QUIZ 20 SOLUTIONS: LESSON 27
NOVEMBER 7, 2018

Write legibly, clearly indicate the question you are answering, and put a box or circle around your final answer. If you do not clearly indicate the question numbers, I will take off points. Write as much work as you need to demonstrate to me that you understand the concepts involved. If you have any questions, raise your hand and I will come over to you.

Let R be the rectangle described by $-1 \leq x \leq 1$, $0 \leq y \leq 2$.

1. [3 pts] Set up the integral that denotes the volume under $f(x, y) = 2xy^2$ over the region R.

Solution: Any of

$$\int_{-1}^{1}\int_{0}^{2} 2xy^2\,dy\,dx, \quad \int_{0}^{2}\int_{-1}^{1} 2xy^2\,dx\,dy, \quad \iint_R 2x^2y dA$$

are acceptable.

2. [7 pts] Evaluate the integral from # 1.

Solution:

$$\begin{aligned}
\int_{-1}^{1}\int_{0}^{2} 2xy^2\,dy\,dx &= \int_{-1}^{1} \frac{2}{3}xy^3\Big|_{y=0}^{y=2} dx \\
&= \int_{-1}^{1} \left[\frac{2}{3}x(2)^3 - \frac{2}{3}x(0)^3\right] dx \\
&= \int_{-1}^{1} \left[\frac{16}{3}x\right] dx \\
&= \frac{16}{6}x^2\Big|_{-1}^{1} \\
&= \frac{8}{3}(1)^2 - \frac{8}{3}(-1)^2 = \boxed{0}
\end{aligned}$$

$$\begin{aligned}
\int_{0}^{2}\int_{-1}^{1} 2xy^2\,dx\,dy &= \int_{0}^{2} x^2y^2\Big|_{-1}^{1} dy \\
&= \int_{0}^{2} \left[(1)^2y^2 - (-1)^2y^2\right] dy \\
&= \int_{0}^{2} 0\,dy = \boxed{0}
\end{aligned}$$