

First Name: \_\_\_\_\_ ID# \_\_\_\_\_

Last Name: \_\_\_\_\_

Section: \_\_\_\_\_

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- 1a Tuesday with Eric Auld
- 1b Thursday with Eric Auld
- 1c Tuesday with Kyung Ha
- 1d Thursday with Kyung Ha
- 1e Tuesday with Khang Huynh
- 1f Thursday with Khang Huynh

**Rules.**

- There are **FOUR** problems; ten points per problem.
- There is an extra page at the end. You may also use the backs of pages.
- No calculators, computers, notes, books, crib-sheets,...
- Out of consideration for your class-mates, no chewing, humming, pen-twirling, snoring,... Try to sit still.
- Turn off your cell-phone, pager,...

1	2	3	4	$\Sigma$

(1) Find the center of mass for a homogeneous planar body occupying the region where

$$-1 \leq x \leq 1 \quad \text{and} \quad 0 \leq y \leq x^4$$

(2) Evaluate the integral

$$\int_0^{\infty} \int_{\sqrt{y}}^{\infty} \frac{y}{(x^2 + y^2)^2} dx dy$$

by converting to polar coordinates.

(3) Determine the volume of the region defined by the following inequalities

$$0 \leq x \leq y \quad \text{and} \quad x^2 + y^2 + z^2 \leq 1$$

(4) Consider the region  $\mathcal{R}$  defined by the inequalities

$$0 \leq x^2 \leq y \leq z \leq 3$$

- (a) Determine the volume of the region  $\mathcal{R}$ .
- (b) Determine the area of the cross-section of  $\mathcal{R}$  lying in the plane  $y = 1$ .

extra paper