

April 1, 2008

MAE 105 Homework #1
Due: Tuesday, 04/8/08

PROBLEM 1:

Solve problem 1.2.3, page 10 of your text (Haberman, 4th ed.).

PROBLEM 2:

Solve problem 1.4.3, 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 by direct calculation show that $\frac{\partial^2 u}{\partial y \partial x} = \frac{\partial^2 u}{\partial x \partial y}$:

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

$$(c) \quad u(x, y) = [\sin(5x) + 3 \cos(x)] e^{-3y}.$$

PROBLEM 4:

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

$$\frac{du}{dx} = 7, \quad x > 0, \quad u(1) = 5.$$

$$\frac{d^2 u}{dx^2} = 3x^2, \quad 0 < x < 2, \quad u(0) = 8, \quad u(2) = 2.$$

$$\frac{d^2 u}{dx^2} = 3\sin(3x), \quad 0 < x < 2, \quad u(0) = 8, \quad u(2) = 2.$$

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*.