

MTH 122 — Calculus II
Essex County College — Division of Mathematics and Physics¹
Project #3 — Sakai Web Project Material

Name: _____

Signature: _____

The following question is worth ten points total, and will be added to your quiz grades. Only correct answers will be accepted. Due date will be announce in class.²

A student came to me the other day with this question, find the exact value of:

$$\sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1}.$$

I looked at it, and was perplexed.³ So I decided to use my calculator to find an approximation. I also used Mathematica to see if it knew the answer, surprisingly it did. Then, as I suspected from the get-go, I *knew* it could be done.

Answer the following questions.

1. Use a computer to calculate (20 decimal places!)

$$\sum_{n=0}^{1000} \frac{(-1)^n}{2n+1}.$$

2. Use Mathematica (*exact value computation*) to calculate

$$\sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1}$$

¹This document was prepared by Ron Bannon (ron.bannon@mathography.org) using L^AT_EX 2_ε. Last revised September 8, 2009.

²Project questions are assigned on occasion, and have strict due dates that must be adhered to.

³Okay, I must be getting old.

3. Look back over your notes to see if I gave you this power series (I did) and then show that Mathematica's results are true.