

## MATH 2415 TEST 4

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

Testing conditions:

- 50-minute time limit;
- notes, books, and calculators are allowed;
- inter-student communication, telecommunication, and internet access are not allowed.

Reminders:

- A total lunar eclipse starts at one tonight (and the NOAA forecasts the skies will clear by then).
- HW 36–40 is due on Thursday.

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*Date:* Apr. 14, 2014.

1. [30 points] Compute  $\int_0^1 \int_0^y x^2 y^3 dx dy$ .

**2. [40 points]** Find the  $z$ -coordinate of the center of mass of the upside-down cone  $\{(x, y, z) : \sqrt{x^2 + y^2} \leq z \leq 4\}$ . (Assume uniform density.)

**3. [30 points]** Let  $R$  be the rectangle  $\{(x, y) : 0 \leq x \leq 2 \text{ and } 0 \leq y \leq 5\}$ . Let  $S$  be the rectangle resulting from rotating  $R$  by  $\pi/3$  radians counterclockwise about the origin. Use a coordinate transformation to express  $\iint_S y^3 dA$  as a single iterated integral. (You do not need to evaluate the integral.)