## Math 2120 - Spring 2020 - Test 2

## Directions:

1. Pick a consecutive 2 -hour window to take this exam, such as $12 \mathrm{pm}-2 \mathrm{pm}$. You may only use 2 hours of consecutive time. Do not split the time (like 12-1 and then 5-6).
2. You can only use your mind to take this exam. No help from any sources or people. No books, no notes, no online, etc.
3. No calculators.
4. Use blank paper (like printer paper) if you have it please.
5. On the first page of your exam, before any of your solutions, put these two things:
(a) Your name.
(b) Copy this statement and then sign your signature after it:
"Everything on this test is my own work. I did not use any sources or talk to anyone about this exam." your signature
6. After your name and the above statement with signature, start putting your solutions to the problems. Please put them in order. That is, first problem 1, then problem 2, etc. You can put each one on its own page.
7. Scan and email to me by Thursday the 9th at 11am.

## The problems are on the next page.

1. Find the limit of the following sequence

$$
\left\{\frac{n^{10}-5 n^{8}-1}{2 n^{15}+4 n^{29}+5}\right\}
$$

2. For the following series, find the value of the series. That is, what does it add up to?

$$
\sum_{k=2}^{\infty} \frac{5 \cdot \pi^{k}}{10^{k+1}}
$$

3. For the following series, find the value of the series. That is, what does it add up to?

Make sure to give a formula for $s_{n}$ and then take the limit as $n$ goes to infinity.

$$
\sum_{k=4}^{\infty} \frac{1}{(k+9)(k+8)}
$$

For problems 4-7 answer this question: Does the series converge or diverge? If you use a test, then make sure to write out the conditions of the test and check that they are fulfilled.
4.

$$
\sum_{k=1}^{\infty} \frac{e^{k}}{e^{k}+10}
$$

5. 

$$
\sum_{k=2}^{\infty} \frac{2}{k \ln (k)}
$$

6. 

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

7. 

$$
\sum_{k=1}^{\infty} \frac{k \cdot 10^{k}}{k!}
$$

