

Math 250B X02 Test Three

Time: 50 minutes

Total: 16 marks

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

1. [3 marks] Find the work done by  $\mathbf{F} = [x^2y, x^2 + x^3]$  along the line segment from  $(0, 1)$  to  $(1, 5)$ .

2. [4 marks] The region  $R$  is the quarter of the disk  $x^2 + y^2 \leq 4$  that lies in the first quadrant. Find the surface area of the part of  $z = xy$  that lies above  $R$ .

Note: You don't need to graph  $z = xy$  in order to solve the problem.

3. [4 marks]  $R$  is bounded by:  $2x+y = 2$ ,  $2x+y = 4$ ,  $y-3x = 0$ ,  $y-3x = 1$ .  
Evaluate  $\iint_R (2x+y)^2 e^{y-3x} dA$ .

4. [5 marks] Use **spherical coordinates** to calculate the volume bounded by  $z = 3\sqrt{x^2 + y^2}$  and  $z = 6$ .