Review 3 Answers

1. (a) Converges, by comparison with a geometric series with $r = 1/2$; possible bounds are 0 and 2; latter obtained using $\sum_{k=0}^{\infty} \frac{1}{2^k}$

   (b) Diverges by ratio test

   (c) Converges by alternating series test; possible bounds are $1 - \frac{1}{\sqrt[3]{2}}$ and 1

   (d) Converges by comparison with p-series; possible bounds are 0 and 2.

2. (a) Yes, since $\lim_{n\to\infty} S_n = 3$; (b) 2.5, $\frac{17}{6} - \frac{14}{5}$; (c) $3 - \frac{17}{6}$ (d) 0

3. (a) No, 8 is outside the interval of convergence; (b) Maybe, -13 is an endpoint of the interval of convergence.

4. $r = 2$; (3,7); It converges at $x = 3$ and diverges at $x = 7$

5. (a) Compare with a p series with $p = 4$. (b) $n \geq 4$

6. Yes, by absolute convergence test

7. (a) Yes, it is a monotone increasing sequence with an upper bound; (b) No, $lim_{n\to\infty} a_n \neq 0$

8. (a) Improper because upper integration limit is ∞; it converges by comparison with p-integral where $p = 3$
   (b) Improper because integrand function is undefined at $x = 2$; it diverges.

9. (a) $r = \infty$, $(-\infty, \infty)$ (b) $.015625$