Math 1152 Written Homework 5

Due: Tuesday, June 14th in Gradescope.

- Calculators are permitted EXCEPT those calculators that have symbolic algebra or calculus capabilities.
- SHOW ALL WORK!
- A completed version of this document is due to be uploaded to Gradescope by 11:59pm on **Tuesday, June 14th**.
- If you have difficulties using Gradescope, see pages under the Gradescope header in the Modules section of our Carmen page for help.
- Ideally, this can be completed on an iPad or android tablet using an app like One Note, Notability, Papyrus, etc. - if you don't have access to one of these options,then printing and scanning or using a smartphone document-scanning feature to generate a pdf to upload will also work.
- If you have difficulties uploading the assignment, email a pdf to your recitation instructor.
- This homework will be graded via random subset selection - not every part of every question will be looked at by the grader.
- Rubrics to applicable questions will be provided later.

Question 1. Read Thurston's Proof and Progress in Mathematics[1] and share your thoughts below.

(William Thurston was a famous geometer and fields-medal recipient working in low-dimensional topology. He passed away August 21, 2012.)

[1] https://arxiv.org/pdf/math/9404236.pdf

Question 2. For which q does

$$\sum \frac{1}{n \log n \, (\log \log n)^q}$$

converge? Can you find any other patterns involving logs and powers that lead to convergence or divergence?

Question 3. Determine whether the series

$$\sum_{k=1}^{\infty} \frac{k}{(3k^2+9)^2}$$

converges or diverges. Which tests did you use and why do they apply? Justify all steps.