

Short Exam 5

Name: _____

Physics 403: Mathematical Methods

April 7, 2008

Complete this quiz showing all work.

1. Evaluate:

$$\int_0^{\infty} x^4 e^{-6x} dx$$

2. Determine the position as a function of time of the damped harmonic oscillator described by

$$\ddot{x} + 3\dot{x} + 6x = 0$$

given $x(0) = 1$ m and $\dot{x}(0) = 0$ m/s.

3. Solve

$$\frac{\partial u}{\partial x} = u - 6 \frac{\partial u}{\partial y}$$

subject to $u(x, 0) = 4e^{-x}$.