

Name: _____

Math 2030, Winter 2016, Quiz 7
4 March 2016
R. Bruner

No calculators needed or allowed.

Let R be the rectangle $1 \leq x \leq 3$ and $0 \leq y \leq 2$. Compute the double integral

$$\iint_R f(x, y) dA$$

by writing it as an iterated integral for the two functions

1. $f(x, y) = xy^2$

2. $f(x, y) = xe^{xy}$

$$1. \int_1^3 \int_0^2 xy^2 dy dx = \int_1^3 \left. \frac{1}{3}xy^3 \right|_{y=0}^{y=2} dx = \int_1^3 \frac{8}{3}x dx = \left. \frac{4}{3}x^2 \right|_1^3 = \frac{4}{3}(9-1) = \boxed{\frac{32}{3}}$$

$$\begin{aligned} 2. \int_1^3 \int_0^2 xe^{xy} dy dx &= \int_1^3 \left. e^{xy} \right|_{y=0}^{y=2} dx && \text{since } \frac{\partial}{\partial y} (e^{xy}) = xe^{xy} \\ &= \int_1^3 e^{2x} - e^0 dx && \text{Recall } e^0 = 1 \\ &= \left. \frac{1}{2}e^{2x} - x \right|_{x=1}^{x=3} \\ &= \left(\frac{1}{2}e^6 - 3 \right) - \left(\frac{1}{2}e^2 - 1 \right) \\ &= \boxed{\frac{1}{2}(e^6 - e^2) - 2} \end{aligned}$$