"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 $\langle 2,-1,-1\rangle$.

$u = \langle 2,-1,1\rangle$

$D_u f = \nabla f \cdot u$

$\nabla f = \langle y^2z^3, 2xyz^3, 3xy^2z^2\rangle = \langle 1,4,6\rangle$

$\nabla f \cdot u = \langle 1,4,6\rangle \cdot \langle 2,-1,1\rangle = 4$

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.

$\nabla f = \langle 2x, 3y^2\rangle = \langle 4,3\rangle$

$|\langle 4,3\rangle| = 5$

$\langle 4/5, 3/5\rangle$

Max rate of change is 5 at direction $\langle 4/5, 3/5\rangle$