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MAC 2313.9728
Cyr

Quiz 5
You must show all work to receive full credit!!

Problem 1. (4 points) Given $f(x, y, z) = y\tan(x + 2z)$, evaluate $f_{xz}(0, 1, \pi/8)$.

$f_x = y\sec^2(x+2z)$

$f_{xz} = y[2\sec(x+2z)][\sec(x+2z)\tan(x+2z)](2)$

$= 4y\sec^2(x+2z)\tan(x+2z)$

$f_{xz}(0,1,\frac{\pi}{8}) = 4(1)\sec^2(\frac{\pi}{4})\tan(\frac{\pi}{4}) = 4(\sqrt{2})^2(1) = \boxed{8}$

Problem 2. (a) (1 point) Evaluate $\lim_{(x,y)\to(1,0)} \dfrac{xy - y}{(x-1)^2 + y^2}$ along the x-axis.

$y=0$; so $\lim_{x\to 1} \dfrac{0}{(x-1)^2} = \boxed{0}$

(b) (2 points) Evaluate $\lim_{(x,y)\to(1,0)} \dfrac{xy - y}{(x-1)^2 + y^2}$ along the line $y = x - 1$.

$\lim_{x\to 1} \dfrac{x(x-1)-(x-1)}{(x-1)^2+(x-1)^2} = \lim_{x\to 1} \dfrac{(x-1)^2}{2(x-1)^2} = \lim_{x\to 1} \dfrac{1}{2} = \boxed{\frac{1}{2}}$

(c) (1 point) What can you conclude about $\lim_{(x,y)\to(1,0)} \dfrac{xy - y}{(x-1)^2 + y^2}$?

It does not exist since $\frac{1}{2} \neq 0$.

Problem 3. (2 points) Name the trace which is generated by intersecting a surface with a plane parallel to the x, y-coordinate plane.

Level curve