

## Final Exam

Please do not turn this page until told to do so. No notes, books, or calculators may be used for this exam. You must show NEAT and COMPLETE work to receive full credit on a problem.

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

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

SID: \_\_\_\_\_

Signature: \_\_\_\_\_

Sections:

001: Deanna, 7:10-8:10

002: Mo, 5:10-6:10

003: Mihaela, 6:10-7:10

004: Josh, 8:10-9:10

Problem(s)	Score
1	/ 15
2	/ 10
3	/ 15
4	/ 15
5	/ 15
6	/ 15
7	/ 15
Total	/ 100

**(15 pts)** 1. Consider the solid generated by revolving the region bounded on the left by the parabola  $x = y^2 + 1$  and on the right by the line  $x = 3$  about the  $x$ -axis. Find the volume of the solid.

**(10 pts)** 2. Find the length of the parametrized curve

$$x = e^t - t, \quad y = 4e^{t/2}, \quad 0 \leq t \leq 1.$$

(15 pts) 3. Evaluate the integral

$$\int x^2 \ln x \, dx.$$

(15 pts) 4. Evaluate the integral

$$\int_0^{\pi/2} \sin(y) e^{\cos y} \, dy.$$

(15 pts) 5. Evaluate the integral

$$\int \frac{x \, dx}{x - 4}.$$

(15 pts) 6. Evaluate the integral

$$\int \frac{x \, dx}{x^2 - 3x + 2}.$$

**(15 pts)** 7. An aluminum beam was brought from the outside cold into a machine shop where the temperature was held at  $65^{\circ}\text{F}$ . After 10 min, the beam warmed to  $35^{\circ}\text{F}$  and after another 10 min it was  $50^{\circ}\text{F}$ . Find the beam's initial temperature.