Calculus Volume 3 Release Notes 2018

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Page Count Difference:

In the latest edition of *Calculus Volume 3,* there are 1023 pages compared to the 1021 pages in the last edition. This page count variation is due to errata revisions and code releases to conserve space.

Errata:

Location	Detail	Resolution Notes	Error Type
Ch 1: Parametric Equations and Polar Coordinates, Sec 4: Area and Arc Length in Polar Coordinates, Example 1.16 and Example 1.18	Calculus Volume 3 Page 65 there is a missing bracket in the working of example 1.16. Also, Page 68 there is another missing bracket in the working of example 1.18.	Our reviewers accepted this change.	Typo
Ch 2: Vectors in Space, Sec 1: Vectors in the Plane, Exercise 38	The exercise should state that the vector c=0.	Our reviewers accepted this change.	Typo
Ch 2: Vectors in Space, Sec 3: The Dot Product	On page 148, right before example 2.22, there is a sentence that reads: "Also by property iv, if \vect{v} \cdot \vect{v} = 0, then \vect{v} = 0". The second zero is not boldface, indicating that it was a scalar and not a vector. That second vector should be boldfaced.	Our reviewers accepted this change.	Typo
Ch 2: Vectors in Space, Section: Vectors in Three Dimensions, Figure 2.27	Figure 2.27 on page 126 has the caption "points that lie in octants have three positive coordinates". This should read "points that lie in octants have three nonzero coordinates".	Our reviewers accepted this change.	
Ch 2: Vectors in Space, Sec 3: The Dot Product, Figure 2.48	The angle alpha should be between the x-axis and the vector v, but the	Our reviewers accepted this change.	Other factual inaccuracy

	figure indicates it is the angle between the x-axis and the y-axis.		in content
Ch 2: Vectors in Space, Sec 5: Equations of Lines and Planes in Space, LO 2.5.1	The learning outcome references the "general form" for the equation of a line, but such a thing is never referenced in the text. Probably what is meant are the "symmetric equations" for a line.	Our reviewers accepted this change.	Typo
Ch 2: Vectors in Space, Sec 7: Cylindrical and Spherical Coordinates, Theorem 2.16	The equations for converting from Spherical to Cylindrical coordinates are incorrectly described as equations for converting from Spherical to Rectangular coordinates.	Our reviewers accepted this change.	Typo
Ch 3: Vector-Valued Functions, Sec 1: Vector-Valued Functions and Space Curves	The magnitude of the vector should be represented with double vertical bars to be consistent with the established notation.	Our reviewers accepted this change.	Typo
Ch 3: Vector-Valued Functions, Sec 1: Vector-Valued Functions and Space Curves, Exercise 36	The equation should read $r^2 = x^2 + y^2$, not $r = x^2 + y^2$.	Our reviewers accepted this change.	Typo
Ch 3: Vector-Valued Functions, Sec 1: Vector-Valued Functions and Space Curves, Exercises 22-26	The hint in the instructions only applies to exercise 22, though the wording and general structure of the exercises imply that the hint should be used for each of exercises 22 - 26.	Our reviewers accepted this change.	General/pedagogical suggestion or question
Ch 3: Vector-Valued Functions, Sec 3: Arc Length and Curvature	On page 291, the last line in the proof of Theorem 3.6. On the right-hand side of the equation after 'therefore', the denominator should be (1+[f'(x)]^2)^(3/2), missing the square on	Our reviewers accepted this change.	Typo

<table>
<tr><td></td><td>f'(x).</td><td></td><td></td></tr>
<tr><td>Chapter 3: Vector-Valued Functions, Section: Arc Length and Curvature, Subsection: Curvature</td><td>The word "not" should be included in the comment following the definition of curvature as ||dT/ds||:

i.e., The formula in the definition of curvature is *not* very useful in terms of calculation.</td><td>Our reviewers accepted this change.</td><td></td></tr>
<tr><td>Ch 3: Vector-Valued Functions, Sec 3: Arc Length and Curvature, Example 3.13</td><td>On page 300, in the description of Example 3.13. 'at t = 1' should be 'at x = 1'.</td><td>In the 1st sentence of Example 3.13 Finding the Equation of an Osculating Circle, revise "t = 1" to "x = 1".</td><td>Typo</td></tr>
<tr><td>Chapter 3: Vector-Valued Functions, Section: Arc Length and Curvature, Exercise 115</td><td>Section 3.3 Homework in Calculus Vol 3.

#115 asks to find the unit tangent vector. In the answers, the tangent vector is given, not the unit tangent vector. The correct solution for #115 should be:

< 2/sqrt(6), (-sint + cost)/sqrt(6), (sint + cost)/sqrt(6) ></td><td>Our reviewers accepted this change.</td><td></td></tr>
<tr><td>Ch 3: Vector-Valued Functions, Sec 4: Motion in Space, Example 3.15</td><td>The $a^{\mathbf{T}}$ under the radical should be $a_{\mathbf{T}}^2$ instead, i.e. the square of the tangential component of acceleration.</td><td>Our reviewers accepted this change.</td><td>Typo</td></tr>
<tr><td>Ch 4: Differentiation of Functions of Several Variables, Sec 1: Functions of Several Variables</td><td>The definition should read z=f(x,y), not z=(x,y).</td><td>Our reviewers accepted this change.</td><td>Typo</td></tr>
<tr><td>Ch 4: Differentiation of Functions of Several Variables, Sec 3: Partial Derivatives</td><td>The notation for higher order partial derivatives is wrong. The mixed partials are described incorrectly.

For example, it should read $\frac{\partial^2</td><td>Our reviewers accepted this change.</td><td>Typo</td></tr>
</table>

	f}{\partial x \partial y} = \frac{\partial}{\partial x}\left[\frac{\partial f}{\partial y} \right]$. This error in notation propagates throughout the section. In particular, it also appears in Example 4.19.		
Chapter 4: Differentiation of Functions of Several Variables	There is a typo on page 403 in the Definition of the differentials: The book says: dx = dx It should say: dx = delta(x)	Our reviewers accepted this change.	Typo
Ch 4: Differentiation of Functions of Several Variables, Sec 4: Tangent Planes and Linear Approximations, Subsec: Tangent Planes	"Therefore, in a small-enough neighborhood around the point, a tangent plane touches the surface at that point only." This statement is simply not true.	Our reviewers accepted this change.	Other factual inaccuracy in content
Chapter 4: Differentiation of Functions of Several Variables, Section: Tangent Planes and Linear Approximations	p403 of the PDF, definition of the total differential in section 4.4 dx = dx should read dx = Delta-x	Our reviewers accepted this change.	Typo
Ch 4: Differentiation of Functions of Several Variables, Sec 5: The Chain Rule, Theorem 4.11	These should be partial derivatives of z.	Our reviewers accepted this change.	Typo
Ch 4: Differentiation of Functions of Several Variables, Sec 6: Directional Derivatives and the Gradient	All of the directional derivatives have vectors as subscripts, but these subscripts are not consistently in boldface font, as is the established convention for the book. Make the vector subscripts consistently boldface font.	Our reviewers accepted this change.	Typo
Ch 4: Differentiation of Functions of Several	In checkpoint 4.34, it should read x^3 not	Our reviewers accepted this change.	Typo

Variables, Sec 7: Maxima/Minima Problems, Checkpoint 4.34	$x3$ in the first term of the function f. This is confirmed with checking the stated answer for that exercise in the back of the book.		
Ch 4: Differentiation of Functions of Several Variables, Sec 7: Maxima/Minima Problems, Definition of Critical Point	If, as stated, f is differentiable on an open set containing (x_0, y_0), then f is also differentiable at (x_0, y_0). If f is differentiable at a point, then all directional derivatives exist at that point. In particular, both partial derivatives exist at that point. Thus, part 2 of this definition will never happen for the hypothesized function. What is meant, probably, is that f should be differentiable on a deleted neighborhood (or some similar such named set) of (x_0, y_0).	Our reviewers accepted this change.	Other factual inaccuracy in content
Ch 4: Differentiation of Functions of Several Variables, Sec 7: Maxima/Minima Problems, Example 4.40	The equation $h'(t) = 0$ is solved twice, the first time incorrectly, and the second time correctly.	Our reviewers accepted this change.	Typo
Ch 4: Differentiation of Functions of Several Variables, Sec 7: Maxima/Minima Problems, Exercise 350	The exercise states that $x + y + z = 1$ describes a line. This is incorrect.	Our reviewers accepted this change.	Typo
Chapter 4: Differentiation of Functions of Several Variables, Section: Tangent Planes and Linear Approximations, Exercise 214	p 408 of the pdf version: Exercise #214 in Section 4.4 The point (pi/4, 0, 0) does not lie on the surface given. Suggest revising to make the coordinates of the given point (pi/4, 0, sqrt(2)/2).	Our reviewers accepted this change.	Typo
Chapter 4: Differentiation		Our reviewers accepted	Typo

of Functions of Several Variables	Exercise #257, Section 4.5 "...where x and t are measured in cm..." should read "...where x and y are measured in cm..."	this change.	
Chapter 4: Differentiation of Functions of Several Variables, Section: Lagrange Multipliers, Example 4.42	Page 464 in PDF version of Calculus Vol. 3: In Step 2 of the solution to the exercise, the right hand side of the equation is: lambda(i + 2j) then the text says 'which can be rewritten as' followed by: lambda(i) + lambda(j). It should be rewritten as: lambda(i) + lambda (2j)	Our reviewers accepted this change.	Typo
Chapter 4: Differentiation of Functions of Several Variables, Section: Lagrange Multipliers, Example 4.43	Page 466 of the pdf version of text: Step 4: 'We then substitute (10,4) into f(x,y)....' The next line begins: 'f(5,1) = ...' It should be f(10,4).	Our reviewers accepted this change.	Typo
Ch 4: Differentiation of Functions of Several Variables, Sec 8: Lagrange Multipliers, Example 4.44	On page 467, in the description of Example 4.44. In the sentence 'maximize the function f (x, y, z) [...]', the word maximize should be 'minimize'.	Our reviewers accepted this change.	Typo
Ch 5: Multiple Integration,	To be consistent with	Our reviewers accepted	Typo

Sec 1: Double Integrals over Rectangular Regions, Equation 5.4	previous notation, the integral should be expressed with dA instead of dxdy.	this change.	
Ch 5: Multiple Integration, Sec 1: Double Integrals over Rectangular Regions, Theorem 5.1	Theorem 5.1, part iv. The equality in the conclusion of the statement should be a $\geq$ instead.	Our reviewers accepted this change.	Typo
Ch 5: Multiple Integration, Sec 2: Double Integrals over General Regions, Theorem 5.4	The integral for a type two region has an iterated integral written with two integrations with respect to y, instead of one with respect to x and one with respect to y.	Our reviewers accepted this change.	Typo
Ch 5: Multiple Integration, Sec 2: Double Integrals over General Regions, Theorem 5.4, Equation 5.6	Equation 5.6 should end with dx dy, not dy dy.	In Equation 5.6, revise the second to last "dy" to "dx".	Typo
Ch 5: Multiple Integration, Sec 3: Double Integrals in Polar Coordinates, Exercise 180	I noticed that there are parentheses missing around x^2+y^2 in #180 on page 551 of Section 5.3 of Calculus 3.	In exercise 180, add parentheses around the " x^2+y^2" subscript throughout.	Typo
Ch 5: Multiple Integration, Sec 3: Double Integrals in Polar Coordinates, Figure 5.34	The figure does not display the graph of the surface z=1-x^2-y^2 above the unit circle in the the xy-plane. The figure shows the graph of some surface with domain [-1,1]x[-1,1].	Revise the caption of Figure 5.34 to "The paraboloid z = 1 - x^2 - y^2."	Other factual inaccuracy in content
Ch 5: Multiple Integration, Sec 4: Triple Integrals, Exercise 228	This surface is not a sphere.	Delete "sphere of" from the exercise so it reads "bounded by the equation...".	Other factual inaccuracy in content
Ch 5: Multiple Integration, Sec: Triple Integrals in Cylindrical and Spherical Coordinates, Exercise 270	For exercise #270 on page 595 the given surface does not match the described solid B. The maximum radius of the sphere should be 3.	Revise the figure for exercise 270 to show a maximum radius of 3 for the sphere.	Other factual inaccuracy in content
Ch 6: Vector Calculus, Sec 1: Vector Fields, Example 6.13	"[However,] R_x = x^3" should be "R_x = 3x^2".	In the solution to Example 6.13 Showing a Vector Field Is Not Conservative, revise the 2nd to last sentence as follows:	None

		"However, R_x = 3x^2 and P_z = 0 so..."	
Ch 6: Vector Calculus, Sec 2: Line Integrals, Checkpoint 6.13	The integral makes no sense because of the = in the integrand.	Revise the integral to "the integral C (x + y)ds".	Typo
Ch 6: Vector Calculus, Sec 2: Line Integrals, Equation 6.10	An integral symbol is missing from the last part of the equation.	Add the missing integral symbol to the last part of the equation.	Typo
Ch 6: Vector Calculus, Sec 2: Line Integrals, Theorem 6.4	The expressions on the right hand side of the equal signs in both equations are incomplete. The integral signs and the functions f(x(t), y(t), z(t)) or f(x(t), y(t)) are missing.	Remove the equals signs from both equations in Theorem 6.4: Scalar Line Integral Calculation.	Typo
Ch 6: Vector Calculus, Sec 2: Line Integrals, Theorem 6.5	There is a minus sign missing in the equation related to reversing the path direction.	In Theorem 6.5: Properties of Vector Line Integrals, revise the equation in part iii. After the Theorem, revise the first equation in the text as well.	Typo
Ch 6: Vector Calculus, Sec 3: Conservative Vector Fields, Exercises 126-129	The relationship, if any, between the vector field F and the function f is not clearly specified. Presumably, the intention is that f is a potential function for F, and if so that needs to be stated. If that is the intention, then replacing F with \nabla f would be sufficient.	In Exercises 126-129, correct the given integrals.	Typo
Ch 6: Vector Calculus, Sec 3: Conservative Vector Fields, Subsec: Fundamental Theorem for Line Integrals	The function F is real-valued, and so should not be bold.	Our reviewers accepted this change.	Typo
Ch 6: Vector Calculus, Sec 4: Green’s Theorem on General Regions	In regards to the derivation of the General Green's Theorem, of which I've included a screenshot. In going from the first line to the second line of the	In the 2nd line of the equation under Figure 6.45, replace the 4th and 6th "+" signs with minus signs, and ensure no subscripts have a negative value.	Typo

	derivation, the line integrals over -P4 and -P2 should have a negative leading coefficient and now have positive paths P4 and P2. This will give you the cancellation that you want to see when you get to line 3 of the derivation.		
Ch 6: Vector Calculus, Sec 5: Divergence and Curl, Example 6.57	The title of the example is "Finding a potential function," but no function is found. Rather, it is given, and in fact it is NOT a potential function for the scenario described. A better title for the example is needed.	Revise the title of Example 6.57 to "Analyzing a Function".	General/pedagogical suggestion or question
Ch 6: Vector Calculus, Sec 6: Surface Integrals	The final parameterization discussed should be r(x,z) not r(z,y).	Our reviewers accepted this change.	Typo
Ch 6: Vector Calculus, Sec 6: Surface Integrals, Example 6.58	The cylinder described with $-\infty < v < 6$ does not have height 6. It has infinite height, though it is bounded above by 6.	In the analysis of Example 6.58, revise "$-\infty < v < 6$" to "$0 < v < 6$".	Other factual inaccuracy in content
Ch 6: Vector Calculus, Sec 6: Surface Integrals, Example 6.59	The parameterization given is for the surface $x^2 + y^2 = z$, not $x^2 + y^2 = 2z$ as is stated.	In the solution to Example 6.59, delete the three extraneous 2s in the last equations.	Other factual inaccuracy in content
Ch 6: Vector Calculus, Sec 6: Surface Integrals, Example 6.60	"On or above z=-2" suggests that for the given parameterization we should have $-2 \leq u < \infty$, not $-2 < u < \infty$.	Revise the parameterization, and ensure it is in vector notation.	Typo
Chapter 6: Vector Calculus, Section: Surface Integrals	Formula has duplicate text ? S f(x, y, z)dSf(x, y, z)dS = ?D f(r(u, v)) ? t u t v ? dA. Should be: ?S f(x, y, z)dS = ?D f(r(u, v)) ? t u t v ? dA.	Our reviewers accepted this change.	Typo

	The next formula directly after has the same error: ?C f(x, y, z)dsf(x, y, z)ds = ?ab f(r(t)) ? r?(t) ? dt. Should be: ?C f(x, y, z)ds = ?ab f(r(t)) ? r?(t) ? dt.		
Ch 6: Vector Calculus, Sec 6: Surface Integrals, Exercise 284	Presumably the second = should be either a + or - instead.	Revise the second equals sign to a minus sign.	Typo
Ch 6: Vector Calculus, Sec 6: Surface Integrals, Exercise 285	For the problem to make sense, the vector field F needs to be a vector field in R^3, not a vector field in R^2. That is, the expression should be F(x,y,z) = ... and not F(x,y) = ...	Our reviewers accepted this change.	Typo
Ch 6: Vector Calculus, Sec 6: Surface Integrals, Figure 6.60	The parameterization r should be bolded, as it is vector valued. Also, the third component of the parameterization is missing. Also, the domain for the parameter u is incorrect. Also, the domain for the parameter v is inconsistent with the one stated in Example 6.60. (The example uses 0 \leq v < 2\pi while the Figure uses 0 \leq v \leq 2\pi.)	In the caption of Figure 6.60, ensure r is bold, add the 3rd component of the parameterization, and revise the domain.	Typo
Ch 6: Vector Calculus, Sec 7: Stokes' Theorem, Checkpoint 6.62	No orientation for the surface is specified.	Add the following sentence to the end of the checkpoint: The boundary curve, C, is oriented clockwise.	Other factual inaccuracy in content
Ch 6: Vector Calculus, Sec 7: Stokes' Theorem, Checkpoint 6.63	No orientation for the curve C is specified.	Revise "and C is the boundary" to "and C is is oriented clockwise and is the boundary".	Other factual inaccuracy in content
Ch 6: Vector Calculus, Sec 7: Stokes' Theorem, Example 6.73	The surface in the figure does not match the parameterization given. The figure displays the	Our reviewers accepted this change.	Other factual inaccuracy in content

	hemisphere with pi/2 \leq theta \leq 3pi/2. In addition, the vector field in the figure does not match the description in the example. The one shown in the figure appears to have a zero i component, not a zero k component.		
Ch 6: Vector Calculus, Sec 7: Stokes' Theorem, Example 6.74	The figure appears to have a boundary consisting of a circle of radius 1 in the xz-plane, centered at (0,0,1). However, the curve C parameterized in the example is a circle of radius 1 in the plane z=1 with center (0,0,1).	Our reviewers accepted this change.	Incorrect answer, calculation, or solution
Ch 6: Vector Calculus, Sec 7: Stokes' Theorem, Example 6.75	The calculation should have the cross product of t_x and t_y, not their dot product.	Revise the solution of Example 6.75 as appropriate.	Typo
Ch 6: Vector Calculus, Sec 7:Stokes' Theorem, Figure 6.79, Exercises	The instructions are ambiguous. It is not clear what is meant by "assuming all are oriented clockwise." Is the boundary curve oriented clockwise? From what perspective? What would it mean for the surface to be oriented clockwise?	Revise the instructions to "For the following exercises, without using Stokes' theorem, ... assuming all boundaries are oriented clockwise as viewed from above.	Other factual inaccuracy in content
Ch 7: Second-Order Differential Equations, Sec 3: Applications	The following link need a new target: (http://www.openstaxcollege.org/l/20_glass2)	Revise URL for http://www.openstaxcollege.org/l/20_glass2 to: https://www.discovery.com/tv-shows/mythbusters/videos/adam-savage-on-breaking-glass	Broken link