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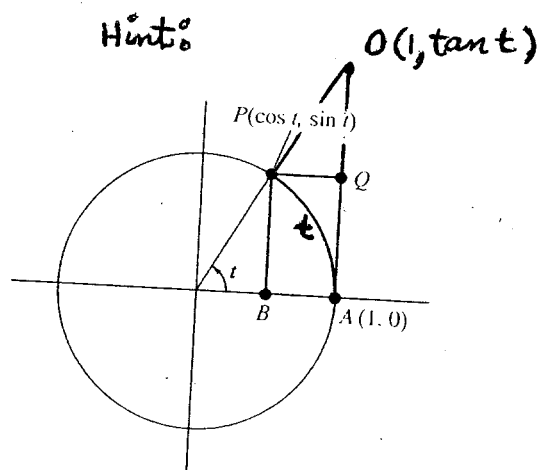
Math 222

Second Exam

Prof. Beck

Fall 2004

1. Prove or disprove: the sequence $\left\{ n \tan \frac{1}{n} \right\}$ converges.



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

Prove your answer.

3. Solve this differential equation:

$$\frac{dy}{dx} - \frac{y}{x} = 3x^3.$$

4. Solve this differential equation:

$$y'' + 2y' + 2y = 0.$$

5. Solve this differential equation by variation of parameters:

$$y'' + y = \csc x \cot x.$$