

Corrections and Minor Revisions of *Mathematical Methods in the Physical Sciences*, third edition, by Mary L. Boas

Updated February 23, 2012 by Harold P. Boas

This list includes all the known errors in the first printing at the stated time of update. If you have a later printing, some of these errors may have been corrected. In addition to corrections, a few minor revisions for clarity are included. Please send any additional corrections to boas@tamu.edu.

This errata list can be found at
http://www.math.tamu.edu/~boas/Boas_MathematicalMethods_errata.pdf.

| Page | Location | Correction |
|------|------------|---|
| viii | Line 20 | For “futher” read “further”. |
| ix | Line 15 | The opening quotation marks around “To the Student” are reversed. |
| 34 | Last line | 6^2 should be 2^6 . |
| 47 | Section 2 | In the second line, the symbol i in the parenthetical comment should be in italics. |
| 51 | Figure 5.1 | In the first label $(1, 1)$ for the point, there is a missing opening parenthesis. |
| 55 | Problem 56 | Insert parentheses to make the problem read “(angle of z) = $\frac{\pi}{2}$ ”. |
| 76 | Problems | In the instructions for the problems, for “compare” read “compare with”. |
| 79 | Problem 12 | Insert the missing left parenthesis before each summation sign. |

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| 86 | Example 2 | In the last matrix, element (3, 4) should be 10 instead of -20 . In the next line, similarly replace -20 by 10. |
| 121 | (6.17) | In the second line, the second expression in parentheses should be $k - \frac{k^3}{3!} + \frac{k^5}{5!} + \cdots$ with ellipsis dots. |
| 136 | Problem 21 | In line 2, insert a missing “of” to read “in the form of a determinant.” |
| 153 | (11.21) | As mentioned on page 50, the notation λ^* is an alternate notation for $\bar{\lambda}$ (the complex conjugate of λ). But to be consistent with the notation used elsewhere in the book, the instances of λ^* in the paragraph containing formula (11.21) should be changed to $\bar{\lambda}$. |
| 167 | (12.25) | For $\lambda = 1$: $\mathbf{R} = (X, Y) = (\sqrt{2}, \sqrt{3})$; for $\lambda = 6$: $\mathbf{R} = (3\sqrt{2}, -2\sqrt{3})$. |
| 208 | Example 6 | Two lines after (7.8), at the end of the sentence, insert the parenthesis: (see page 189). |
| 212 | Last line | The number 1 should be the letter l . Also replace the final period by a comma and add: and $V = w^2l = l^3/2$. |
| 226 | (10.3a) | The equations should be $4z + 2y = 0$ and $4y + 2z = 0$. |
| 235 | Line -6 | In the second integral, dt is missing. |
| 239 | Last line | Replace $(\lambda/2)$ in the exponent by λ . |
| 294 | (6.8) | Replace $r \sin \phi$ by $r \sin \theta$. |
| 306 | Example 6 | For “two of the equations corresponding to (8.17) do not hold” read “one of the equations corresponding to (8.17) does not hold”. |
| 311 | Line 2 | For “w” read “we”. |
| 311 | Line 5 | The opening quotes of “simply connected” are slanted the wrong way. |
| 312 | (9.12) | At the end of the line, $\mathbf{j}x$ should be $\mathbf{j}dx$. |
| 313 | Problem 1 | The reference to Figure 9.2 should be to Figure 9.1. |
| 329 | Line -6 | For “ $ \mathbf{H} $ same at all points” read “ $ \mathbf{H} $ is the same at all points”. |
| 330 | Line -17 | For <i>earths’</i> read <i>earth’s</i> . |
| 336 | Problem 17(g) | The integrand of the first integral on the right-hand side should be $(\mathbf{V} \times \nabla\phi) \cdot \mathbf{n} d\sigma$, not $(\nabla \times \nabla\phi) \cdot \mathbf{n} d\sigma$. |
| 337 | Problem 16(b) | The W at the end of the sentence is a scalar and so should not be boldface. |
| 354 | Example 2 | In the last line, $\sin(x + 3\pi/2)$ should be $\sin(3x + 3\pi/2)$. |
| 367 | Line 4 | After “cosine series” add the bracket [(9.5) and the comments following it]. |
| 371 | Headline | In the page header, read “Section 9” instead of “Section 10”. |
| 380 | (12.3) | The exponent should be $i\alpha_n x$ with an i . |
| 381 | (12.13) | Both integrals should be with respect to $d\alpha$. |
| 381 | (12.14) | In the second equation, $g_s(x)$ should be $g_s(\alpha)$. |

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| 382 | (12.15) | In the integrand of the first equation, $g_c(x)$ should be $g_c(\alpha)$. |
| 382 | (12.17) | In the first integral, dx should be $d\alpha$. In the second line, there is a missing right-hand parenthesis in the numerator of the first integral. |
| 383 | Above (12.20) | The cross reference “from (12.1)” should be “from (12.2)”. |
| 385 | Problem 22 | The expression for $j_1(\alpha)$ should be $(-\alpha \cos \alpha + \sin \alpha)/\alpha^2$. |
| 387 | Problem 4(a) | In the differential equation, the lowercase c should be a capital C . |
| 414 | Problem 11 | A letter y is missing. The equation should be $4y'' + 12y' + 9y = 0$. |
| 431 | Line 8 | For $p \, dy/dx$ read $p = dy/dx$. |
| 442 | Line 13 | The period at the beginning of the line belongs at the end of the preceding equation. |
| 446 | Example 2 | In the first line of the three-line display, the second integral has unbalanced parentheses. It should be $\int_0^t (e^{-\tau} - e^{-2\tau})e^{-(t-\tau)} d\tau$. |
| 457 | Example 5 | The third equation for ρ should have $r^2 \sin \theta$ instead of $r \sin \theta$. |
| 493 | (7.1) | The first equation should be parallel to the second one: $Y(x, \epsilon) = y(x) + \epsilon \eta(x)$. |
| 499 | (2.7) | Delete the z 's in column 3 of the matrix. |
| 506 | Example 1 | In the second paragraph, the cross reference “(3.5) to (3.8)” should be “(3.6) to (3.9)”. |
| 514 | Example 1 | Starting in the middle of line 7, revise as follows: “the z components of \mathbf{U} and \mathbf{V} change sign and the x and y components do not; these are then requirements for all vectors. But the z component of $\mathbf{U} \times \mathbf{V}$ does not change sign while the x and y components do (Problems 3 and 4).” Continue as in the text. |
| 515 | Polar and ... | Starting at the end of the third line, revise as follows: “If a vector under rotations has the property that under reflections the signs of its components are opposite to those of a displacement vector, then it is called an <i>axial</i> vector.” Continue as in the text. |
| 520 | Problem 2 | The unit vector \mathbf{e}_{22} should be \mathbf{e}_2 . |
| 526 | (9.7) | On the right-hand side, after the equals sign, the unit vector \mathbf{e}_1 should be in boldface type. |
| 535 | Problem 18 | The problem should read: Using (10.19), show that $\mathbf{a}^i \cdot \mathbf{a}_j = \delta_j^i$. |
| 542 | Problem 3 | There is a missing left parenthesis in the binomial coefficient. |
| 543 | Problem 3 | Both binomial coefficients are missing a left parenthesis. |
| 549 | Line -7 | In the unnumbered three-line display between (10.3) and (10.4), the integral on the right-hand side of the first line is missing the factor $1/t^3$. |
| 567 | Problem 1 | $P_l(l)$ should be $P_l(1)$, that is, the argument should be “one” instead of “ell”. |

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| 568 | Problems 4,5 | There is a missing left parenthesis in front of the differential operator in each case. |
| 568 | (4.1) | In the denominator, 2^1 should be 2^l , that is, the exponent should be the letter “ell” instead of the number “one”. |
| 569 | Problem 2 | In the second line, the exponent on $(x - 1)$ should be the letter “ell” instead of the number “one”. |
| 582 | Problem 16 | The last equation should be: $I = \int_{-1}^1 f^2(x) dx + (b_0 - c_0)^2 + (b_1 - c_1)^2 + (b_2 - c_2)^2 - c_0^2 - c_1^2 - c_2^2$. |
| 583 | Line above (10.6) | Replace “are are” by “and are”. |
| 615 | Problems 2 & 3 | There is a missing left parenthesis in the binomial coefficient. |
| 618 | Problem 26 | In the last sentence, the subscript on j should be the letter “ell” instead of the number “one”. |
| 621 | Section 2 | At the end of the first paragraph, there is a missing period at the end of the parenthetical sentence. |
| 645 | (6.6) | For $\cos kvt/a$ read $\cos kv t/a$ with “cos” in upright font. |
| 647 | Line 9 | Replace 1^1 by 1^2 . |
| 651 | Problem 18 | The delimiters are unmatched in the displayed equation: the expression $[V(r) - E]$ should be $[V(r) - E]$. |
| 652 | Problem 22 | In the line following the displayed equation, the quantity α^2 should be the reciprocal of what is indicated: namely, $-\hbar^2/(2ME)$. |
| 655 | Figure 8.4 | In the caption, “Ffigure” should be “Figure” (lowercase i). |
| 671 | Last paragraph | The equation in the second line should read $\nabla^2\phi = \partial^2\phi/dx^2 + \partial^2\phi/\partial y^2 = 0$. |
| 677 | Problem 5 | The first integral needs a dz . |
| 677 | Problem 9 | In the denominator of the integrand, x should be z . |
| 711 | Example 1 | Line 5 should read: “at any point of the plate [see equation (13.3.7)].” |
| 733 | Line -13 | In the displayed formula for $P(A)$, the factor (0.095) should be instead (0.95). The final answer 0.0755 is correct. |
| 769 | Example 2 | In the displayed formula, the term $\left(\frac{499}{500}\right)^{998}$ should be instead $\left(\frac{499}{500}\right)^{1498}$ with exponent 1498. |
| 775 | Problem 2 | For $\bar{x} = \sum_{i=1}^n x_i$ read $\bar{x} = (1/n) \sum_{i=1}^n x_i$ with a factor $1/n$. |
| 781 | 6.5 | For “b D” read “(b) D”; the answer is intended to be given for part (b) of the problem. |

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| 784 | Section 14 | The given answers are the solutions that a computer most likely would produce. In some cases, there are additional possible answers. For 14.2, 14.3, 14.5, and 14.6, one can add $2\pi i n$ to the given answer. For 14.10, the general solution is $e^{-\pi^2(\frac{1}{4}+n)}$. For 14.11 and 14.14, one can multiply the given solution by $e^{-2\pi n}$. For 14.15, the general solution is $e^{-(\pi \sinh 1)(1+2n)}$. For 14.23, there are two sets of solutions: $e^{\frac{1}{2}\pi-2\pi n}$ and $(0.4361 + 0.4533i)e^{-2\pi n}$. The given solutions to 14.8, 14.18, and 14.20 are complete. |
| 785 | 17.6 | The answer can be multiplied by $e^{-2\pi^2 n}$. |
| 785 | 17.7 | The answer can be multiplied by $e^{-2\pi n}$. |
| 787 | Problem 8.23 | The $\lambda = 8$ solution should be $y = -2x$. |
| 787 | Problem 10.3 | $\cos(\mathbf{B}, \mathbf{D}) = 17/\sqrt{345}$. |
| 792 | Problem 10.5 | The answer should be $4\pi \cdot 5^5$. |
| 799 | Problem 11.23 | In both (a) and (c), the denominator of the third answer (spherical coordinates) should be $r^2 \sin \theta$ instead of $r \sin \theta$. |