ which is between the planes $z = 5$ and $z = 8$.

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Math 11

7 November 2005
Hour Exam II

Problem	Points	Score
1	25	
2	30	
3	15	
4	15	
5	15	
Total	100	

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