MATH 152, Fall 2019

Worksheet 4

1. Does the improper integral

$$\int_0^\infty x^4 e^{-x^5}\,dx$$

converge?. If it converges find its value.

2. The region between the curve $y = 1/x$, $x \geq 1$ and the x- axis for $x \geq 1$ is revolved about the x-axis to generate a solid D. Show that D has a finite volume.

3. Let $\{a_n\}$ be the sequence defined by

$$a_n = \frac{\sqrt{n+1}}{5n+3}$$

Determine if the sequence is increasing/decreasing/not monotone.

4. Find

$$\lim_{n\to\infty} \left(\sqrt{n^2 - 7n} - n\right)$$

5. Find

$$\lim_{n\to\infty} \int_{n-3}^{n+5} \frac{x^2 + 4}{x^2 + 1}\,dx$$

6. Consider the sequence $\{a_n\}$ defined by

$$a_n = n^{2/3}\left((n+2)^{1/3} - n^{1/3}\right)$$

Find $\lim_{n\to\infty} a_n$.

7. Determine the SUM of the series

$$\sum_{n=1}^\infty \frac{1}{25n^2 + 15n - 4}$$