

MATH 122: Calculus II
Some Hints and Answers for Assignment 20

I: Section 8.1: 20, 27, 34

Exercise 20: $\{\frac{\arctan n}{n}\}$: Numerator approaches $\pi/2$ and denominator grows unboundedly.

Exercise 27: Use l'Hôpital's Rule four times. The sequence diverges.

Exercise 34: Write as $\frac{\sin \frac{1}{n}}{\frac{1}{n}}$ and apply l'Hôpital's Rule. Sequence has limit 1.

II: Section 8.2: 1, 8, 15

Exercise 1: $\sum_{n=1}^{\infty} a_n = \sum_{n=1}^{\infty} \frac{-2}{(2n+5)(2n+3)}$: A partial fraction decomposition shows $a_n = \frac{1}{2n+5} - \frac{1}{2n+3}$. Show $S_n = -\frac{1}{5} + \frac{1}{2n+5}$ so the sum of the series is $-\frac{1}{5}$ as $\lim_{n \rightarrow \infty} \frac{1}{2n+5} = 0$.

Exercise 8: Ratio is $-\frac{1}{4}$ so series converges to $\frac{12}{5}$

Exercise 15 Ratio is (-1) ; series diverges