You can share answers

"QUIZ" for Lecture 8

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E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: qXFirstLast.pdf) ASAP BUT NO LATER THAN Oct. 1, 2020, 8:00pm

1. Find the directional derivative of the function $f(x, y, z) = xy^2z^3$ at the point $(2, 1, 1)$ in the direction $\langle 2, -1, -1\rangle$.

$D_u f(P) = \nabla f_p \cdot \vec{u} = \langle 1,4,6\rangle \cdot \langle 2,-1,-1\rangle = 2 - 4 + 6 = -8$

$\nabla f_p = \langle \frac{\partial}{\partial x} f(xyz), \frac{\partial}{\partial y} f(xyz), \frac{\partial}{\partial z} xy^2z^3 \rangle$

$= \langle y^2z^3, 2xyz^3, 3xy^2z^2 \rangle$

$= \langle 1, 4, 6 \rangle$

2. Find the maximum rate of change of $f(x, y) = x^2 + y^3$ at the point $(2, 1)$ and the direction in which is occurs.

$\nabla f(x,y) = \langle 2x, 3y^2 \rangle$

$\nabla f_{(2,1)} = \langle 4, 3 \rangle$

$\vec{u} = \frac{\langle 4,3\rangle}{5}$ direction

$\|\nabla f_{(2,1)}\| = \sqrt{4^2+3^2} = 5$ max rate of change