

Math 1552, Integral Calculus

Section 10.1: Sequences

1. For each sequence below, find the l.u.b. and g.l.b., and determine if the sequence is monotonic.

$$\{\sin(n\pi)\}, \quad \left\{(-1)^{n+1} \frac{1}{5^n}\right\}, \quad \left\{\frac{n+1}{n}\right\}$$

2. Determine whether or not each sequence converges. If so, find the limit.

- (a)  $\left\{\frac{2n^2}{\sqrt{9n^4+1}}\right\}$
- (b)  $\left\{\left(1 - \frac{1}{8n}\right)^n\right\}$
- (c)  $\left\{\frac{n!}{e^n}\right\}$
- (d)  $\left\{\left(\frac{n}{n+5}\right)^n\right\}$

3. Consider the infinite series:

$$\sum_{n=0}^{\infty} \left( \frac{2}{3^n} + \frac{(-1)^n}{6^n} \right).$$

(a) Write out the first four terms of the series.

(b) Does the series converge? If so, find the sum.