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MATH 53 2nd MIDTERM

Write your name and section number on EVERY page of this exam.
Use only the page containing a given problem for the answer to that problem (both sides if needed). At the end, please give the exam to your TA

Good Luck!


Name: _____
Section: _____

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Problem 1 (25 pts).

- a) Evaluate $\iint_D e^x dA$ where D is the triangle with vertices at $(0,0)$, $(2,4)$, and $(6,0)$. 13
- b) Evaluate $\int_0^1 \int_x^1 x^3 \sin y^3 dy dx$. 11

a.



$$\int_0^2 \int_{x+4}^{6-y} e^x dx dy + \int_2^6 \int_0^{6-y} e^x dx dy$$


$$= \int_0^2 (e^{6-y} - e^{x+4}) dy + \int_2^6 (e^{6-y} - e^x) dy$$

$$= [ye^{6-y} - 2e^{x+4}]_0^2 + [-e^{6-y} - ye^x]_2^6$$

$$= 2e^2 - 2e^2 - (0-2) + (-e^2 - 4e^2 - (-e^6 - 0))$$

$$= 2e^2 + 2 - e^2 - 4e^2 + e^6 = e^6 - 3e^2 + 2$$

b.



$$\int_0^1 \int_x^1 x^3 \sin y^3 dy dx = \int_0^1 \left[\frac{x^4}{4} \sin y^3 \right]_{x=0}^{x=y} dy$$

$$= \int_0^1 \left(\frac{1}{4} y^4 \sin y^3 \right) dy = \left[-\frac{1}{3} \cos(y^3) \right]_0^1 = -\frac{1}{3} \cos(1) - \left(-\frac{1}{3} \right)$$

$u = y^3$
 $du = 3y^2 dy$

$$= \frac{1}{3} - \frac{1}{3} \cos(1)$$

