Assignment #04 – MATH 3511
Fall 2007

Kawai Name: ____________________________

- Due on Monday, 17 September. You may leave it with my Lab Assistants in SI 130/132 by 8:00 p.m.
- Attach this cover sheet to this assignment.
- Copy all of your work onto engineering pad paper!
- Give enough details about each problem so that I should NOT need to refer back to the text.

p. 224: #8. Find \( \frac{\partial z}{\partial x} \), \( \frac{\partial z}{\partial y} \), \( z_{xx} \), \( z_{xy} \), and \( z_{yy} \).

p. 224: #16. Assume that \( f(u) \) and \( g(u) \) are SINGLE-VARIABLE functions. When we introduce new inputs like \( (x - ct) \), THEN it becomes multivariable. Also assume that \( f'(u) \) and \( g'(u) \) exist also.

p. 224: #18. Use the shortcut formula for implicit.

\[
\left( \frac{\partial V}{\partial T} \right)_{p, n} = - \left( \frac{F_T}{F_V} \right) \quad \text{and} \quad \left( \frac{\partial V}{\partial p} \right)_{T, n} = - \left( \frac{F_p}{F_V} \right)
\]

Additional question:
How would you calculate \( \left( \frac{\partial p}{\partial T} \right)_{V, n} \) if you had the two previous answers?

- This is similar to p. 225, #27.
  Find the total differential \( dw \) for

\[
w = f(x, y, z) = \frac{x}{(x^2 + y^2 + z^2)^{3/2}}.
\]

p. 225: #35 & #36.