

Math 170: Worksheet 3

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February 2, 2021

Problem 1. Open <https://www.desmos.com/calculator> and plot $y = \sin x$. Judging from how the graph looks, compute the following integral:

$$\int_{-1}^1 (x^3 - x + \sin x) dx.$$

Problem 2. Let $a_n = \frac{3n+1}{2^n}$. What is your guess for $\lim_{n \rightarrow \infty} a_n$? Please provide a proof using the ϵ -definition.

Problem 3. (extra, difficult!!) Let $a_n = \frac{n+1}{n^2}$. Use your calculator to find $a_1, a_{10}, a_{100}, a_{1000}$. Can you guess what is $\lim_{n \rightarrow \infty} a_n$? Try to provide a proof using the ϵ -definition.