DOWNLOAD PDF A MAPLE APPROACH TO CALCULUS

Chapter 1 : The meaning of a limit - An approach to calculus

The activities and ideas captured in these Maple worksheets reflect concepts in calculus impleÂ- mented in Maple. There is an overt message to the reader that carries with it a side effect. However, it is possible that for one reader the side effect is the message and the message is the side effect!

For a little more payoff, there is a 15 minute Quick Start Tutorial viideo and for someone who has an hour to invest in getting a comprehensive overview of Maple as a new user, there is a 55 minute Getting Started with Maple video introduction to Maple. Examples of how to use Maple for every topic in this sequence may be found below on this page. Maple worksheets on the web? If Maple is installed locally on your machine or network, you can just click on the link to a Maple worksheet and it will open. Variable names or expressions to be multiplied must be separated by a space or explicit asterisk or will be interpreted as a new variable name: Getting Started Worksheets versus Documents. Document mode is a blank document with no input prompts just white space, but usually we want to work in the more structured worksheet mode, which has input prompts and separate output regions, and shows the user what Maple commands are used by the right click menus, which can often be edited to modify easily without foreknowledge of the command. One can switch to worksheet mode from document mode simply by introducing a prompt. View, Expand Document Block will show the underlying computations hidden in Document mode. If you choose to start with a New Document instead, there are no input prompts, and results of right-clicking on expressions follow them after an arrow and commands are suppressed. Right clicking on expressions gives you menus to select operations you wish to perform. This can be useful for inputting little Maple programs in a more organized way than the 2d math line breaking spacing rules allow. When the cursor is in an input or even math mode text region, clicking on an icon will insert it with its placeholders to fill in moving between them with the Tab key. It is relatively easy to learn how to combine palette input with typing to create any mathematical expression or equation. If it is in an input region, entering it to produce an output allows the user to right click on that output and take actions from the context sensitive menu. Predefined Constants and Variable Names Maple is case-sensitive like mathematics, distinguish uppercase and lowercase letters and be consistent. D is reserved for Maple function differentiation. You still need to know these 1d math names to enter them in the pop up interactive windows, like the plot range in the plot builder for trig functions where ranges like Any convenient string that conveys meaning about its interpretation is useful. All groupings overriding the usual rules for order of performing the basic operations are done using matching rounded parentheses only no brackets or braces of any kind. Square brackets [,] enclose a list of objects numbers, functions, color names whose order is to be maintained, like vector components, or a list of functions to coordinate with a list of colors in a plot command. Holding the Shift key and pressing the Enter key at the end of a Maple input allows you to go to the next line. If you wish to put two Maple inputs together in 2d math notation, they must be separated by a semicolon ";" or a colon ": In 2d math mode input, spaces are needed between variables to imply multiplication: Always use parentheses when needed for grouping! All 4 arrow keys and the Tab key can be used to move around in 2d math input. When you give a range of values for a variable: F1 gives you the short list of keystroke hints. When you put the cursor on a Maple command, F2 gives you the Maple help for that command, or you can then go to the Help menu and find "Help on When a command is in a package like plots, or Student[Calculus1], by loading the package with no punctuation or a semicolon first, one can click on the desired command in the list and hit F2. Control Space invokes auto-complete when entering Maple commands to choose from a popup menu of all commands which begin with the typed letters. If the output of a worksheet on the web has been removed Edit Menu, bottom, Remove Output, from entire worksheet , it can be restored by Edit Menu, Execute Worksheet or by clicking on the!!! You may also select a region and execute it with the! Square brackets around a list of expressions maintains their order, while curly "set" braces do not, since sets are not supposed to have a preferred order. If you enter an expression for a real function that you want to plot or a sequence of functions separated by commas and surrounded by curly set braces , choose plot builder from the right click menu, not 2d plots where you have to further right click on the smartplot and choose axes, range to reset the

window. To 2d plot multiple expressions by right-click menu, one can also enter one expression and plot it by right-clicking on the output and selecting plot builder, then enter the other expressions in a new input region and select and drag them one by one from their output onto the plot. Avoid smartplot, it is not smart enough. First click on a plot to make it "live" you see the resize box border. Right click on the plot and choose "Probe Info, Cursor Position" from the context menu to get two crosshair lines centered on the cursor in the plot with a numerical readout of the cursor position. You can also zoom into any plot with a right click choice, but you might need "pan" to recenter the zoom window. Click on the black grid icon on the plot context toolbar line that appears when the plot is live to get gridlines on the plot, very helpful for understanding how points on curves relate to the axis tickmarks. You can also insert a new section from the insert menu. These are opened and closed by clicking on the arrow in the section title. Subsection allows more structure to your document. Matrices or Vectors 1 row or 1 column: A superscript of -1 will produce the inverse of a square matrix, while a space " " between matrices will multiply them, without loading the LinearAlgebra or Student[LinearAlgebra] packages. To "augment" a set of Vectors into a matrix, use Matrix [u1,u2]. Vectors are treated by default as column matrices and are shown as column matrices in Maple output. To retain this column matrix output when using the Student[VectorCalculus] package, you need an extra command: Then right clicking on the rref matrix allows Solvers and Forms, Linear Solve to solve the linear system for which it is the rref augmented matrix. Alternately just right clicking on an expression allows you to approximate it to various numbers of decimal places. To add a row or column to an existing matrix in input mode: Sometimes in rare cases it is not enough to place a space between matrices to multiply them rtable error , in which case a period between the matrices will do the job. There are still no literal superscripts for tensor notation. Prime derivative notation and Maple function notation: For partial derivatives the D[1,2] f notation is preferable for Maple functions. Although in most cases the arrow definition available in the Expression palette is sufficient, one must occasionally use an alternative approach: If you want a different default differentiation variable without being bothered to change it students especially! Such subscripts should be literal: Want to include plots with sliders to change the parameters in a family of functions? You can display vectors or matrices with more than 10 rows by for example: Then you can select each range of only 1d inputs avoiding text regions and do Format, Convert to, 2d math input. This requires some fiddling, since the autolinebreaking feature is not perfect and there are a few other possible minor glitches. Remove final semicolons from a single input or from the final input of a multiple input line execution group; they are now only needed to separate multiple inputs. In a worksheet, you must first introduce a document block with the Format Menu, Create Document Block. Center the figure with the text center icon. Expressions, Common Symbols, Matrix, Greek, Operators for cross product symbol , Punctuation for underscore in 2d math input. MAT Example Files For the Engineering and Science Calculus course sequence there are example files perhaps most useful for instructors: To save these files, please right-click on them and choose Save Link As. You are free to type literally old style 1d math character mode found in textbook examples right into the 2d input mode, but you can also take advantage of 2d features while doing so, mixing 1d and 2d entry. Fortunately the Maple "Clickable Calculus" approach makes it very easy to use palette entry and context sensitive right click menus to do most of what is needed in these courses without special instruction! These files have their output removed [Edit Menu, Remove Output, All] and must be re-executed by clicking on the Execute Worksheet icon "!!! This saves a lot of server space since the executed files can be much larger, especially when 3d graphics are present. However, when executing with "!!! To execute step by step, just hit the Enter key for each execution of an input group to see its output appear. Then move on to the next step. Learn to use Maple by watching a 3 minute video on clickable calculus. Lillian Lieber , American mathematician Russian immigrant from Ukraine as a child and popular mathematics writer who used mathematics in defense of positive human values see the essays and by woman science writer Maria Popova , with whimsical drawings by her husband Hugh to illustrate her points.

Chapter 2 : John T. Gresser (Author of TI Graphics Calculator Approach to Calculus)

Do you know of a book that should be included in our list? Tell us about it!

Evaluating that rate of change under those vanishing conditions requires the idea of a limit. And central to the idea of a limit is the idea of a sequence of rational numbers. A sequence of rational numbers We encounter such a sequence in geometry when we determine a formula for the area of a circle. To do that, we inscribe in the circle a regular polygon of n sides. The area of the polygon, which we can actually calculate, will be an approximation to the area of the circle. As we increase the number of sides -- that is, if we consider a sequence of polygons: Now, the circle is never equal to a polygon. Less, say, than 0. That is the idea of a sequence approaching a limit, or a boundary, which in this example is the area of the circle. The student surely can recognize the number that is the limit of this sequence of rational numbers. To see the answer, pass your mouse over the colored area. To cover the answer again, click "Refresh" "Reload". The limit of a variable Consider this sequence of values of a variable x: Now, no member of that sequence will every equal 2. We say, however, that those values are approaching 2 as their "limit. Because 2 is the smallest number such that no matter which term of the sequence we name, it will be less than 2. In other words, it will be possible to name a term of that sequence such that the absolute value of the difference between that term and 2 -- 1. We write the absolute value because the terms are less than 2 , and so the difference itself will be negative. We also say that a sequence converges to a limit. The sequence above converges to 2. By a sequence in what follows, we mean an ordering of rational numbers according to a rule or an indicated pattern. Here, for example, is a sequence that approaches 0: Left-hand and right-hand limits Now the sequence we chose were values less than 2: And so will all subsequent differences we might name. Again , when we say that the values of x "approach a limit," that limit -- that number -- is never a value of x. There is always a difference between the values of x and their limit. The limit is the boundary beyond which no member of the sequence will pass. We summarize this in the following definition. But first, x is not the only variable. And y will be a function of x -- f x -- which is also a variable. In the following, then, we will use the letter v to represent any variable. The limit of a variable. And so when the values of a variable approach a limit, there is always a difference between the limit and those values. But that difference can be made as small as we please. That is the essence of a variable approaching a limit. Now, a sequence of values of x, the independent variable, will cause a sequence of values of f x , the dependent variable. As the values of x approach a limit c, will the corresponding values of f x approach a limit L? Suppose again that x assumes this sequence: The definition of the limit of a variable will be satisfied. Moreover, if x approaches 2 from the right: That sequence also will approach 4. Therefore, the limit of x2 as x approaches 2 both from the right and from the left is the same number. The limit of a function of a variable. If that is the case, then we write: The theorems on limits imply that. The most important limit -- the limit that differential calculus is about -- is called the derivative. All the other limits studied in Calculus I are logical fun and games, never to be heard from again. Now here is an example of a function that does not approach a limit: The left- and right-hand limits are not equal.

Chapter 3 : Maple Student Edition: Math Software for Students - Maplesoft

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Chapter 4 : A Maple Approach to Calculus - Maplesoft Books - Maple Books, Maple Resources and Math E

Exploring Calculus Using a Maple Approach is a workbook designed to help students explore the concepts of a first-semester Calculus course using the computer algebra system, Maple.

Its prototype is a straight line. There is no limit to the smallness of the distances traversed. Calculus wants to describe that motion mathematically, both the distance traveled and the speed at any given time, particularly when the speed is not constant. Solving that mathematical problem is one of the first applications of calculus. In any real problem of continuous motion, the distance traveled will be represented by a "continuous function" of the time traveled because we always treat time as continuous. Therefore, we must investigate what we mean by a continuous function. We are about to see that that is the definition of a function being " continuous at the value c. A graph is an aid to seeing a relationship between numbers. Therefore, consider the graph of a function f x on the left. That graph is a continuous, unbroken line. But a function is a relationship between numbers. Topic 3 of Precalculus. Any definition of a continuous function therefore must be expressed in terms of numbers only. To do that, we must see what it is that makes a graph -- a line -- continuous, and try to find that same property in the numbers. To avoid scrolling, the figure above is repeated. The graph of g x on the right does not. In the graph of f x , there is no gap between the two parts. We saw in Lesson 1 that that is what characterizes any continuous quantity. Let us think of the values of x being in two parts: Then as x approaches c, both from the left and from the right, if the corresponding values of f x -- those numbers -- approach f c , those values will share a common boundary, namely the one number, f c. If the left-hand limit were the value g c , the right-hand limit would not be g c. Here is the definition: A function continuous at a value of x. And if a function is continuous in any interval, then we simply call it a continuous function. By "every" value, we mean every one we might name; any meaning more than that is unnecessary. Calculus is essentially about functions that are continuous at every value in their domains. Prime examples of continuous functions are polynomials Lesson 2. To see the answer, pass your mouse over the colored area. To cover the answer again, click "Refresh" "Reload". Do the problem yourself first! We must apply the definition of "continuous at a value of x.

Chapter 5 : MAPLE Examples and Tips | Villanova University

Maple combines the world's most powerful math engine with an interface that makes it extremely easy to analyze, explore, visualize, and solve mathematical problems.

Chapter 6 : Maple Approach to Calculus, A

With one of the largest book inventories in the world, find the book you are looking for. To help, we provided some of our favorites. With an active marketplace of over million items, use the Alibris Advanced Search Page to find any item you are looking for. Through the Advanced Search Page, you.

Chapter 7 : Robert A Adams: used books, rare books and new books @ www.nxgvision.com

Calculus-Mathematics Ideally suited for use with either Bradley/Smith or Varberg/Purcell/Rigdon, this manual may also be used in conjunction with other calculus texts. Many of the exercise sets have additional problems labeled "projects" which are somewhat more involved.

Chapter 8 : Continuous functions - An approach to calculus

f(x) therefore is continuous at x = 8. (Definition 3.)In this same way, we could show that the function is continuous at all values of x except x = This is an example of a perverse function, in which the function is deliberately assigned a value

different from the limit as x approaches 1.

Chapter 9 : Maple and Mathematica, A Problem Solving Approach for Mathematics

Gresser's Maple Approach Calculus, A (2nd Edition) 3rd (third) edition by Gresser published by Prentice Hall [Paperback] () Paperback - December 15, Be the first to review this item See all formats and editions Hide other formats and editions.