

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

4-digit code: \_\_\_\_\_

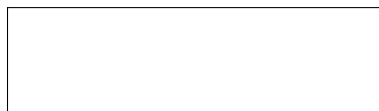
- Write your name and the last 4 digits of your SSN in the space provided above.
- The test has four (4) pages, including this one.
- The test is fifty (50) minutes long.
- Enter your answer in the box(es) provided.
- You must show sufficient work to justify all answers unless otherwise stated in the 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.

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Page	Max. points	Your points
2	30	
3	30	
4	40	
<b>Total</b>	100	

**Problem 1** (15 pts). Calculate the double integral  $\iint_R \frac{1+x^2}{1+y^2} dA$ , for the rectangle  $R = [0, 1] \times [0, 1]$ .

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**Problem 2** (15 pts). Use a double integral to compute the volume under the surface  $z = xy$  and above the region bounded by  $x = y^2$  and  $x = y^3$ .



**Problem 3** (15 pts). Evaluate  $\iint_R (3x + 4y^2) dA$ , where  $R$  is the region in the upper half-plane bounded by the circles  $x^2 + y^2 = 1$  and  $x^2 + y^2 = 4$ .

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**Problem 4** (15 pts). Electric charge is distributed over the square  $\{(x, y) : 0 \leq x \leq 1, 1 \leq y \leq 2\}$  so that the charge density at  $((x, y)$  is  $\sigma(x, y) = e^{x+e^x}$  (measured in Coulombs per square meter). Find the total charge of the disk.

**Problem 5** (5 pts). Evaluate  $\int_{-2}^2 \int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}} \int_{\sqrt{x^2+y^2}}^2 (x^2 + y^2) dz dy dx$ .

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**Problem 6** (25 pts). Evaluate  $\iiint_E xyz dV$ , where  $E$  lies between the spheres  $\rho = 2$ ,  $\rho = 4$  and above the cone  $\phi = \pi/3$ .