Name: _____

4-digit code: _____

- Write your name and the last 4 digits of your SSN in the space provided above.
- The test has five (5) pages, including this one.
- Enter your answer in the box(es) provided.
- You must show sufficient work to justify all answers unless otherwise stated in the problem. Correct answers with inconsistent work may not be given credit.
- Credit for each problem is given in parentheses at the right of the problem number.
- No books, notes or calculators may be used on this test.

Page	**Max. points**	**Your points**
2	25	
3	25	
4	25	
5	25	
Total	100	

Problem 1 (10 pts)**.** Find the area of the region that is enclosed between the curves $x = 2y^2$ and $x = 4 + y^2$.

$A =$ ____

Problem 2 (15 pts)**.** Find the volume of the solid that is obtained by rotating the region bounded by the curves $x = 2\sqrt{y}$, $x = 0$ and $y = 9$ about the y-axis.

$V =$ ____

Problem 3 (15 pts)**.** Find the volume of the solid generated when the region enclosed by the curves $x = 1 + y^2$, $y = 1$, $y = 2$ and $x = 0$ is revolved about the x-axis.

$V =$ ☐

Problem 4 (10 pts)**.** Use the Fundamental Theorem of Calculus to find the derivative of

$$f(x) = \int_{1-3x}^{1} \frac{u^3}{1+u^2}\, du.$$

$f'(x) =$ ☐

Problem 5 (15 pts)**.** Find a positive value of k such that the average value of $f(x) = 2 + 6x - 3x^2$ over the interval $[0, k]$ is equal to 3.

$k =$ ____

Problem 6 (10 pts)**.** Evaluate the integral $\int \sec^3 x \tan x \, dx$.

Problem 7 (15 pts)**.** Evaluate the integral $\displaystyle\int_0^{1/\sqrt{3}} \frac{x^2-1}{x^4-1}\,dx$.

$A =$ ☐

Problem 8 (10 pts)**.** Find the average value of the function $f(x) = 1/x$ over the interval $[1, e]$.

$f_{ave} =$ ☐