

Math 253, Section 102, Fall 2006

Quiz 5, October 18

Name:

SID:

Instructions

- The total time is 20 minutes.
- The total score is 25 points.
- Use the reverse side of each page if you need extra space.
- Show all your work. A correct answer without intermediate steps will receive no credit.
- Calculators and cheat sheets are not allowed.

Problem	Points	Score
1	10	
2	8	
3	7	
TOTAL	25	

1. Use differentials to estimate the amount of metal in a closed cylindrical can that is 10 cm high and 4 cm in diameter if the metal in the top and bottom is 0.1 cm thick and the metal in the sides is 0.05 cm thick.

(10 points)

2. Let

$$M = xe^{y-z^2}, \quad \text{where } x = 2uv, \ y = u - v, \ z = u + v.$$

Find

$$\frac{\partial M}{\partial u} \text{ when } u = 3, v = -1.$$

(8 points)

4

3. If $u = f(x, y)$, where $x = e^s \cos t$ and $y = e^s \sin t$, show that

$$\left(\frac{\partial u}{\partial x}\right)^2 + \left(\frac{\partial u}{\partial y}\right)^2 = e^{-2s} \left[\left(\frac{\partial u}{\partial s}\right)^2 + \left(\frac{\partial u}{\partial t}\right)^2 \right]$$

(7 points)