

"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

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

$$X = rs, Y = r + s$$

$$J = (X_r)(Y_s) - (X_s)(Y_r) = s - r$$

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  $D$ ).

$$X = u + v, Y = v^2$$

$$J = (X_u)(Y_v) - (X_v)(Y_u) = 2v$$

$$\iint_D y \, dA = \iint_R Y J \, dA = \iint_R 2v^3 \, dA$$

$$\int_0^6 \int_1^2 2v^3 \, dv \, du = \left( \int_0^6 du \right) \left( \int_1^2 2v^3 \, dv \right)$$

$$\left[ u \right]_0^6 \left[ \frac{v^4}{2} \right]_1^2 = 6 \left( \frac{2^4 - 1}{2} \right) = 45$$