Galois Theory, *First Edition*

David A. Cox, published by John Wiley & Sons, 2004

Errata as of September 18, 2012

This errata sheet is organized by which printing of the book you have. The printing can be found by looking at the string of digits "10 9 8 . . . " at the bottom of the copyright page: the last digit that appears indicates the printing.

All of these typos were corrected in the second edition of the book, which was published in 2012.

***First Printing*: The typographical errors include the following five errata plus the errata listed for subsequent printings.**

Page 39, line 1: Replace "Also, the of" with "Also, the leading term of"

Page 40, line -9 of page 40 (part (a) of Exercise 13): Replace "d_1d_2" with "d_1+d_2"

Page 88, line 11 (part (a) of Exercise 2): Replace "where $a\in\mathbb{Z}$, $F[x]\in\mathbb{Z}[x]$, and $p\nmid F(a)$" with "where $a\in\mathbb{Z}$ and $F(x)\in\mathbb{Z}[x]$ satisfy $\deg(F)\le n$ and $p\nmid F(a)$"

Page 220, lines 2 and 3 of Exercise 5: Replace "is solvable by radicals over K and that the coefficients of the minimal polynomial of α over K are solvable by radicals over F" with "is expressible by radicals over K and that the extension $F\subset K$ is a solvable extension"

Page 294, line -5: Replace "is the code" with "is the ASCII code"

***Second Printing*: The typographical errors include the following three errata plus the errata listed for subsequent printings.**

Page 6, line -3: The quantity inside the parenthesis should be "$-q-\sqrt{q^2+4p^3/27}$"

Page 121, line 4 of **Example 5.4.3**: There is a missing ")", i.e., the second field should be "$\mathbb{Q}(\sqrt{2},\sqrt{3})$"

Page 176, line -3: Replace "$a(x)-yb(x)$" with "$a(x)-\alpha b(x)$"

***Third Printing*: The typographical errors include the following two errata plus the errata listed for subsequent printings.**

Page 35, line 18: "is can be" should be "can be"

Page 84, line 17 (line 4 of the proof of **Theorem 4.2.3**): Replace "$[b]\in\mathbb{F}_p$" with "$[b]\in\mathbb{F}_p=\mathbb{Z}/p\mathbb{Z}$"

Page 126, line -14 (line 2 of part (b) of **Proposition 6.1.4**): Replace "*another*" with "*also a*"

***Fourth and Subsequent Printings*: The typographical errors include the following errata.**

Page vi, line 4: "contain of endnotes" should be "contain endnotes"

Page vii, line 10: "remainder" should be "the remainder"

Page 5, line 8: "quadratic,formula" should be "quadratic formula"

Page 14, line 2 of **Historical Notes**: "Mémories" should be "Mémoires"

Page 26, line -1: "fg and $f+g$" should be "$f+g$ and fg"

Page 27, line 2 of third display: "$\alpha_1\alpha_3++\alpha_1\alpha_4$" should be "$\alpha_1\alpha_3+\alpha_1\alpha_4$"

Page 29, line 7 of the first bullet of **Mathematical Notes**: "which the subject" should be "which is the subject"

Page 35, line 14 (second display): Remove the period at the end of the display.

Page 35, line 1 of **C. Uniqueness**: "is can be" should be "can be"

Page 36, line -13: Replace "$\cdots + a_1x + a_n$" with "$\cdots + a_{n-1}x + a_n$"

Page 48, third line of first display: "$-27d^3$" should be "$-27d^2$"

Page 49, line 6: Replace "Δ" with "$\sqrt{\Delta}$"

Page 50, display (2.33): In the first row of the matrix, replace "s_{2n-1}" with "s_{2n-3}", and in the second row of the matrix, replace "$s_{2n-1}\ \ s_{2n-2}$" with "$s_{2n-3}\ \ s_{2n-4}$"

Page 71, line 11: "a optional" should be "an optional"

Page 73, line -3: "this not" should be "this is not"

Page 79, line -7: "chose" should be "choose"

Page 80, lines 2 and 9: "1877" should be "1871" in two places

Page 81, line 1 of Section 4.2: "are polynomial,irreducible" should be "are irreducible"

Page 92, line 7: "part (a) of Exercise 7" should be "part (a) of Exercise 8"

Page 93, line -12: "1894" should be "1871"

Page 97, line 1 of the proof of **Theorem 4.4.10**: "Exercise 3" should be "Exercise 7"

Page 101, line 5: Add a period at the end of the sentence.

Page 117, line 21: "every root of h has multiplicity at least 2" should be "every root of h has multiplicity at least 2 as a root of f"

Page 118, lines 2 and 3 of Exercise 13: "part (b) of Theorem 5.3.15" should be "part (c) of Theorem 5.3.15"

Page 118, line -1: "is a separable" should be "is separable"

Page 123, line 3 of Exercise 8: "Exercise 12 of Section 5.3" should be "Exercise 8 of Section 5.3"

Page 129, line 11: "work of his student, Heinrich Weber" should be "work of Heinrich Weber"

Page 135, line 17: "he terminology" should be "his terminology"

Page 148, line -18: "$\sigma(\tau(\alpha)) = (\sigma\tau)(\alpha_i)$" should be "$\sigma(\tau(\alpha)) = (\sigma\tau)(\alpha)$"

Page 150, line 12: "group divides" should be "divides"

Page 159, line 3 of **The Galois Correspondence**: "Corollary 7.3.2" should be "Theorem 7.3.2"

Page 170, line -13: "Exercise 11" should be "Exercise 8"

Page 194, line 11: "be prime" should be "be a prime"

Page 194, line 5 of **Example 8.1.6**: "$\mathrm{AGL}(1,\mathbb{F}_p)$ non-" should be "$\mathrm{AGL}(1,\mathbb{F}_p)$ is non-"

Page 195, line 3 of **Example 8.1.11**: "S_6" should be "S_3"

Page 195, part (a) of Exercise 1: "$\{(12)(34),(13)(24),(14)(23)\}$" should be "$\{e,(12)(34),(13)(24),(14)(23)\}$"

Page 197, line -18: "is some" should be "is that some"

Page 200, line 17: “in terms a radicals” should be “in terms of radicals”

Page 200, line -3: Add a period at the end of the sentence.

Page 205, line 8: Add a period at the end of the sentence.

Page 211, line -15: “$\sigma^{-1}(j_1\ j_2\ j_3)\sigma(j_1\ j_2\ j_3)$” should be “$\sigma^{-1}(j_1\ j_2\ j_3)^{-1}\sigma(j_1\ j_2\ j_3)$”

Page 214, line 2 of Example 8.4.7: The display should end with a period.

Page 217, line 6: Remove the period at the end of the display.

Page 217, line 9: “we these” should be “we know these”

Page 218, lines -6 and -5: In three places “f” should be “g”

Page 219, line 11: “$\mathbb{C}$ splits” should be “$\mathbb{C}[x]$ splits”

Page 223, line 5: “is a not” should be “is not a”

Page 223, line 21: “p divides $[L:K] = |\mathrm{Gal}(L/K)|$” should be “$p$ divides $[L:F] = |\mathrm{Gal}(L/F)|$”

Page 223, line 22: “$\mathrm{Gal}(L/K)$ has an element” should be “$\mathrm{Gal}(L/F)$ has an element”

Page 224, line 5: “example Theorem 8.6.5” should be “example of Theorem 8.6.5”

Page 225, line before Example 8.6.11: “satisfies of Proposition 8.6.10” should be “satisfies Proposition 8.6.10”

Page 230, line -9: At the end of the display, “$(p_s^{r_s} - p_s^{r_s-1})$” should be “$(p_s^{a_s} - p_s^{a_s-1})$”

Page 235, line 1 of the proof of **Theorem 9.1.11**: “$\mathbb{Q} \subset \mathbb{Q}(\zeta n)$” should be “$\mathbb{Q} \subset \mathbb{Q}(\zeta_n)$”

Page 237, line 2: “is root of” should be “is a root of”

Page 237, part (b) of Exercise 12: “Let n be an odd” should be “Let $n > 1$ be an odd”

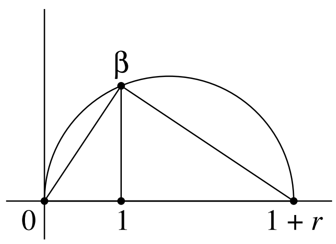
Page 253, part(c) of Exercise 9: “$x^2 - (4,1)x - (4,3)$” should be “$x^2 - (4,1)x + (4,3)$”

Page 255, line -4: “circles give” should be “circles (assuming they are nonempty) give”

Page 258, display (10.1) and the line immediately before the display: Replace this line and display with the following:

To study $\sqrt{r}$, let $r > 0$ be constructible and define the point β by the diagram

(10.1)



β = the intersection of the line $x = 1$ with the indicated semicircle

Page 258, lines -4, -3 and -2: In three places, “α” should be “β”

Page 259, line 1: “1 to α” should be “1 to β”

Page 259, line 2 of the proof of **Theorem 10.1.6**: “$\alpha_i \in F_i$” should be “$\alpha_i \in F_{i-1}$”

Page 260, display following (10.3): “$a_2(-b_1y+c_1)+c_2$” should be “$a_2(-b_1y+c_1)+b_2y+c_2$”

Page 262, line -6: “construcible” should be “constructible”

Page 263, line 9: “of f over” should be “of α over”

Page 263, line 1 of **Starting Configurations**: "construcible" should be "constructible"

Page 267, line 2 of part (b) of Exercise 3: "construcible" should be "constructible"

Page 272, line -2: "is prove" should be "is to prove"

Page 273, Exercise 3: The exercise should end with a period, not a comma.

Page 275, display (10.10): "$(y-\frac{1}{2}a)^2$" should be "$(y_1-\frac{1}{2}a)^2$"

Page 283, line 10: "proved the Greeks" should be "proved by the Greeks"

Page 285, line 3: "$(\frac{1}{2},0)$" should be "$(0,\frac{1}{2})$".

Page 286, two lines below first display: "$Q \neq A$" should be "$Q \neq D$"

Page 291, first display: Delete the period at the end of the display.

Page 293, line -3: "Lidland" should be "Lidl and"

Page 295, line 13: "of the these" should be "of these"

Page 297, line -5 to -3: Delete these lines and replace with the following:

from 1901). In 1893 E. H. Moore showed that *any* finite field is isomorphic to one of the form (11.6). He also introduced the notation $\mathrm{GF}(p^n)$ for the finite field with p^n elements constructed in (11.6), although these days the notations $\mathrm{GF}(p^n)$ and $\mathbb{F}_{p^n}$ are often used interchangeably.

Page 298, line 3 of Exercise 2: "is greatest" should be "is the greatest"

Page 298, part (b) of Exercise 5: "that if every" should be "that every"

Page 306, Exercise 1: "f separable" should be "f is separable"

Page 307, line 6: Remove the period at the end of the display.

Page 307, part (b) of Exercise 12: "$f|h^p-p$" should be "$f|h^p-h$"

Page 308, line 2: "$1=1,2$" should be "$i=1,2$"

Page 308, line 3 of Exercise 16: "make a   that takes" should be "make a pseudo-random number generator that takes"

Page 308, line 4 of Exercise 16: "is primitive" should be "is a primitive"

Page 311, line 3: "proved studied" should be "studied"

Page 315, line 5: "that that" should be "that"

Page 316, line -3: "One easily see" should be "One easily sees"

Page 327, line 10: "$+\zeta_n^{(p-1)i})^p$" should be "$+\zeta_p^{(p-1)i})^p$"

Page 330, part (b) of Exercise 8: "Chapter 2 express" should be "Chapter 2 to express"

Page 331, line -2 of Exercise 8: "G in H" should be "H in G"

Page 333, line 17: "the the proposition" should be "the proposition"

Page 336, Example 12.2.2: "x^4-4x+2" should be "x^4-4x^2+2"

Page 339, line 4: "that image" should be "that the image"

Page 343, part (b) of Exercise 2: Delete "and (b)"

Page 344, part (a) of Exercise 10: Delete "be the field"

Page 348, line 13: “let $G(x)$ is” should be “let $G(x)$ be”

Page 350, line -14: “existence” should be “existence of”

Page 352, line 9: “the use congruences” should be “the use of congruences”

Page 361, line 3 of **Example 13.1.2**: “$y^3+4x^2-4x-17$” should be “$y^3+4y^2-4y-17$”

Page 361, line 1 of second bullet of **Example 13.1.2**: “of polynomial” should be “of a polynomial”

Page 365, line 8: “Exercise 14” should be “Exercise 13”

Page 366, line 2 of part (a) of Exercise 11: “is a .” should be “is a Pythagorean triple .”

Page 372, display (13.17): Replace “$F[x]$” with “$F[y]$”

Page 374, line -3: “$y^3+b_2y^2+b_4+b_6$” should be “$y^3+b_2y^2+b_4y+b_6$”

Page 376, line 11: “2^5” should be “5^5”

Page 376, line 16: “Exercise 13” should be “Exercise 14”

Page 379, line 13: “symmetries of the give” should be “symmetries of the icosahedron give”

Page 380, line 2: “that arbitrary” should be “that an arbitrary”

Page 381, line 4: “goes to say” should be “goes on to say”

Page 383, line 3 of Exercise 10: Replace the comma at the end with a period.

Page 385, line 3: “of the these groups” should be “of these groups”

Page 385, line 11: “used Theorem” should be “used in Theorem”

Page 389, line 10: “$F[x]$” should be “$F[y]$”

Page 389, line -3: “$\mathbb{Q}[x]$” should be “$\mathbb{Q}[y]$”

Page 393, Exercise 6: “irreducible separable quartic” should be “irreducible quartic”

Page 394, part (b) of Exercise 8: “$\subset F$” should be “$\subset F^3$”

Page 394, part (c) of Exercise 8: “be F” should be “F be”

Page 398, display in Example 13.4.4: In three places, “u_2^3” should be “u_2^2”

Page 399, line -5: “Fundamental” should be “the Fundamental”

Page 400, line -4: “Here are an example” should be “Here is an example”

Page 402, line 7: “$\bmod 31$” should be “$\bmod p$”

Page 402, line -2: “to number” should be “to the number”

Page 403, line 5: “to the each” should be “to each”

Page 404, part (a) of Exercise 11: “S_4 make” should be “S_4, make”

Page 404, line 2 of part (b) of Exercise 11: “in table” should be “in a table”

Page 406, line 3: “адгебраических” should be “алгебраических” (change in second letter)

Page 409, line -4: “since F is” should be “since f is”

Page 412, part (a) of Exercise 2: “$= gH$” should be “$= H$”

Page 412, line 3 of Exercise 6: The exercise should end with period, not a comma.

Page 420, line 20: "are primitive" should be "are imprimitive"

Page 421, display of part (b) of Exercise 7: "$\big(\tau\tau', ((\tau')^{-1})\cdot\phi)\phi'\big)$" should be "$\big(\tau\tau', ((\tau')^{-1}\cdot\phi)\phi'\big)$"

Page 428, part (b) of Lemma 14.3.15: "is normal is" should be "is normal in"

Page 433, line 2 of first quote: "They give" should be "This gives"

Page 433, line -14: "a permutations" should be "as permutations"

Page 437, part (b) of Exercise 14: Add a period at the end of the sentence.

Page 447, fourth display: Remove the period at the end of the display.

Page 450, line 8: "one if its" should be "one of its"

Page 452, line -14: "On other other hand" should be "On the other hand"

Page 460, line 3: "construcible" should be "constructible"

Page 461, line 1: "$r = 1$" should be "$r_0 = 1$"

Page 461, line -11: "construcible" should be "constructible"

Page 471, line 4: "$P_2(u) = 1$" should be "$P_2(u) = 2$"

age 472, line 21: "$\mu n + \nu m = 1$" should be "$\mu m + \nu n = 1$"

Page 476, line -12: "$\varphi'(iy) = \varphi(y)$" should be "$\varphi'(iy) = \varphi'(y)$"

Page 482, line -9: "Section 15.3" should be "Section 15.2"

Page 490, first display: The first equal sign should be followed by "i^{ε}"

Page 496, denominator of formula in line 2 of the quote: "$B_{(p-1)/4}x^p$" should be "$B_{(p-1)/4}x^{p-1}$"

Page 496, line -7: "an *two-term*" should be "a *two-term*"

Page 497, part (b) of Exercise 2: "of part a" should be "of part (a)"

Page 497, part (c) of Exercise 2: "Use part b" should be "Use part (b)"

Page 498, line 2 of Exercise 9: "no common" should be "have no common"

Page 498, Exercise 13: "$Z[i]$" should be "$\mathbb{Z}[i]$"

Page 502, line 16: "not be a power" should be "not be a power"

Page 502, third display: Remove the final "$= 0$"

Page 506, line 18: "Vol. I, p. 11" should be "Vol. IV, p. 11"

Page 510, line 14: Add a period at the end of the sentence.

Page 521, part (a) of Exercise 8: Add a period at the end of the sentence.

Page 523, line -7: "generalize   in" should be "generalize Gauss's Lemma in"