

MATHEMATICS 264A 2006 ASSIGNMENT 1

Due in Class Tuesday Sept. 19, 2006

1. The region \mathcal{R} is the rectangle with sides parallel to the co-ordinate axes and diagonally opposite vertices $(1, 3)$ and $(4, 7)$. Evaluate the double integral in the first instance integrating with respect to x first and in the second case with respect to y first

$$\iint_{\mathcal{R}} e^{-x+y} dA$$

The final answer should be the same in both cases.

2. The region \mathcal{R} is the triangle with vertices $(0, 1)$, $(0, 3)$, $(4, 3)$. Evaluate the double integral in the first instance integrating with respect to x first and in the second case with respect to y first

$$\iint_{\mathcal{R}} x \cos \pi x + y dA$$

The final answer should be the same in both cases.

3. Using plane polar co-ordinates, evaluate

$$\iint_{\mathcal{R}} r \cos 3\theta dA$$

and the region \mathcal{R} in this case is the circle given by the equation in the polar coordinate system, $r = 4 \sin \theta$.

4. With the help of the formula $\mathbf{n}dS = \mathbf{r}_u \times \mathbf{r}_v dudv$ and a suitable parametrization, calculate the surface area of the piece of the plane $x + 2y + 3z = 6$ which lies in the first octant.