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Name: \_\_\_\_\_

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Math 222

Prof. Beck

Second Exam

Fall 2004

1. Prove or disprove: the sequence  $\{\sin(2n\pi/3)\}$  converges.

2. For which values of  $x$  does the series  $\sum_{n=1}^{\infty} \ln(n)x^n$  converge?  
For which does it converge absolutely?

Prove your answer.

3. Solve this differential equation:

$$\frac{dy}{dx} + \frac{y}{x} = \frac{1}{x}$$

4. Solve this differential equation:

$$(D^4 + 3D^2 - 4)y = 0.$$

5. Solve this differential equation by variation of parameters:

$$y'' - 3y' + 2y = \frac{e^x}{e^x + 1}.$$