

MTH 1420, SPRING 2012
DR. GRAHAM-SQUIRE

LAB 9: SERIES PRACTICE

Name: _____

1. INSTRUCTIONS

- (1) Work on the problems on your own for the first 45 minutes of class.
- (2) After the 45 minutes are up, everyone in the class should get together to go over your answers. In particular you must do two things: (a) Compare answers to make sure that you have all the correct answers and (b) Compare methods to see if anyone proved something a different way from you. If someone proves it a different way from you (but you get the same result), you should write down their method as well as yours and make note of it.
- (3) Everyone should be able to turn in their lab by the end of the lab period today.

2. INTRODUCTION

Below are 11 series. You must figure out if each series converges or diverges, show your work and/or explain your reasoning. You **must state which test you are using to justify your answer**, and there may be multiple ways of doing it. If the series converges, you must do one of three things:

- (i) Give the exact sum of the series, if possible.
- (ii) If you cannot give an exact value, give an approximation for the sum of the series to the nearest 0.001, (and explain how you know that it is within 0.001 using some remainder estimate).
- (iii) If you cannot give the exact sum or an approximation, explain why not.

3. PROBLEMS

$$(1) \sum_{n=1}^{\infty} (-1)^n \frac{1}{n!}$$

$$(2) \sum_{n=1}^{\infty} \frac{3 + \cos^3 n}{3^n}$$

$$(3) \sum_{n=1}^{\infty} \frac{n}{n^2 + 1}$$

$$(4) \sum_{n=1}^{\infty} e^{-n}$$

$$(5) \sum_{n=1}^{\infty} \frac{1}{n^\pi}$$

$$(6) \sum_{n=1}^{\infty} \frac{3}{2^{n-1}}$$

$$(7) \sum_{n=1}^{\infty} \frac{n^2}{n^2 + 1}$$

$$(8) \sum_{n=1}^{\infty} \frac{10n + 3}{n2^n}$$

$$(9) \sum_{n=1}^{\infty} \frac{1}{\sqrt{3n-2}}$$

$$(10) \sum_{n=1}^{\infty} \left(\frac{1}{n+1} - \frac{1}{n+2} \right)$$

$$(11) \sum_{n=1}^{\infty} \frac{2n^2 - 1}{3n^5 + 2n + 1}$$