Computational Methods in Structural Dynamics, Exam 2 Winter 2000
One 8.5" by 11" cheat sheet. 10 points each

1. Non-dimensionalize the following equation of motion completely (so that no dimensioned terms remain in the non-dimensionalize equation). Here m is mass per unit length.

$$\frac{d^2}{dx^2}\left(EI(x)\frac{d^2w}{dx^2}\right) + m\frac{d^2w}{dt^2} = 0 \tag{1}$$

2. Determine if the two dimensional Laplace operator is self-adjoint. The operator is given by:

$$L = \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}$$

Note that the operator is used for two dimensional problems, so you must consider it over an area and not a line. Assume that the boundary conditions are such that the displacement is zero.

Bonus: Name a problem to which this operator applies. Be *very* specific. Include a sketch and describe the phenomenon. There are multiple answers. (3 points)