Math 173 - Quiz 7

April 14, 2010

Name Key

Score

Show each step to receive full credit. Supply explanations when necessary.

1. (5 points) Evaluate the iterated integral $\int_0^4 \int_y^{2y} (8x+e^y)\,dx\,dy$. You'll need integration by parts. Show your work!

$$\int_0^4 \left(4x^2 + xe^y\right)\Big|_y^{2y} dy = \int_0^4 \left(16y^2 + 2ye^y - 4y^2 - ye^y\right) dy = \int_0^4 \left(12y^2 + ye^y\right) dy$$

$$= \int_0^4 (12y^2)\,dy + \int_0^4 ye^y\,dy = 4y^3\Big|_0^4 + ye^y\Big|_0^4 - \int_0^4 e^y\,dy$$

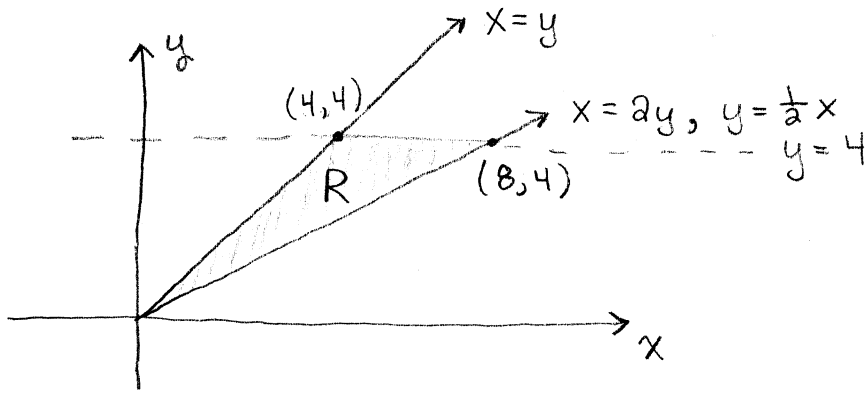
$u = y \quad du = dy$

$dv = e^y \quad v = e^y$

$$= 256 + 4e^4 - (e^4 - e^0)$$

$$= 257 + 3e^4$$

2. (2 points) Referring to the iterated integral above, carefully sketch the region of integration.



3. (3 points) Referring to the iterated integral above, set up the iterated integrals with the reversed order of integration. You'll need two iterated integrals.

$$\underbrace{\int_{x=0}^{x=4} \int_{y=\frac{1}{2}x}^{y=x} (8x+e^y)\,dy\,dx}_{\frac{3e^4 - 6e^2 + 259}{3}} + \underbrace{\int_{x=4}^{x=8} \int_{y=\frac{1}{2}x}^{y=4} (8x+e^y)\,dy\,dx}_{\frac{6e^4 + 6e^2 + 512}{3}} = 3e^4 + 257$$