

March 30, 2009

MAE 105 Homework #1
Due: Tuesday, 04/07/09

PROBLEM 1:

Solve problem 1.2.9, page 11 of your text (Haberman, 4th ed.).

PROBLEM 2:

Solve problem 1.4.2, page 19 of your text (Haberman, 4th ed.).

PROBLEM 3:

For each of the following expressions of $u = u(x, y)$, calculated explicitly

$$\frac{\partial u}{\partial x}, \quad \frac{\partial u}{\partial y}, \quad \frac{\partial^2 u}{\partial x^2}, \quad \frac{\partial^2 u}{\partial y^2}, \quad \frac{\partial^2 u}{\partial x \partial y},$$

and show that $\frac{\partial^2 u}{\partial y \partial x} = \frac{\partial^2 u}{\partial x \partial y}$:

$$(a) \quad u(x, y) = x^3 \sin(3y), \quad (b) \quad u(x, y) = \sin(xy) e^{2y},$$

PROBLEM 4:

Solve the following ODE's and obtain their *complete solution, explicitly*:

$$\frac{du}{dx} = 5, \quad x > 0, \quad u(0) = 2.$$

$$\frac{d^2 u}{dx^2} = 3x^2, \quad 0 < x < 2, \quad u(0) = 6, \quad u(2) = 7.$$

$$\frac{d^2 u}{dx^2} = 2\sin(2x), \quad 0 < x < 2, \quad u(0) = 8, \quad u(2) = 2.$$

Note 1: To receive full credit, *all steps must be neatly shown*. Writing down the final results will receive no credit.

Note 2: Homeworks must be turned in at the start of due-date class. Late homeworks will be graded but *will receive zero credit*.