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

$f_x = y^2z^3$

$f_y = 2xyz^3$

$f_z = 3xy^2z^2$

$(2,1,1) =$ $f_x = 1$, $f_y = 4$, $f_z = 6$

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

$u = \frac{\langle 2,-1,-1\rangle}{\sqrt{6}}$

$\sqrt{4+1+1} = \sqrt{6}$

$= \langle 0.82, -1.22, -1.22\rangle$

$\nabla f \cdot u = \langle 1,4,6\rangle \cdot \langle 0.82, -1.22, -1.22\rangle$

$= 0.82 - 4.88 - 7.32 =$

$= \boxed{-11.38}$

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.

$f_x = 2x + y^3$

$f_y = x^2 + 3y^2$

$\nabla f(2,1) = \langle 5,7\rangle$

$roc = \sqrt{5^2+7^2} = \sqrt{25+49} = \boxed{\sqrt{74}}$