## Math 21B

## Midterm 2

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 ALL work to receive full credit on a problem.

## Name:

$\qquad$
Section: $\qquad$
SID: $\qquad$

Sections:
001: Deanna, 7:10-8:10
002: Momar, 5:10-6:10
003: Mihaela, 6:10-7:10
004: Josh, 8:10-9:10

| Problem(s) | Score |
| :--- | :---: |
| 1 | $/ 20$ |
| 2 | $/ 20$ |
| 3 | $/ 20$ |
| 4 | $/ 40$ |
| Total | $/ 100$ |

(20 pts) 1. Find the volume of the solid generated by revolving the region bounded by the following lines and curves:

$$
y=\sqrt{\cos x}, \quad 0 \leq x \leq \pi / 2, \quad y=0, \quad x=0
$$

(20 pts) 2. Find the length of the curve

$$
x=8 \cos t+8 t \sin t, \quad y=8 \sin t-8 t \cos t, \quad 0 \leq t \leq \pi / 2
$$

(20 pts) 3. If a force of 20 lb is required to hold a spring 1 ft beyind its unstressed length, how much work does it take to stretch the spring this far?
(40 pts) 4. Find the center of mass of a thin plate of constant density covering the region bounded by the $x$-axis and the semicircle $y=\sqrt{9-x^{2}}$.

Feel free to use symmetry arguments. To find the mass of the region, you can use the formula for the area of a circle.

