MAT2500-01/03 21s Quiz 5 Print Name (Last, Firs	MAT2500-01/03	21s Ouiz	5 Print Name	(Last First)
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Show all work, including mental steps, in a clearly organized way that speaks for itself. Use proper mathematical notation, identifying expressions by their proper symbols (introducing them if necessary), and use EQUAL SIGNS and arrows when appropriate. Always SIMPLIFY expressions. BOX final short answers. LABEL parts of problem. Keep answers EXACT (but give decimal approximations for interpretation if appropriate). Indicate where technology is used and what type (Maple, GC). Only use technology to CHECK hand calculations, not substitute for them.

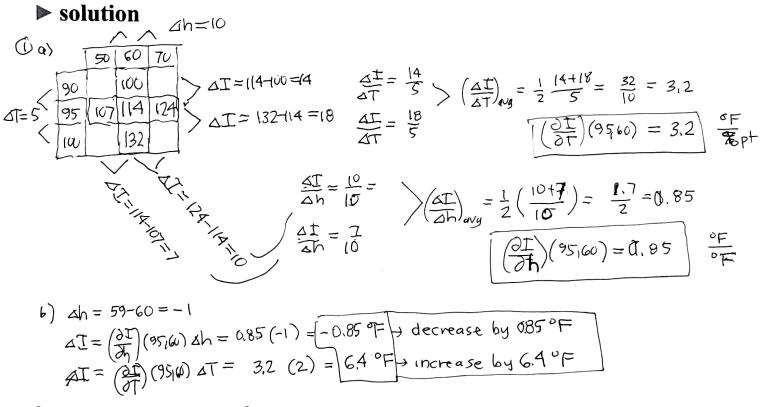
- 1. The temperature-humidity index I (or humidex, for short) is the perceived air temperature when the actual temperature is T and the relative humidity is h, so we can write I = I(T, h). The following table of values of I is an excerpt from a table compiled by the National Oceanic & Atmospheric Administration. [Remember units in your responses.]
- a) Evaluate the tabular partial derivatives  $\frac{\partial I}{\partial T}$  (95, 60) and  $\frac{\partial I}{\partial T}$  (95, 60)
- b) Using this result, by how much would you expect the perceived temperature of 114° F to decrease if the humidity decreases from 60% to 59% at an actual temperature of 95° F? By how much would you expect the perceived temperature to change if the actual temperature increases by 2° F?

Apparent temperature as a function of temperature and humidity

Relative humidity (%)

T	20	30	40	50	60	70
80	77	78	79	81	82	83
85	82	84	86	88	90	93
90	87	90	93	96	100	106
95	93	96	101	107	114	124
100	99	104	110	120	132	144
	80 85 90 95	80 77 85 82 90 87 95 93	80 77 78 85 82 84 90 87 90 95 93 96	80     77     78     79       85     82     84     86       90     87     90     93       95     93     96     101	80         77         78         79         81           85         82         84         86         88           90         87         90         93         96           95         93         96         101         107	80     77     78     79     81     82       85     82     84     86     88     90       90     87     90     93     96     100       95     93     96     101     107     114

2. Evaluate the 2 partial derivatives of the polynomial  $f(x, y) = 2x^4y^2 - 5xy^3 + 4y$  and their values at (x, y) = (-1, 2).



2) 
$$f(x_1 y) = 2x^4y^2 - 5xy^3 + 4y$$
  
 $f_x(x_1 y) = \frac{2}{3x}(2x^4y^2 - 5xy^3 + 4y) = 2y^2\frac{1}{9x}x^4 - 5y^3\frac{1}{9x}x + 0 = 2y^2(4x^3) - 5y^3 = 8x^2y^2 - 5y^3$   
 $f_y(x_1 y) = \frac{2}{3y}(2x^4y^2 - 5xy^3 + 4y) = 2x^4\frac{2}{9y^2} - 5x\frac{1}{9y}y^3 + 4 = 2x^4(2y) - 5x(2y^2) + 4$   
 $f_x(-1,2) = 8(-1)^32^2 - 5\cdot2^3 = -32 - 40 + -72$   
 $f_y(-1,2) = 4(-1)^5 \cdot 2 - 15(-1)\cdot2^2 + 4 = 8 + 60 + 4 = 72$