

Math 10B Midterm Spring 2008

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Math 10B Midtem

- This is a close book exam. The total points are 100+10
- In each problem, you have to show every step of your calculation.

Name:_____

ID Number:_____

1. (30 points) Find the volume of the following regions:

- (a) under the surface $f(x, y) = x - \sin y$ and above $z = 0$, $1 \leq x \leq 2$, $\frac{\pi}{2} \leq y \leq \pi$;
- (b) inside $x^2 + y^2 = 1$ and $z^2 \leq 4$.

2. (30 points) Find following double integrals $\int \int_D f dA$:

(a) $f(x, y) = (x + 1) \cos y, [0, 1] \times [0, \pi];$

(b) $f(x, y) = xy^{2008}, 0 \leq x \leq y \leq 1.$

3. (20+10 points) Find the triple integral $\iiint_W f dV$ for $f(x, y, z) = x + z$, $x^2 \leq z \leq y$, $0 \leq x \leq y \leq 1$. (bonus problem) What can you say if W is $0 \leq x \leq y \leq z \leq 1$?

Choose one and only one from following three problems. Please mark the problem which you choose (20 points):

4. Find the integral $\int \int_W (x^2 + y^2 + z^2) dV$ with $W = \{0 \leq z \leq x^2 + y^2 \leq 1\}$.

5. Find $\int \int \int_W \sin(x+y) \cos(y+z) dV$ with $x+y, y, y+z \in [0, 1]$.