Math 43900 Problem Solving
Fall 2018
Lecture 8 Sequences and series

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1 Problems

1.1 Sequences and their limits

Easier

1.

Harder

2.

1.2 Series and products

Easier

3. [Hint: partial fractions.]
4. [Hint: Find some upper bound.]
5. [Hint: what is $\sum_{a=1}^{n} a^k$ look like?.]
6. [Hint: telescope.]
7. [Hint: Riemann sums.]

Harder

8. [Hint: partial fractions.]
9. [Hint: Taylor expand.]
10. [Hint: telescope.]

1.3 Extra exercises

Easier

11.

12. (a)

    (b) [Hint: you'll get a linear recurrence, remember from polynomials!.]

13.

14. [Hint: You have to be a little careful here, depending on the number of fractions you see..]

15.

16.

17. [Hint: Subtract off πn from the inside then use conjugates..]

18.

19. [Hint: Multiply by $1 - x$..]

20.

Harder

21. [Hint: Yes.]

22.

23. [Hint: Try some small cases and guess..]

24. [Hint: Put n^2 in the denominator and use limits of ratios..]

25. [Hint: telescope.]

26. [Hint: Look at $x_n + 1 + 1/2^2 + \cdots + 1/(n-1)^2$..]

27.