Math 252 Test Three

Time: 50 minutes
Total: 25 marks

Name: _____

1. [8 marks] The DE $8y'' + 72y = 8\csc 3x$ has $y_C = C_1 \cos 3x + C_2 \sin 3x$. Solve the DE using Variation of Parameters.

2. [4 marks] Solve:

a) $x^2y'' + 3xy' + y = 0$

b) $x^2y'' + xy' + 4y = 0$

3. [5 marks] A mass weighing 39.2 N stretches a spring by 70 cm. There is a damping force of magnitude β times the velocity. Find β so that the motion is critically-damped. (Use $g = 9.8$ N/kg.)

4. [8 marks] Consider the DE below.

Use $y = \sum_{n=0}^{\infty} C_n x^n$ to find C_2, C_3 and C_4 in terms of C_0 and C_1.

$y'' - 7xy = 0$