QUIZ 20 SOLUTIONS: LESSON 27 NOVEMBER 8, 2017

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.

1. [5 pts] Evaluate

$$\iint_R 3x^2 \, dA$$

where R is the rectangle with vertices (0,0), (0,1), (2,0), (2,1).

<u>Solution</u>: This rectangle is described by $0 \le x \le 2$ and $0 \le y \le 1$. Hence,

$$\iint_{R} 3x^{2} dA = \int_{0}^{1} \int_{0}^{2} 3x^{2} dx dy$$
$$= \int_{0}^{1} x^{3} \Big|_{x=0}^{x=2} dy$$
$$= \int_{0}^{1} [2^{3} - 0^{3}] dy$$
$$= \int_{0}^{1} 8 dy$$
$$= 8y \Big|_{y=0}^{y=1}$$
$$= 8(1) - 8(0) = 8$$

2. [5 pts] Evaluate

$$\int_{-1}^{1} \int_{0}^{2} 6xy^{2} \, dx \, dy.$$

Solution:

$$\int_{-1}^{1} \int_{0}^{2} 6xy^{2} dx dy = \int_{-1}^{1} 3x^{2}y^{2} \Big|_{x=0}^{x=2} dy$$
$$= \int_{-1}^{1} \left[3(2)^{2}y^{2} - 3(0)^{2}y^{2} \right] dy$$

$$= \int_{-1}^{1} 12y^{2} dy$$
$$= 4y^{3} \Big|_{y=-1}^{y=1}$$
$$= 4(1)^{3} - 4(-1)^{3}$$
$$= 4 + 4 = \boxed{8}$$