Quiz 5

Key

This is a two-stage quiz. During the first stage, use a one-sided 8.5 by 11 & calculator. You have 15 min. In the second stage, you are now welcome to use your books, notes, and students in the class to retake the same quiz. You have the remainder of the quiz time to write one solution (with everyones name on it!!!) to be turned in for the group.

Worth hw 14.3 #2

1. [2] Use the table below to approximate $\frac{\partial I}{\partial H}|_{(96,70)}$ $\approx \frac{\Delta I}{\Delta H} = \frac{130-125}{75-70} = \frac{5}{5} = 1$ (very H)

or $\frac{125-121}{70-65} = \frac{4}{5}$

Table 1 **Heat Index I As a Function of Temperature and Humidity**

Actual temperature (°F) \ Relative humidity (%) H	50	55	60	65	70	75	80	85	90
90	96	98	100	103	106	109	112	115	119
92	100	103	105	108	112	115	119	123	128
94	104	107	111	114	118	122	127	132	137
96	109	113	116	121	125	130	135	141	146
98	114	118	123	127	133	138	144	150	157
100	119	124	129	135	141	147	154	161	168

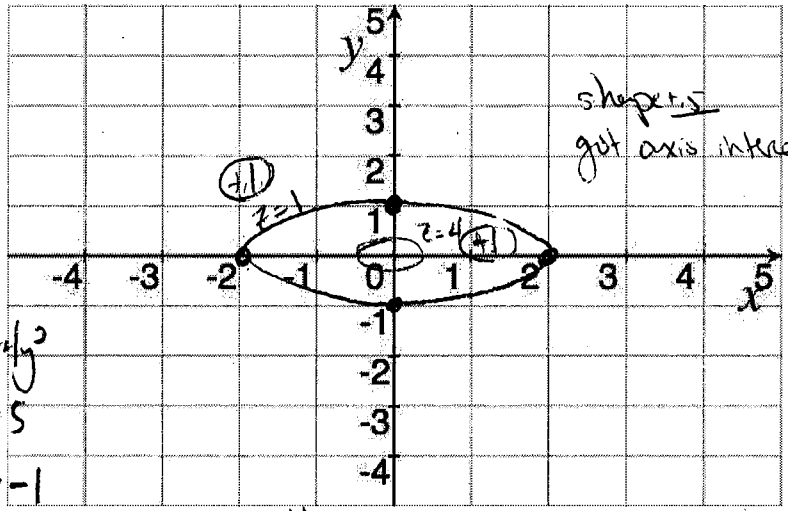
(+.5) fx T @ 96
(+.5) very H around 70
$\frac{\Delta I}{\Delta H}$ (+.5)
gut # (+.5)

3D Functions #2

2. Let $f(x,y) = \frac{5}{1+x^2+4y^2}$.

(a) [3] Draw sections of the contour map/the level curves of f when $z = 1$ and $z = 4$. Label the curves!

set z to fixed # (+.5)



shapes ✓
got axis intercepts +5

(+.5) $1 = \frac{5}{1+x^2+4y^2}$ ⇓ $1+x^2+4y^2 = 5$ $x^2+4y^2 = 4$

$4 = \frac{5}{1+x^2+4y^2}$ ⇓ $(1+x^2+4y^2)4 = 5$ $x^2+4y^2 = \frac{5}{4}-1$

Webwork 14.3 #5

(b) [2] Find $f_x(x,y)$ treat y as const (+.5)

chain/quotient (+1.5) got # (+.5)

$f_x(x,y) = \frac{\partial f}{\partial x} = \frac{\partial}{\partial x}\left(5(1+x^2+4y^2)^{-1}\right) = 5(-1)(1+x^2+4y^2)^{-2}(2x)$

$= \frac{-10x}{(1+x^2+4y^2)^2}$

Quotient rule $\frac{(1+x^2+4y^2)(0)-(5)(2x)}{(1+x^2+4y^2)^2}$

3D Calculus #4

(c) [3] Find the equation of a line that is tangent to f at $(1,0)$. (Lots of answers!)

(+1) Looking for equation of line +.5 .5D

$\langle x,y,z\rangle = \langle x_0,y_0,z_0\rangle + t\langle d_1,d_2,d_3\rangle$

(+.5) $= \langle 1,0,0.5\rangle + t\langle 1,0,-\frac{5}{2}\rangle$

(+.5) pt $(1,0) \Rightarrow z = \frac{5}{1+1^2+4\cdot 0}$ $\frac{5}{2} = 2.5$

(from (b) $\frac{\partial f}{\partial x}|_{(1,0)} = \frac{-10}{4}$ (+1)