Math 180A HW0

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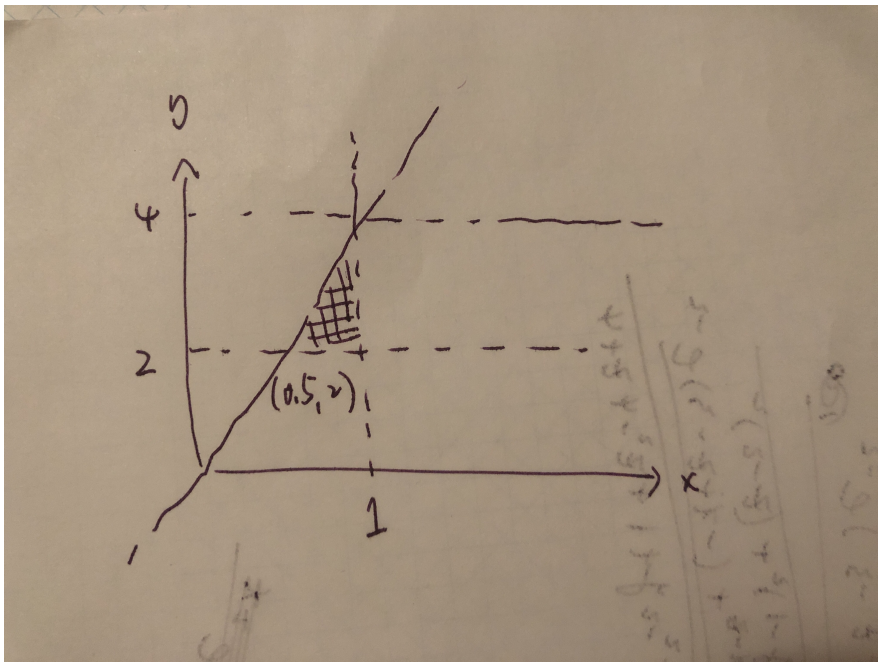
Problem 4

(a)



(b)

$$\iint_D 6xy^2 dxdy = \int_2^4 \int_{0.5}^1 6xy^2 dxdy \tag{1}$$

$$= \int_2^4 \int_{0.5}^1 6xy^2 dxdy \tag{2}$$

$$= \int_2^4 3x^2y^2 dy \Big|_{0.5}^1 \tag{3}$$

$$= \int_2^4 \left(3y^2\right) - \left(0.75y^2\right) dy \tag{4}$$

$$= \int_2^4 2.25y^2 dy \tag{5}$$

$$= 0.75y^3 \Big|_2^4 \tag{6}$$

$$= 0.75 \cdot 4^3 - 0.75 \cdot 2^3 \tag{7}$$

$$= 42 \tag{8}$$

Problem 5

(a) $A \cap B \cap C$

(b) $A \cap B^c \cap C^c$

(c) $A \cup B$

(d) $A \cap B \cap C^c$

Problem 6

(a) 2^{10}

(b) $\binom{10}{5}$

Problem 7

(a)

$$\sum_{k=0}^{\infty} \frac{x^{2k}}{4^k} = \sum_{k=0}^{\infty} \left(\frac{x^2}{4}\right)^k \tag{9}$$

$$= \frac{1}{1 - \frac{x^2}{4}} \tag{10}$$

(b)

$$\sum_{k=0}^{\infty} \frac{x^{k+1}}{k!} = \sum_{k=0}^{\infty} \frac{x^k}{k!} \cdot x \tag{11}$$

$$= x \cdot e^x \tag{12}$$