1. see p. 239

2. \( s_n \to 10 \) where \( s_n = a_1 + a_2 + \ldots + a_n \).

3. (a) Converges (absolutely); p-series with \( p = 3/2 \).
   (b) Converges conditionally; Alternating series theorem; p-series with \( p = 1/2 \).
   (c) Converges (absolutely); limit comparison test with \( \sum \frac{1}{n^2} \).
   (d) Converges (absolutely); ratio test: \( \frac{|a_{n+1}|}{|a_n|} \to 1/e < 1 \)

4. No conclusion.

5. (a) \((-\infty, \infty)\) (Use ratio test.)
   (b) \([-\frac{2}{3}, 0)\)

6. (a) \( a_n = \frac{1}{4} (x)^n; \ r = 4 \).
   (b) \( 3 + x + \frac{x^5}{5} + \frac{x^9}{9} + \ldots \) \( a_n = x\frac{4n-3}{(n-3)!} \) for \( n \geq 1 \); \( r = 1 \) (same radius as the series before integration: \( |x^4| < 1 \), or do the ratio test)

7. \( 1 - 1(x - 1) + (x - 1)^2 - (x - 1)^3 \)

8. (a) 10
   (b) 0

9. (a) True. Justification: \( x=3 \) is closer to the point of expansion \( (x=2) \) than is \( x=0 \).
   Further explanation but more than is required for the "brief explanation": If a power series converges at any value, it must converge for any value closer to the point of expansion.
   (b) False; one counterexample is \( a_n = \frac{1}{n^2}, b_n = \frac{1}{n} \)

10. \( 1+2x+2x^2+\frac{4}{3}x^3+\frac{2}{3}x^4+\ldots \) (The first FIVE power series coefficients are 1, 2, 4/3, 2/3).

11. \( N > 99 \) (Use the alternating series error bound: the error is less than the size of the first omitted term.)

12. \( a = -1 \) ("M" in the Taylor remainder formula for \( R_n(x) \) is the max of the third derivative of \( e^x \) for \( x \) between \( a \) and 0. Note that \( a \) is negative. Since \( e^x \) is increasing, its max is at the right hand endpoint, zero. The value of the max is \( e^0 = 1 \).)

13. See p. 767, part i

14. Lots of possibilities. The easiest two are perhaps the two circles centered at the origin and of radius 1 (level 1), and 2 (level 4).