Chapter 1—Answer Section

- **Section 1.3**
  - Page 582, Exercise 1e.
    Replace “\(\sqrt{(x - 1)^2 + y^2}\)” with “\((x - 1)^2 + y^2\)”.

- **Section 1.4**
  - Page 584, Exercise 7.
    The answer should read as follows:
    \[\text{Arg}(z_1z_2) = \text{Arg}(-4i) = \pi.\] However, \[\text{Arg}(z_1) + \text{Arg}(z_2) = \frac{2\pi}{3} + \frac{5\pi}{6} = \frac{3}{2}\pi.\]

- **Section 1.5**
  - Page 585, Exercise 11b.
    Replace “Let \(z = e^{i\theta}\)” with “Let \(z = e^{i\theta}\).” (i.e., insert a period after \(e^{i\theta}\)).

Chapter 2—Text

- **Section 2.1**
  - Page 53, line 5.
    Replace “of \(R\) to be function” with “of \(R\) to be a function”.
  - Page 58, lines 4–5.
    The phrase “linear transformation” should be in bold.
    Change the wording in the exercise statement as follows:
    replace “total charge” with “electric field intensity”.
  - Page 63, Exercise 11b.
    Replace “\(h(z) = f(g(z))\)” with “\(h(z) = g(f(z))\)”.
  - Page 63, Exercise 12.
    Eliminate part d. Replace “Find” with “Sketch” in parts a, b, and c.

- **Section 2.2**
  - Page 70, Exercise 10.
    The reference to Figure 2.14 in line 3 of the exercise should be to Figure 2.12.
Section 2.5

- Page 91, Exercise 10.
  Replace the phrase “outside the disk $D_1(1) = \{w : |w - 1| < 1\}$” with “outside the circle $C_1(1) = \{w : |w - 1| = 1\}$”.

Chapter 2–Answer Section

Section 2.1

- Page 586, Exercise 1c.
  Replace “2i” with “2”.

Section 2.2

- Page 587, Exercise 1g.
  The answer should read as follows:
  The infinite strip $\{(u, v) : 1 < v < 8\}$, which is the region in the $uv$ plane between $v = 1$ and $v = 8$.

- Page 587, Exercises 7a and 7c.
  For clarity, change the answers to the polar form $\rho e^{i\phi}$ so that they read as follows:
  Exercise 7a: The set $\{\rho e^{i\phi} : \rho > 8, \text{ and } \frac{3\pi}{4} < \phi < \pi\}$.
  Exercise 7c: The set $\{\rho e^{i\phi} : \rho > 64, \text{ and } \frac{3\pi}{2} < \phi < 2\pi\}$.

Section 2.3

- Page 588, Exercise 5a.
  The last equation should read $\lim_{z \to 0} \bar{z} = 0$.

- Page 588, Exercise 17.
  Replace “Rewrite $f$ as in Exercise 9” with “Rewrite $f$ as in Exercise 11”.

- Page 588, Exercise 19.
  Replace “that if $z \in D_\delta^*(0)$” with “that if $z \in D_\delta^*(z_0)$”.

Section 2.4

- Page 589, Exercise 3.
  The last sentence should read as follows:
  Thus, the range of $f_{2\pi}(z)$ is $\{z = \rho e^{i\phi} : \rho > 0 \text{ and } \pi < \phi \leq 2\pi\}$.

- Page 589, Exercise 5a.
  The last equality should be $|z|e^{i\text{Arg}(z)} = z$. 
• Section 2.5

- Page 589, Exercise 11.
  Replace “The exterior of the disk \( D_1(-\frac{i}{2}) = \{(u, v) : u^2 + (v + \frac{1}{2})^2 > 1\} \)” with “The exterior of \( C_1(-\frac{i}{2}) \), which is \( \{(u, v) : u^2 + (v + \frac{1}{2})^2 > 1\} \)”.

- Page 590, Exercise 21. Change the answer so that it reads as follows:
  Broadly speaking, \( \pm \infty \) are designations for limits in Calculus indicating quantities that get arbitrarily positive or negative. There is no such signed measure in Complex Analysis, only a measure of how far things are from the origin. In that sense, the point \( \infty \) on the Riemann sphere can be equated with both \( \pm \infty \) in real analysis. Elaborate and give some other comparisons.

Chapter 3–Text

• Section 3.2

- Page 112, Exercise 16b.
  Replace “\( \frac{1}{2}[u_x - v_y + i(y_x + u_y)] = 0 \)” with “\( \frac{1}{2}[u_x - v_y + i(v_x + u_y)] = 0 \)”.

• Section 3.3

- Page 120, Exercise 6.
  Replace “\( u_2 = x^3 - 3xy^2 \)” with “\( u_2(x, y) = x^3 - 3xy^2 \)”.

Chapter 3–Answer Section

• Secton 3.2

- Page 591, Exercise 1g.
  Replace the last equation (“\( f'(z) = 2x \)” with “\( f'(z) = f'(x, 0) = 2x \)”.

- Page 591, Exercise 9a.
  Replace “and \( u_y = \cosh x \sin y = -v_x \)” with “and \( u_y = \cosh x \cos y = -v_x \)”.

- Page 591, Exercise 11c.
  The answer should read as follows:
  \( f \) is analytic in quadrants I and III and differentiable on the \( x \)- and \( y \)-axes.

• Section 3.3

- Page 592, Exercise 13a.
  The solution should read as follows:
  \[
  f(z) = \frac{1}{z+i} = \frac{x}{x^2+y^2} + i \frac{-y}{x^2+y^2}.
  \]
Chapter 4—Text

- Section 4.4
  - Page 151, second line after the phrase “Calculation for $D$”. Replace “<” with “≤”.

Chapter 4—Answer Section

- Section 4.2
  - Page 140, Exercise 7.
    Per student requests, replace “Prove that if $z = c$” with “Prove that if a complex number $c$”.

- Section 4.4
  - Page 595, Exercise 7.
    The “$(b_n)$” term should be deleted from the next to the last expression so that it reads as follows:
    \[
    \sum_{n=1}^{\infty} n(n+k)(n+k-1) \cdots (n+1)c_{n+k}(z-\alpha)^{n-1}.
    \]

Chapter 5—Text

- Section 5.4
  - Page 178, the line just below Equation (5–31).
    Per student request, reword the line so that it reads as follows:
    Let $z = x + iy$ and subtract Equation (5–31) from Equation (5–30). Solving for $\sin z$ then gives
  - Page 181
    Replace “$\sin z \cosh y$” with “$\sin x \cosh y$” in the right side of the first equation so that it begins as follows:
    \[
    |\sin z|^2 = |\sin x \cosh y + i \cos x \sinh y|^2
    \]
  - Page 186, Exercise 3.
    The reference should be to Figures 5.7 and 5.8

Chapter 5—Answer Section

- Section 5.1
  - Pages 595–596, Exercises 5, 7a, and 7c.
    Relabel: the answer for Exercise 5 should be the answer for Exercise 7; the answers listed for Exercises 7a and 7c should be for Exercises 5a and 5c. After relabeling, of course, put the answers in their proper order.
• Section 5.3
    The answer should read as follows:
    No. \(1^{a+ib} = e^{-b2\pi n} \cos(a2\pi n) + ie^{-b2\pi n} \sin(a2\pi n)\), where \(n\) is an integer.

Chapter 6–Text
• Section 6.2
  – Page 202, Definition 6.2.
    Replace \(\int_C f(z)dt\) with \(\int_C f(z)dz\) (i.e., replace the “\(dt\)” with “\(dz\)”).
  – Page 213, Exercise 10b.
    Replace “2\(\pi \left(\frac{\pi + \ln R}{R}\right)\)” with “2\(\pi \left(\frac{(\ln R)^2 + \pi^2}{R}\right)\)”.

• Section 6.3
  – Page 219, second line of the proof.
    Replace “We then construct” with “To do so, construct”.
  – Page 221, second line of Example 6.13
    Replace “does not lie interior to \(C\)” with “does not lie on or interior to \(C\)”.
  – Page 227, Figure 6.28 (b).
    The two circular curves should be touching each other as in Figure 6.28 (a).

• Section 6.6
    Replace “= 0” with “= (0)(2\(\pi\) = 0”.
    Rephrase parts (a) and (b) so that the exercise reads as follows:
    (a) Let \(f\) be analytic and nonconstant in the domain \(D\). If \(f(z) \neq 0\) for all \(z\) in \(d\),
    then \(|f(z)|\) does not attain a minimum value at any point \(z_0\) in \(D\).
    (b) Show that the requirement that \(f(z) \neq 0\) in part a is necessary by finding an example of a function defined on \(D\) for which \(f(z) = 0\), and yet whose minimum is attained somewhere in \(D\).
  – Page 248, Exercise 11.
    Replace “Hint: Use both” with “Hint: Refer to Exercise 7 and use both”.

Chapter 6–Answer Section
• Section 6.4
    Replace “\(-\frac{1}{2} \ln \sqrt{2}\)” with “\(- \ln \sqrt{2}\)”.
• Section 6.6

  The answer should be \((z + i)(z - i)(z - 2 + i)(z - 2 - i)\).
– Page 602, Exercise 7a.
  Replace “If \(|f(z)| \geq m\) for all \(z\) in \(D\), where \(m > 0\),” with “If \(f(z) \neq 0\) for all \(z\) in \(D\),”.
– Page 602, Exercise 11.
  Reword the answer so that it reads as follows:
  (By contraposition) If \(f\) does not have a zero, then by the minimum modulus theorem, the minimum of \(|f|\) occurs on the boundary (prove that this result follows from Exercise 7). Since \(|f|\) is constant on the boundary, both the minimum and maximum of \(|f|\) are the same on the boundary. This condition implies that the maximum of \(|f|\) also occurs in \(D_1(0)\) (explain!), which by the maximum modulus theorem means that \(f\) is constant in \(D_1(0)\).

Chapter 7–Text

• Section 7.1

– Page 255, Exercise 3c.
  Replace “\(\sum_{k=0}^{\infty} \frac{z^k}{k+1}\)” with “\(\sum_{k=0}^{\infty} \frac{z^k}{k+1}\)”. 

• Section 7.2

– Page 258, Equation (7–8).
  Replace “\(|z_0 - a| = r\)” with “\(|z_0 - \alpha| = r\)” (i.e., replace the “\(a\)” with “\(\alpha\)”).
  For part b, replace “\(g(z)\)” with “\(f(z)\)”. For part c replace “\(h(z)\)” with “\(f(z)\)”. 

• Section 7.4, 

– Page 283, Exercise 1e.
  Replace “\(z^2 + 10z + 0\)” with “\(z^2 + 10z + 9\)”.

Chapter 7–Answer Section

• Section 7.2

– Page 604, Exercise 15.
  Change “Then apply Corollary 7.2.” to “Then apply Corollary 7.2 in the manner of Example 7.2.”
• Section 7.4

– Page 605. The line (that begins with “Simple zeros”) immediately after the answer for Exercise 1i should be labeled in bold with “1k.”.

– Page 605, Exercise 2k.
  Replace “$z = 2n\pi$” with “$z = 2n\pi i$”.

– Page 605, Exercise 3a.
  Replace “Removable singularity at the origin” with “Simple pole at the origin”.

Chapter 8–Text

• Section 8.3

– Page 311, Exercise 8.
  Replace “$(x^2 + 4)^{2n}$” with “$(x^2 + 4)^{2n}$”.

• Section 8.7

– Page 327, Exercise 11.
  Replace “$f(z) = \exp(-z^2)$” with “$f(z) = \exp(iz^2)$”.

Chapter 8–Answer Section

• Section 8.1

– Page 607, Exercise 11.
  Reword the answer so that it reads as follows:

By Theorem 8.2, \( \text{Res}[g, n] = \lim_{z \to n} (z - n)\pi f(z) \cot \pi z = \pi f(z) \cos(\pi z) \frac{z^n}{\sin(\pi z)} \), where \( n \) is any integer. Use L’Hôpital’s rule to get \( \lim_{z \to n} \cos(\pi z) \frac{z^n}{\sin(\pi z)} = \frac{1}{\pi} \). Explain how this calculation and the fact that \( f \) is analytic at \( n \) then give the result.

• Section 8.3

– Page 608, Exercise 7.
  The answer should be \( \frac{\pi}{2} \).

Chapter 9–Text

• Section 9.1, 

– Page 354, next to last line.
  Replace “$a = \frac{5}{4}$” with “$a = \frac{4}{5}$”.

– Page 355, Figure caption for Figure 5.4.
  Replace “$\frac{5}{4} y[n] + 1$” with “$\frac{4}{5} y[n] + 1$”.
Chapter 10–Answer Section

- **Section 10.1**
  - Page 615, Exercise 3.
    In the third line of the answer replace “Arg \( f'(1+i) = \frac{3\pi}{2} \)” with “Arg \( f'(1+i) = -\frac{\pi}{2} \).”
  - Page 615, Exercise 5.
    The second line of the answer should be changed to read as follows:
    \[ f'(\frac{-\pi}{2} + i) = i \sinh 1, \alpha = \text{Arg} f'(\frac{-\pi}{2} + i) = \frac{\pi}{2}, |f'(\frac{-\pi}{2} + i)| = \sinh 1; \]

Chapter 11–Text

- **Section 11.5**
  - Page 453, Exercise 3
    Replace “\( T(0, y) = 10, \text{ for } y < 1 \)” with “\( T(0, y) = 10, \text{ for } y > 1 \).”
  - Page 454, Exercise 5
    Replace “\( T(x, y) = 0, \text{ for } \frac{-\pi}{2} < x < \frac{\pi}{2} \)” with \( T(x, 0) = 0, \text{ for } \frac{-\pi}{2} < x < \frac{\pi}{2} \).”

- **Section 11.8**
  - Page 484, Exercise 2a.
    Replace \( \frac{4u^2}{(r+\frac{1}{2})^2} + \frac{4v^2}{(r-\frac{1}{2})^2} = 1 \)” with “\( \frac{u^2}{(r+\frac{1}{2})^2} + \frac{v^2}{(r-\frac{1}{2})^2} = 1 \).”
  - Page 484, Exercise 2b.
    Replace “\( \frac{u^2}{\cos^2 \theta} - \frac{v^2}{\sin^2 \theta} = 1 \)” with “\( \frac{u^2}{4\cos^2 \theta} - \frac{v^2}{4\sin^2 \theta} = 1 \).”
  - Page 485, Exercises 6
    Replace the word “cardioid” with the phrase “cardioid-like curve”.
  - Page 485, Exercise 7
    Replace the word “cardioid” with the phrase “cardioid-like curve”.

- **Section 11.11**
  - Page 509
    Replace “\( F(z) = \lim_{a \to 0} \frac{\log(z) - \log(z-a)}{2a} \)” with “\( F(z) = \lim_{a \to 0} \frac{\log(z+a) - \log(z-a)}{2a} \).”

Chapter 11–Answer Section

- **Section 11.3**
  - Page 617, Exercise 1.
    The answer should read as follows:
    \[ \phi(x, y) = \frac{y}{2\pi} \ln \left( \frac{(x-1)^2 + y^2}{(x+1)^2 + y^2} \right) + \frac{x}{\pi} \text{Arctan} \frac{y}{x-1} - \frac{x}{\pi} \text{Arctan} \frac{y}{x}. \]
• **Section 11.9**
  
  – Page 619, Exercise 3
  
  Replace “\( f'(z) = A(z + 1)^{\frac{1}{2}}(z - 1)^{-\frac{1}{2}} \)” with “\( f'(z) = A(z + 1)^{\frac{1}{2}}(z - 1)^{-\frac{1}{2}} \)”.

  – Page 619, Exercise 9
  
  Replace “\( x_2 = \pi \)” with “\( x_2 = 0 \)”.

**Chapter 12—Text**

• **Section 12.3**
  
  – Page 535. Problems 2–5 should be combined into one Exercise numbered 2 with parts a,b,c.

• **Section 12.4**
  
  – Page 539, Table 12.1, row 5 (Frequency shifting).
  
  Replace “\( \mathcal{F}(e^{-\omega_0 t}U(t)) \)” with “\( \mathcal{F}(e^{i\omega_0 t}U(t)) \)” (i.e., no negative exponent).

  – Page 540, Exercise 5.
  
  The equation should read as follows:
  
  \[ \mathcal{F}\left(e^{-a|t|}\right) = \frac{a}{\pi(a^2 + u^2)}, \text{ for } a > 0. \]

  
  Replace “\( \mathcal{F}\left(\frac{i\sin \pi t}{1-t^2}\right) \)” with “\( \mathcal{F}\left(\frac{\sin \pi t}{1-t^2}\right) \)”.

  
  Replace “\( \frac{1-|w|^n}{4\pi} \)” with “\( \frac{1-|w|^n}{4} \)”.

  
  Replace “\( \frac{1-|w|^n}{4\pi} \)” with “\( \frac{1-|w|^n}{4} \)”.

• **Section 12.6**
  
  – Page 553, Exercise 7.
  
  Replace “\( t - 1 + e^t \)” with “\( t - 1 + e^{-t} \)”.

• **Section 12.7**
  
  – Page 557, line 5.
  
  Replace “\( 1 - \cos t \)” with “\( 1 + \cos t \)”.

• **Section 12.8**
  
  – Page 562, Exercise 8.
  
  Replace “\( \ln \frac{t^2}{s^2 + 1} \)” with “\( -\frac{1}{2} \ln \frac{s^2}{s^2 + 1} \)”.
Chapter 12–Answer Section

- **Section 12.4**
  
  - Page 621, Exercise 5.
    The solution should be $\mathfrak{F}\left(e^{-a|t|}\right) = \frac{a}{\pi(a^2 + u^2)}$, for $a > 0$.
  
  - Page 621, Exercise 9.
    Replace $\frac{1-|w|^u}{4\pi}$ with $\frac{1-|w|^u}{4}$.

- **Section 12.5**
  
  - Page 621, Exercise 1
    Replace “$(0+0i) = \frac{-1}{\sigma+i\tau} = \frac{1}{s}$” with “$(0+0i) - \frac{-1}{\sigma+i\tau} = \frac{1}{\sigma+i\tau} = \frac{1}{s}$”.

- **Section 12.10**
  
  - Page 624, Exercise 15
    Replace “$\mathcal{L}(e^t)\mathcal{L}(\cos t)$” with “$\mathcal{L}(e^{-t})\mathcal{L}(\cos t)$”.