1 Chapter 12

12.1.4: $1, \frac{3}{5}, \frac{1}{2}, \frac{5}{11}, \frac{3}{7}$.

12.1.6: $2, 8, 48, 384, 3840$.

12.1.8: $4, \frac{4}{3}, 4, \frac{4}{3}, 4$.

12.1.10: $a_n = \frac{1}{2n}$.

12.1.12: $a_n = (-1)^n \frac{n}{(n+1)^2}$.

12.1.14: $a_n = 3 + (-1)^{n+1} 2$.

12.1.16: Converges to $\frac{1}{3}$.

12.1.18: Converges to 1.

12.1.20: Diverges.

12.1.22: Diverges.

12.1.24: Converges to 1.

12.1.26: Converges to $\frac{\pi}{2}$.

12.1.28: Converges to 1.

12.1.30: Diverges.

12.1.32: Converges to 0.

12.1.34: Diverges.

12.2.12: Diverges.

12.2.14: Converges to $\frac{5}{3}$.

12.2.18: Converges to $2 + \sqrt{2}$.

12.2.20: Converges to $\frac{3e}{3-e}$.

12.2.22: Diverges.

12.2.24: Diverges.

12.2.26: Converges to $\frac{5}{6}$.

12.2.28: Converges to $\frac{32}{7}$.

12.2.30: Diverges.

12.2.32: Converges to $\frac{\cos 1}{1-\cos 1}$.

12.2.34: Diverges.

12.2.42: The series converges for $3 < x < 5$. The sum is then $\frac{x-4}{5-x}$.

12.3.4: Diverges.

12.3.6: Converges to $\frac{1}{e-1}$.

12.4.6: Diverges.

12.4.8: Diverges.

12.4.10: Converges.

12.4.12: Converges.

12.4.14: Diverges.

12.4.16: Converges.

12.4.18: Diverges.

12.4.20: Converges.

12.4.22: Converges.

12.4.24: Diverges.

12.4.26: Converges.

12.4.28: Converges.

12.5.14: Converges.

12.5.16: Converges.

12.5.18: Diverges.

12.6.4: Divergent.

12.6.6: Absolutely convergent.

12.6.8: Conditionally convergent.

12.6.10: Divergent.

12.6.12: Absolutely convergent.

12.6.14: Absolutely convergent.

12.6.16: Divergent.

12.6.18: Absolutely convergent.

12.7.12: Converges.

12.7.24: Converges.

12.7.26: Converges.

12.7.28: Converges.

12.7.30: Converges.

12.7.32: Converges.

12.7.34: Diverges.

12.8.4: The radius of convergence is 1. The interval of convergence is (-1, 1].

12.8.6: The radius of convergence is 1. The interval of convergence is (-1, 1).

12.8.8: The radius of convergence is 0. The interval of convergence is 0.

12.8.10: The radius of convergence is 3. The interval of convergence is [-3, 3).

12.8.12: The radius of convergence is 5. The interval of convergence is [-5, 5].

12.8.14: The radius of convergence is ∞. The interval of convergence is $(-\infty, \infty)$.

12.8.16: The radius of convergence is 1. The interval of convergence is (4, 6).

12.8.18: The radius of convergence is $\frac{1}{2}$. The interval of convergence is $(-\frac{7}{2}, -\frac{5}{2}]$.

12.8.20: The radius of convergence is 1. The interval of convergence is $[-\frac{1}{3}, -\frac{5}{3})$.

12.8.22: The radius of convergence is 1. The interval of convergence is [3, 5].

12.10.6: The series is $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n} x^n$. The radius of convergence is 1.

12.10.14: The series is $\ln 2 + \sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n2^n}(x-2)^n$. The radius of convergence is 2.

12.10.24: The series is $\sum_{n=0}^{\infty} \frac{(-1)^n}{n!2^n} x^n$. The radius of convergence is ∞.

12.10.26: The series is $\sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!} x^{8n+4}$. The radius of convergence is ∞.

12.10.38: Approximately 0.5234 after three terms.

12.10.40: $\mathrm{C} + \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)(2n+1)!} x^{2n+1}$.

12.10.44: Approximately 0.00080.

12.10.54: $-x - \frac{3}{2}x^2 - \frac{4}{3}x^3 - ....$

12.10.56: $\frac{\sqrt{3}}{2}$.

12.10.58: $e^{\frac{3}{5}}$.

12.12.8: $(x-1) - \frac{3}{2}(x-1)^2 + \frac{11}{6}(x-1)^3$.

12.12.16: $\frac{1}{2} - \frac{\sqrt{3}}{2}(x - \frac{\pi}{3}) - \frac{1}{4}(x-\frac{\pi}{3})^2 + \frac{\sqrt{3}}{12}(x-\frac{\pi}{3})^3 + \frac{1}{48}(x-\frac{\pi}{3})^4$, error approximately 0.0105.

12.12.24: Approximately 0.35837.

12.12.28: x should be between (approximately) -1.238 and 1.238.