Math 252 X01

Test Three

Time: 50 minutes

Total: 19 marks

Name: _____

1. [3 marks] Solve $x^3y''' + 8x^2y'' = 0$

2. [4 marks] A mass weighing 29.4 N stretches a spring by 28 cm. The environment offers a damping force equivalent to β times the velocity, in other words: $F = \beta$ N/(m/s). Find β so that the spring-mass system is critically damped.

3. [6 marks]
Use sigma notation to find C_2, C_3, C_4, C_5 and C_6 in terms of C_0 or C_1.

$y'' + 3xy = 0$

4. [6 marks] The DE $y'' - 2y' + 2y = e^x \csc x$
has $y_C = C_1 e^x \cos x + C_2 e^x \sin x$.
Solve the DE using variation of parameters.