

"QUIZ" for Lecture 16

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E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q16FirstLast.pdf) ASAP BUT NO LATER THAN Nov. 2, 8:00pm

1. Compute the Jacobian of the transformation

$$\Phi(r, s) = (rs, r + s)$$

Handwritten work for problem 1:

$$\begin{array}{l|l} 1. & f_{rr} = s & f_{rs} = r \\ & f_{sr} = 1 & f_{ss} = 1 \\ \hline & \text{Jacobian} = & s - r \end{array}$$

2. Let $D = \Phi(R)$ where $\Phi(u, v) = (u + v, v^2)$ and $R = [0, 6] \times [1, 2]$. Calculate

$$\iint_D y \, dA.$$

(Note: it is not necessary to compute D).

Handwritten work for problem 2:

$$\begin{array}{l|l} 2. & f_{uu} = 1 & f_{uv} = 1 \\ & f_{vu} = v^2 & f_{vv} = 2v \\ \hline & \text{Jacobian} = & 2v - v^2 \\ & \int_1^2 \int_0^6 v^2(2v - v^2) \, du \, dv \\ & = \int_1^2 -6v^3(v-2) \, dv \\ & = \frac{39}{5} \end{array}$$