Math 241 Exam 3 2001 SP

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PRINT Your Name:_____

There are 9 problems on 5 pages. Problem 1 is worth 12 points. Each of the other problems is worth 11 points. SHOW your work. CIRCLE your answer. **NO CALCULATORS!**

1. Find the directional derivative of $f(x,y) = x^2y$ at the point $P = (1,2)$ in the direction of $\vec{u} = \frac{3}{5}\vec{i} - \frac{4}{5}\vec{j}$.

$D_{\vec{u}} f|_P = \vec{\nabla} f|_P \cdot \vec{u} = (2xy\vec{i} + x^2\vec{j})|_P \cdot \vec{u} = (4\vec{i} + \vec{j}) \cdot (\frac{3}{5}\vec{i} - \frac{4}{5}\vec{j}) = \frac{12}{5} - \frac{4}{5} = \frac{8}{5}$

wrong

2. Let $f(x,y) = xe^{xy}$. Find $\vec{\nabla} f$.

$\vec{\nabla} f = (xye^{xy} + e^{xy})\vec{i} + x^2e^{xy}\vec{j}$