Calculus Volume 1 Release Notes 2020

Publish Date: March 16, 2020

Revision Number: 6 5 4 3 2 1

Page Count: 873 (no change since last version)

Errata:

Location	Detail	Resolution Notes	Error Type
Chapter 1: Functions and Graphs, Review	The instructions require simplification of a trigonometric expression, but question 321 gives "cos(2x)=sin^2(x) as the problem. The solution in the appendix does not suggest what might have been meant instead...	Revise the question stem to cos^2 x – sin^2 x. Update answer to "cos^2 x – sin^2 x = cos2x or = (1 – 2sin^2 x)/2 or = (2cos^2 x – 1)/2".	Typo
Chapter 1: Functions and Graphs, Section 2 Basic Classes of Functions	In Figure 5(b) the label for the orange function should be +x^3-3x^2... and not -x^3-3x^2...	This figure will be updated.	Typo
Chapter 1: Functions and Graphs, Section 2 Basic Classes of Functions	When trying to find the the interval in which 2+x is negative you flipped the direction of inequality twice , once in "2 + x ≥ 0" and once in "x ≥ −2." Although the mistake is found , the solution presented is correct	The solution to part b will be revised.	Typo
Chapter 1: Functions and Graphs, Section 2 Basic Classes of Functions	Part B of Figure 5 (or 1.19) shows the graph of two cubic functions, f(x) in blue and another f(x) in orange. The equation of the orange function, according to the image, is $f(x) = -x^3 - 3x^2 + 3x + 1$ I believe it should read $f(x) = +x^3 - 3x^2 + 3x + 1$	This figure will be updated.	Typo

	That is, the coefficient of x^3 is negative, when it should be positive, according to the graph and according to the text explanation Also, the graph of the blue f(x) looks like it has slope 0 when x=0, which is not the case.		
Chapter 1: Functions and Graphs, Section 4: Inverse Functions, Homework	The values given in a, b, and c are Mach numbers, so should be labeled as M values, not mu.	Revise μ to M.	Typo
Chapter 1: Functions and Graphs, Section 5: Exponential and Logarithmic Functions	you mentioned that 'tanh(0)=1' .In fact it equals 0 I wish you correct to avoid confusion	Revise to "tanh(0) = 0".	Typo
Chapter 2: Limits, Section 1: A Preview of Calculus	The equation s(0.49) - s(0.5) / (0.49-0.5) in the solution shall be s(0.5) - s(0.49) / (0.5-0.49); the order shall be reversed.	Revise to (s(0.5) – s(0.49))/(0.5 – 0.49).	Typo
Chapter 2: Limits, Section 1: A Preview of Calculus	In the solution to example 2, part b, the average velocity should be -16.16 (not -16.016).	Revise "–16.016" to "–16.16".	Typo
Chapter 2: Limits, Section 1: A Preview of Calculus, Chapter Review Exercises	The plot of f(x) = x^2 + 1 passes through point (3,9) but should pass through (3,10). As a result, the rightmost rectangle, and the total area in the solution, are off by 1 unit relative to what one expects from the function definition.	This figure will be updated.	Incorrect answer, calculation, or solution
Chapter 2: Limits, Section 2: The Limit of a Function	In the definition of infinite limits from the right parts i and ii both contain the phrase "...we say that the limit as x approaches a from the left...." The phrase should be "...from the right...."	Revise “...approaches a from the left...” to “...approaches a from the right...”.	Typo

Chapter 2: Limits, Section 2: The Limit of a Function	The solution to the 1st example (limit of sinx/x) contains a link identified as "Table 1" but actually linking to Table 2. The text identifying the link should read "Table 2."	This is correct in webview.	Typo
Chapter 2: Limits, Section 2: The Limit of a Function	First sentence at top of page starts out as "Limit from the left: Let f(x) be a function defined at all values in an open interval of the form z, ..." Based on how a few lines below the limit from the right is defined, at the end of the above line fragment z should be replaced with (c,a)	Revise "z" to "(c, a)".	Typo
Chapter 2: Limits, Section 3: The Limit Laws	The original problem is a square root, but the solution is treating it as if it were a cube root.	The question stem will be revised to "lim_x→1 cubed root (f(x) – g(x))".	Incorrect answer, calculation, or solution
Chapter 2: Limits, Section 3: The Limit Laws	In the example "Evaluating a Two-Sided Limit Using the Limit Laws," part b in the solution begins by asserting that the limit of f(x) as x approaches 2 from the right is equal to the limit of (x-3)^2 as x approaches 2 from the left. The right side of the equation should probably be the limit as x approaches 2 from the right.	Revise to "x→2^+".	Typo
Chapter 2: Limits, Section 4: Continuity	Should be 'theta' not 'x'	Our reviewers accepted this change.	Typo
Chapter 2: Limits, Section 4: Continuity, Chapter Review Exercises	In the "classifying a discontinuity" example dealing with piecewise function f(x) = -x^2 + 4 if x \le 3; f(x) = 4x - 8 if x > 3, the solution says that the limit of f(x) as x approaches 3 from the left is -5 and the limit of f(x) as x approaches 3 from the left is 4. The second limit	Revise to "x → 3^+".	Typo

	should be the limit as x approaches 3 from the right.		
Chapter 2: Limits, Section 4: Continuity, Homework	The function needs a name.	Add f(x) = before the function.	Typo
Chapter 2: Limits, Section 5: The Precise Definition of a Limit	The precise definition of a limit from the left lets f(x) be defined over open interval (b,c) with b < c. For consistency with the following lines, the interval should be (b,a) with b < a (or in the following lines a should be replaced with c).	Revise "defined over an open interval of the form (b, c) where b < c" to "defined over an open interval of the form (a, b) where a < b" and revise "x → a^–" to "x → b^–".	Typo
Chapter 2: Limits, Section 5: The Precise Definition of a Limit	Step 4 of the proof that the limit of x^2 as x approaches 2 is 4 infers from delta = min{ 2 - sqrt(4-epsilon), sqrt(4+epsilon) - 2 } that delta \ge 2 - sqrt(4-epsilon). The "greater than or equal" should be "less than or equal."	In step 4 of the solution, revise "≥" to "≤".	Typo
Chapter 2: Limits, Section 5: The Precise Definition of a Limit	ε^2 should be ε^4	This figure will be updated.	Typo
Chapter 3: Derivatives and Chapter 4: Applications of Derivatives	Chapters 3 and 4 use the term "interior point" (of a set), but neither this book nor any lower-level OpenStax math textbooks appear to define the term. I suggest that a definition of "interior point" be added.	This will be added to the index and a definition added to the text.	General/pedagogical suggestion or question
Chapter 3: Derivatives, Section 1: Defining the Derivative	Homework problem 6 seems awkward to me. There is a vertical asymptote at x = -1/2 and we are finding a secant line over the interval [-2, 0].	Revise "x_1 = –2, x_2 = 0" to "x_1 = 0, x_2 = 2". The solution will also be updated.	Other factual inaccuracy in content

	To me, this is not doing what we want secant lines to do as it does not do a very good job of approximating the tangent line. If we changed the interval so -1/2 was not included in the interval, the problem would be fine. Thank You!		
Chapter 3: Derivatives, Section 2: The Derivative as a Function	Under the section "Higher Order Derivatives" A list of derivatives increasing in order is given as: d^2*y/d*x^2 , d^3*y/d*y^3 , d^4*y/d*y^4 , ... , d^n*y/d*y^n It should be corrected to: d^2*y/d*x^2 , d^3*y/d*x^3 , d^4*y/d*x^4 , ... , d^n*y/d*x^n Due to the limitations of the ability of the text to show proper formatting and notation, I have included a screenshot of the error below	In the last line, revise the 2nd, 3rd, and 4th denominators to "dx^3", "dx^4", and "dx^n".	Other factual inaccuracy in content
Chapter 3: Derivatives, Section 3: Differentiation Rules	In the proof of the extended power rule, there are two instances where differentiation is represented as d/d instead of d/dx.	Revise to "d/dx".	Typo
Chapter 3: Derivatives, Section 3: Differentiation Rules	Student is asked to find points where the "slope of the line is horizontal". It should say "slope of the line is zero" or "line is horizontal"	Revise the question stem to "Determine all points on the graph of f(x) = x^3 + x^2 − x − 1 for which a. the tangent line is horizontal b. the tangent line has a slope of –1."	Other factual inaccuracy in content
Chapter 3: Derivatives, Section 4: Derivatives as Rates of Change	I believe that the answer for homework problem 162b is $12.60 rather than $12 as to find the marginal profit for	The solution manual will be updated.	Incorrect answer, calculation, or solution

	the 30th item you should find P'(29) rather than P'(30). Thanks.		
Chapter 3: Derivatives, Section 4: Derivatives as Rates of Change	The answer in instructor manual should be for speeding up "(-1 , 0.5)" this one is wrong , and for slowing down you guys should add (- infinity, -1)	The solution manual will be updated.	Incorrect answer, calculation, or solution
Chapter 3: Derivatives, Section 4: Derivatives as Rates of Change	IN chapter 3, Homework problem 160b) looks to me like it is worded wrong. I would word it something like, "Find the marginal cost function and use it to estimate the cost of the 13th food processor." This will make it more consistent with part c) of the same problem.	Revise the part b question stem to "Use the marginal cost function to estimate the cost of manufacturing the thirteenth food processor."	Other factual inaccuracy in content
Chapter 3: Derivatives, Section 5: Derivatives of Trigonometric Functions	The simplest solution is: y"=2cscx[cot^2{x}+csc^2{x}. I cannot figure out how they came to the solution in the text, I tried substitions for both cot^2(x) and csc^2(x) and neither result in the answer provided.	Revise the answer to "2csc x(csc^2 x + cot^2 x)".	Incorrect answer, calculation, or solution
Chapter 3: Derivatives, Section 5: Derivatives of Trigonometric Functions	In exercise 201, the wording doesn't really make sense: there is exactly one pair of constants (a, b) with the property that s(0) = 0 and s'(0) = 3, but for these constants there are also other moments t when s'(t) = 3. I suggest the following alternative wording: "Find the constants a and b such that at time t = 0, the position s is equal to 0 and the velocity is 3." The use of units in this question is also confusing, since in the definition of s neither s nor t is given units,	Revise question to "Let the position of a swinging pendulum in simple harmonic motion be given by s(t) = α cos t + b sin t where a and b are constants, t measures time in seconds, and s measures position in centimeters. If the position is 0 cm and velocity is 3 cm/s when t = 0, find the values of a y and b."	Other

	while the velocity is given in cm/s.		
Chapter 3: Derivatives, Section 5: Derivatives of Trigonometric Functions	In the penultimate line, the expression "sin x(0) + cos x(1)" has very unfortunate spacing that could be confusing. I suggest instead "(sin x)[multiplication dot](0) + (cos x)[multiplication dot](1)", which is clearer in that there is no ambiguity about functional application and no ambiguity about whether the implied multiplication is happening inside or outside the application of the trig functions.	Revise to "sin x · 0 + cos x · 1"	General/pedagogical suggestion or question
Chapter 3: Derivatives, Section 5: Derivatives of Trigonometric Functions	At the beginning of the proof the book recalls the limit of (cosh h - 1)/h as h->0. This isn't the limit needed later in the proof however. The function cosh should be replaced by cos.	Revise to cos.	Typo
Chapter 3: Derivatives, Section 5: Derivatives of Trigonometric Functions, Chapter Review Exercises	In Chapter Review Exercises 189 and 190, there should be a comma separating the two equations (one defining f(x), the other giving the point x), just as there is in Chapter Review Exercises 185--8.	Add commas as indicated.	Typo
Chapter 3: Derivatives, Section 6: The Chain Rule	In factoring out should you not be left with a 10(3x-2) and then 72x+1 in the following line?	Revise "(3x – 7)" to "(3x – 2)" and "(72x – 49)" to "(72x + 1)".	Incorrect answer, calculation, or solution
Chapter 3: Derivatives, Section 6: The Chain Rule	In the example differentiating cos^4(7x^2+1), the first line of the solution has an extra,	Our reviewers accepted this change.	Typo

	and unmatched, parenthesis before the 2nd "cos". (Sorry about an earlier report of this that wasn't clear. I've marked what I think is the extra parenthesis in the attached screenshot.)		
Chapter 3: Derivatives, Section 6: The Chain Rule	In Your Calc I OpenStax, Online version Sect. 3.6, Example #2: Find f'(x) for f(x)= (2x^3+2x-1)^4. There appears to be a typo in the solution.	Revise "6x" to "6x^2" and "3x" to "3x^2".	Typo
Chapter 3: Derivatives, Section 7: Derivatives of Inverse Functions	I have caught a typo in the definition of the derivative of an inverse function. g(x)=1/f'(g(x)) (see screenshot) This should be the derivative of g(x) is equal to the reciprocal f'(g(x)). For example, if we use f(x)=e^x and g(x)=ln(x), then this is saying that ln(x)=1/e^(ln(x)=1/x which is not true	This will be updated.	Typo
Chapter 3: Derivatives, Section 7: Derivatives of Inverse Functions	Homework problem 268 give f(x) =x^2 + 3x + 2 , x>= -1. To me it would make more sense if you change the restriction on the domain to x >= -3/2 as the x-coordinate of vertex of the parabola is at x = -3/2 and this will then give the right half of the parabola which is typically what we do with these type of problems.	Revise "x ≥ –1" to "x ≥ –3/2".	Other factual inaccuracy in content
Chapter 3: Derivatives, Section 7: Derivatives of Inverse Functions	In the grey box statement of the Inverse Function Theorem, the function, g, should be differentiated.	Revise to g'(x).	Typo
Chapter 3: Derivatives, Section 8: Implicit Differentiation	The second function offered in the text immediately preceding Figure 1 should be y = sqrt(25-x^2) if -5 \le x < 0; y = -sqrt(25-x^2) if 0 \le x	This function will be revised.	Typo

	\le 5. (The bounds on x are currently -25 \le x < 0 and 0 \le x \le 25.) This change makes the definition consistent with the lower right graph in the figure, and keeps all values of the function real.		
Chapter 3: Derivatives, Section 8: Implicit Differentiation	The question is poorly posed: the point (3, 8/3) does not belong to the ellipse 4x^2 + 25y^2 = 100.	Revise the point to (3, 8/5) and revise the solution.	Other factual inaccuracy in content
Chapter 3: Derivatives, Section 8: Implicit Differentiation	Following the correction to erratum 6048, there is one copy of "(3,8/3)" that still needs to be changed to "(3,8/5)", on the second line of the solution.	Our reviewers accepted this change.	Typo
Chapter 3: Derivatives, Section 9: Derivatives of Exponential and Logarithmic Functions	In the box for Theorem 3.16, in the very last line of the box, it says g''(x) where it should say g'(x). This is in the definition of h'(x) where h(x) = b^{g(x)}.	Revise to g'(x).	Other factual inaccuracy in content
Chapter 4: Applications of Derivatives, Section 1: Related Rates	I've tried to approach this question in numerous different ways but continue to get the answer 9/25 rad/s. If the answer is in fact 21/25 rad/s, I would greatly appreciate an explanation of some kind because I'm beyond lost on this question if 9/25 is not the correct solution.	Revise solution as appropriate.	Incorrect answer, calculation, or solution
Chapter 4: Applications of Derivatives, Section 1: Related Rates	The question reads: The volume of a cube decreases at a rate of 10 m/sec. The units should be m^3/sec.	Revise to "m^3/s".	Typo
Chapter 4: Applications of Derivatives, Section 1: Related Rates, Chapter Review Exercises	The units "in./min" should be "in/min" (no period).	Revise to "in/min".	Typo

Chapter 4: Applications of Derivatives, Section 2: Linear Approximations and Differentials, Chapter Review Exercises	Problems 50--55 are marked [T], but nothing in the problems requires a calculator. On the other hand, problems 62--67 require exact numerical calculations and so should be marked [T].	Remove [T] from Chapter Review Exercises 50–55 and add it to Chapter Review Exercises 62–67.	Typo
Chapter 4: Applications of Derivatives, Section 3, Chapter Review Exercises	Question 316 is misleading. It states "You are constructing a cardboard box with the dimensions 2 m by 4 m." when in reality the dimensions must be 2-x m by 4-x m. It should say "You are constructing a cardboard box out of a paper with the dimensions 2 m by 4 m." How the question is currently phrased would come up with a different answer, where x is an infinitely large number. The picture shown doesn't help without this fix.	Revise the beginning of the question stem to "You are constructing a box out of a sheet of cardboard with dimensions...". The figure will also be updated.	Incorrect answer, calculation, or solution
Chapter 4: Applications of Derivatives, Section 3, Chapter Review Exercises	Exercise 93 reads, "When you are checking for critical points, explain why you also need to determine points where f(x) is undefined." It should instead read "When you are checking for critical points, explain why you also need to determine points where f'(x) is undefined." (That is, f(x) should be replaced by f'(x) in the formula.) It might also be more on-point if the problem said, "When you are checking for local extrema, explain why you also need to determine points where f'(x) is undefined." since the question as currently stated allows the correct but	Revise to "...explain why f'(x) is...".	Other factual inaccuracy in content

	uninformative answer "By definition of critical point."		
Chapter 4: Applications of Derivatives, Section 3, Chapter Review Exercises	The instruction before exercise 100 includes the sentence "Assume domains are closed intervals unless otherwise specified." Since in no case is anything specified about the domains, the "unless otherwise specified" is totally unneeded. The whole sentence would be a more helpful instruction for this set of Chapter Review Exercises if it indicated that the drawing is the entire graph, i.e., that the graph does not continue beyond what is shown in the picture.	Revise from "Assume domains are closed intervals unless otherwise specified" to “Assume the graph represents the entirety of each function.”	Other
Chapter 4: Applications of Derivatives, Section 3: Maxima and Minima, Chapter Review Exercises	In exercise 121, the function is not defined at 0 or at 1, so giving the domain as [0, 1] (instead of (0, 1)) is misleading.	Revise the domain to "(0, 1)".	Other factual inaccuracy in content
Chapter 4: Applications of Derivatives, Section 4: The Mean Value Theorem	In the proof of Rolle's Theorem Case 1: If f(x) = 0 ... should read Case 1: If f(x) = k	Revise "f(x) = 0" to "f(x) = k".	Typo
Chapter 4: Applications of Derivatives, Section 5: Derivatives and the Shape of a Graph	Should be 'f' not 'F'	Revise to (d/dx)(kF(x)) = k(d/dx)F(x) = kf(x).	Typo

Chapter 4: Applications of Derivatives, Section 5: Derivatives and the Shape of a Graph, Chapter Review Exercises	In Figure 4.34 in the PDF (Figure 3 in the web view), parts (a) and (c) say "f' is increasing, f' is concave up" when they should say "f' is increasing, f is concave up". (The caption is correct.)	This figure will be updated.	Typo
Chapter 4: Applications of Derivatives, Section 6: Limits at Infinity and Asymptotes	Should be 2 + 1/x not (2+1)/x	Revise to 2 + 1/x.	Typo
Chapter 4: Applications of Derivatives, Section 7: Applied Optimization Problems, Chapter Review Exercises	Should be (x^2)/(4+y^2) = 1 not (x^2)/(4+y^2=1)	Revise (x^2)/(4 + y^2 = 1) to (x^2/4) + y^2 = 1 and revise y = (sqrt (1 – x^2)/4) to y = (sqrt (1 –(x^2/4)).	Typo
Chapter 4: Applications of Derivatives, Section 8: L'Hôpital's Rule	x tends to minus infinty not, x tends to a	Our reviewers accepted this change.	Incorrect answer, calculation, or solution
Chapter 4: Applications of Derivatives, Section 8: L'Hôpital's Rule, Chapter Review Exercises	Denominator not divided by highest power of x	Revise (3 + 5/x)/(2x + 1) to (3 + 5/x)/(2 +1/x) on both solution lines.	Typo
Chapter 4: Applications of Derivatives, Section 8: L'Hôpital's Rule, Chapter Review Exercises	The problem asks to compute the limit as x approaches 0 of x^(1/x). The online textbook gives a solution of 1, but the limit should be zero.	Revise to 0.	Incorrect answer, calculation, or solution
Chapter 4: Applications of Derivatives, Section 8: L'Hôpital's Rule, Chapter Review Exercises	The given limit in Section 4.8 Exercise 393 does not exist. The solutions manuals both state that the limit is 1. Either the solutions manuals should state that the limit does not exist, or the problem should be restricted to the limit from the right. The limit from the right is 0. So the solution in both of the solutions	Revise to 0^+.	Incorrect answer, calculation, or solution

	manuals would need to change to 0.		
Chapter 5: Integration, Chapter Review Chapter Review Exercises	Exercise 450 reads: \int_0^{\frac \pi 4} e^{cos^2x}\sin x \cos dx But it is missing the "x" of the last cosine function. Should read: \int_0^{\frac \pi 4} e^{cos^2x}\sin x \cos x dx	Revise to cosx dx.	Typo
Chapter 5: Integration, Section 3: The Fundamental Theorem of Calculus, Chapter Review Exercises	The integral is missing the "d\theta"	Add "dθ" to the end of the integral.	Typo
Chapter 5: Integration, Section 4: Integration Formulas and the Net Change Theorem, Chapter Review Exercises	The calculation of d(t) for t>3 is incorrect. It should be d(t) = 18+t^2-6t. Then the total distance should be d(6) = 18m.	Revise the solution as needed.	Incorrect answer, calculation, or solution
Chapter 5: Integration, Section 4: Integration Formulas and the Net Change Theorem, Chapter Review Exercises	These two problems are in a list of problems for which the instruction is to "compute the following antiderivatives", but both questions ask for definite integrals.	Add " or definite integrals" to the end of the instructions.	Other
Chapter 5: Integration, Section 5: Substitution	Lower limit of Integral of cos theta is incorrect Should be '1/2' not '0'	While our reviewers determined this was not an error, a different error was located on this page. On the third line of the solution, add "1/2" after "dθ +".	Typo
Chapter 5: Integration, Section 5: Substitution	The suggested substitution in exercise 268 has a typo. There is an equals sign that should be subtraction.	Our reviewers determined this was not an error.	Typo

Chapter 5: Integration, Section 5: Substitution	The upper integral is e^2 in the problem but the solution uses e^x	Revise "e^2" to "e^x".	Incorrect answer, calculation, or solution
Chapter 5: Integration, Section 5: Substitution, Chapter Review Exercises	Error in the problem which does not match the answer. The integral is written with (t) in the numerator and it should be (t^2) to correctly match the answer.	Revise "t" to "t^2".	Other factual inaccuracy in content
Chapter 5: Integration, Section 5: Substitution, Chapter Review Exercises	The integral denominator contains a square root which does not result in the answer shown. The square root should be deleted for the answer in the book to be correct. Also appears in the solutions manual.	Delete the square root from around 1 + x^2 in the denominator.	Other factual inaccuracy in content
Chapter 5: Integration, Section 5: Substitution, Chapter Review Exercises	The instruction here to consider the interval x > 1 is placed in an extremely confusing location, literally in the middle of an equation. I suggest rewriting to "[equation] for x > 1; u = ..."	Revise to move x > 1: to the beginning.	Other
Chapter 5: Integration, Section 7: Integrals Resulting in Inverse Trigonometric Functions	Formulas 5.23-5.25 on page 608 contain a number of factual errors. Formula 5.23 Does not hold if one chooses a<0. The right-hand side of the equation should read arcsin(u/|a|)+C Formula 5.25 Does not hold if we have a definite integral over an interval of negative numbers. The right-hand side should say (1/|a|)*arcsec(|x/a|).	Revise denominators in Formula 5.23 and 5.25 to |a|.	Other factual inaccuracy in content
Chapter 6: Applications of Integration, Section 1: Areas Between Curves	The 2nd sentence in the instructions reads "Let be the region...." It should presumably be "Let R be the region...."	Our reviewers accepted this change.	Typo