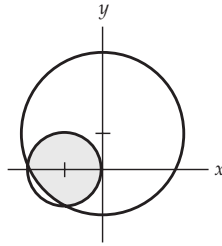


31. $\sum_{k=0}^{\infty} (-1)^k (z+1)^k, R = \sqrt{2}; \sum_{k=0}^{\infty} \frac{(-1)^k}{(2+i)^{k+1}} (z-i)^k, R = \sqrt{5}$



33. $\frac{1}{1-3z}$

37. $1.1 + 0.12i$

Exercises 6.3, page 334

- 1. $\frac{1}{z} - \frac{z}{2!} + \frac{z^3}{4!} - \frac{z^5}{6!} + \dots$
- 3. $1 - \frac{1}{1! \cdot z^2} + \frac{1}{2! \cdot z^4} - \frac{1}{3! \cdot z^6} + \dots$
- 5. $\frac{e}{z-1} + e + \frac{e(z-1)}{2!} + \frac{e(z-1)^2}{3!} + \dots$
- 7. $-\frac{1}{3z} - \frac{1}{3^2} - \frac{z}{3^3} - \frac{z^2}{3^4} - \dots$
- 9. $\frac{1}{3(z-3)} - \frac{1}{3^2} + \frac{z-3}{3^3} - \frac{(z-3)^2}{3^4} + \dots$
- 11. $\dots - \frac{1}{3(z-4)^2} + \frac{1}{3(z-4)} - \frac{1}{12} + \frac{z-4}{3 \cdot 4^2} - \frac{(z-4)^2}{3 \cdot 4^3} + \dots$
- 13. $\dots - \frac{1}{z^2} - \frac{1}{z} - \frac{1}{2} - \frac{z}{2^2} - \frac{z^2}{2^3} - \dots$
- 15. $\frac{-1}{z-1} - 1 - (z-1) - (z-1)^2 - \dots$
- 17. $\frac{1}{3(z+1)} - \frac{2}{3^2} - \frac{2(z+1)}{3^3} - \frac{2(z+1)^2}{3^4} - \dots$
- 19. $\dots - \frac{1}{3z^2} + \frac{1}{3z} - \frac{1}{3} - \frac{z}{3 \cdot 2} - \frac{z^2}{3 \cdot 2^2} - \dots$
- 21. $\frac{1}{z} + 2 + 3z + 4z^2 + \dots$
- 23. $\frac{1}{z-2} - 3 + 6(z-2) - 10(z-2)^2 + \dots$
- 25. $\frac{3}{z} - 4 - 4z - 4z^2 - \dots$
- 27. $\dots + \frac{2}{(z-1)^3} + \frac{2}{(z-1)^2} + \frac{2}{z-1} + 1 + (z-1)$
- 29. $\frac{1}{z} + \frac{z}{6} + \frac{7z^3}{360} + \dots$

Exercises 6.4, page 340

- 1. Define $f(0) = 2$.
- 3. Define $f(0) = 0$.
- 5. $-2 + i$ is a zero of order 2.
- 7. 0 is a zero of order 2; i and $-i$ are simple zeros.
- 9. $2n\pi i, n = 0, \pm 1, \dots$, are simple zeros.
- 11. order 5
- 13. order 1
- 15. $-1 + 2i$ and $-1 - 2i$ are simple poles.
- 17. -2 is a simple pole; $-i$ is a pole of order 4.

35. $-\frac{\pi}{8} \left(\frac{e^{-3}}{3} - e^{-1} \right)$ 37. πe^{-1}
 57. $\log_e 2$ 59. $12\pi i$
 61. $4\pi i$ 63. $10\pi i$
 69. $\frac{\pi^2}{8}$ 71. $\frac{\sqrt{2}\pi^2}{16}$

Exercises 6.7, page 384

1. $\frac{1}{s-5}, s > 5$ 3. $\frac{3}{s^2+9}, s > 0$
 5. $s > k$ 7. $\frac{k}{s^2-k^2}, \frac{s}{s^2-k^2}$
 9. $\frac{1}{120}t^5$ 11. $\frac{1}{2} \sin 2t$
 13. $\frac{1}{\sqrt{3}} \sinh \sqrt{3}t$ 15. $e^{3(t-a)}\mathcal{U}(t-a) - e^{2(t-a)}\mathcal{U}(t-a)$
 17. $\frac{1}{2} \sinh t - \frac{1}{2} \sin t$ 19. $\frac{1}{1-ia}$

Chapter 6 Review Quiz, page 386

1. true 3. true
 5. true 7. true
 9. false 11. false
 13. true 15. true
 17. true 19. false
 21. $-3 + 6i$ 23. $\frac{125}{26} - \frac{25}{26}i$
 25. $|z - 2 - i| = \frac{1}{13}$ 27. $1/R$
 29. $\frac{1}{5}(z+1) - \frac{1}{5^2}(z+1)^2 + \frac{1}{5^3}(z+1)^3 - \dots; R = 5$
 31. $\frac{7}{(z+1)^2} + \frac{4}{z+1} - 2 + (z+1)$
 33. 1 35. $\frac{1}{6}$
 37. $1, \frac{1}{z-\pi}, \pi$
 39. (a) $\pi + \pi i$
 (b) 0 for $n = 0$; 0 for $n = 1$; $2\pi i(1/1!)$ for $n = 2$; 0 for $n = 3$; $2\pi i(-1/3!)$ for $n = 4$; 0 for $n = 5$; $2\pi i(1/5!)$ for $n = 6$; and so on.

Chapter 7

Exercises 7.1, page 396

1. f is not conformal at $z = \pm 1$.
 3. f is not conformal at $z = (2n+1)\pi i, n = 0, \pm 1, \pm 2, \dots$.
 5. f is not conformal at $z = \frac{1}{2}(2n+1)\pi, n = 0, \pm 1, \pm 2, \dots$.