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| ***Techniques for Documenting with Proof or Supporting Evidence, and Related Strategies for Problem Solving***  **By David Alderoty © 2016**  **Chapter 15) Technique-13, Reasoning Based**  **On Mathematics, and Related Concepts**  [**This e-book presents 28 techniques for supporting the validity of the statements you write**](http://www.TechForText.com/DP/List)**.**  **Left click on the above for a list of the techniques**  **This chapter contains a little over 2,500 words**  **If you want to go to chapter 14, left click on the following link:**  [**www.TechForText.com/DP/chapter-14**](http://www.TechForText.com/DP/chapter-14)  **To contact the author use David@TechForText.com**  [**or left click for a website communication form**](http://www.david100.com/Mail)  **Table of Contents, and an Outline of this Chapter**  The following is a hyperlink table of contents, as well as an outline of this chapter. If you left click on a blue underlined heading, the corresponding topic or subtopic will appear on your computer screen. Alternatively, you can scroll down to access the material listed in the table of contents, because this chapter is on one long webpage.  [Topic 1.) Technique-13 Reasoning Based on Mathematics 5](#_Toc473707106)  [**Subtopic, Deductive Reasoning and Mathematics** 5](#_Toc473707107)  [**Subtopic, Mathematics and Inductive Reasoning** 5](#_Toc473707108)  [**For Additional and Supporting Information for Topic 1, See The Following Web-Based Sources** 5](#_Toc473707109)  [Topic 2.) Using Mathematics to Support Your Writing 6](#_Toc473707110)  [**Subtopic, The Utility of Explaining How You Derived Your Calculated Results, or Mathematical Conclusions** 6](#_Toc473707111)  [**Subtopic, Examples of Documents that are Likely To Require Mathematics and Writing** 7](#_Toc473707112)  [Topic 3.) Software for Writing Text and Mathematics in the Same Document 8](#_Toc473707113)  [**Subtopic, Using Microsoft Word to Write Text And Mathematics in the Same Document** 9](#_Toc473707114)  [**Subtopic, Using Mathcad to Write Text and Mathematics in the Same Document** 11](#_Toc473707115)  [**Subtopic, Using Microsoft Excel to Write Text And Mathematics in the Same Document** 12](#_Toc473707116)  [**Additional and Supporting Information for this Chapter, From Web-Based Articles, and Related Software** 22](#_Toc473707117)  [**Additional and Supporting Information For This Chapter, from Web-Based Videos** 24](#_Toc473707118)  **This E-Book Provides Additional and Supporting Information from other Authors, with Web Links**  This e-book contains links to web-based articles and videos from other authors, for **additional, alternative, and supporting information.** The links are the blue underlined words, presented throughout this e-book. However, some of these links are to access different sections of this e-book, or material on my own websites.  Quotes and paraphrases in this e-book have hyperlinks to access the original source. The quotes are presented in brown text, which is the same color of these words. (The precise text color is RGB Decimal 165, 42, 42, or Hex #a52a2a)  Some of the web links in this e-book will probably fail eventually, because websites may be removed from the web, or placed on a new URL. If a link fails, use the blue underlined words as a search phrase, with [www.Google.com](http://www.google.com/) If the link is for a video, use [www.google.com/videohp](http://www.google.com/videohp) The search will usually bring up the original website, or one or more good alternatives. |

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| ***For those who prefer listening, as an alternative to reading, this book is recorded in an audio format.***  [***For an audio narration of this chapter, left click on these words (requires 23 minutes, and 50 seconds).***](P1.mp3) |

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| **Topic 1.) Technique-13 Reasoning Based on Mathematics**  |||  Technique-13, reasoning based on mathematics, involves any type of mathematical calculation with numbers or symbols, as well as any type of mathematical proof, such as the following examples:   * Arithmetic calculations * Statistical calculations * Algebraic calculations * Calculations involving calculus * Geometric proofs * Computer evaluations involving mathematics * Experimental results of a specific type of mathematical manipulation * Deductive reasoning with mathematics * Inductive reasoning with mathematics   After you read the following subtopics the concept and utility of technique‑13, **(**reasoning based on mathematics) will be clarified.  **Subtopic, Deductive Reasoning and Mathematics**  |||  If a mathematical concept, such as a theorem, were proved true by experimentation, and/or with inductive reasoning, the goal would be to prove it true with deductive reasoning. Mathematicians consider deductive reasoning to be the most important type of mathematical proof. There is a simplified example of deductive reasoning, involving basic algebra, and two axioms, presented below. Except for the numbers, this example and related text are almost identical to the example presented in [**chapter 7**](http://www.techfortext.com/DP/chapter-7), which is focused on deductive reasoning.  To understand the following **axioms**, it is necessary to keep in mind that the left and right side of an equation are equal to each other.  **Axiom 1)** ***When equal quantities are added or subtracted from equal quantities, the results are equal****.* This means if you add or subtract the same number from the left and right side of an equation, the left and right side of the equation will remain equal to each other.  **Note for axiom 1)** I combine two of the axioms into one, for the sake of simplicity.  This involved ***equal quantities added to equal quantities,*** combined with ***equal quantities subtracted from equal quantities.***  **Axiom 2), *When equal quantities are divided by equal quantities, the results are equal.***  This means if you divide the left and right side of an equation by the same number, the equality between the left and right side will be maintained.  With the axioms presented above, the statement highlighted is in yellow, will be proved true, with deductive reasoning.    **Subtopic, Mathematics and Inductive Reasoning**  |||  The following is a simplified example of deductive reasoning and mathematics. Except for the numbers, this example is similar to the example and chapter 8, which is focused on inductive reasoning.  Examine the red digits, and try to devise a hypothesis consisting of a formula that will indicate the value of X. **2, 4, 16, 256, X** The correct answer is presented below.  The hypothesis is the previous number squared, equals the next number in the sequence. That is each number was squared to obtain the following number in the sequence. This can be expressed in the following formula: With this formula, P=the previous number and N=the next number in the sequence. This hypothesis () is experimentally evaluated below, to see if it can be used to reproduce the numbers in the sequence (**2, 4, 16, 256, X**)  **,** thus, , , , This confirms that validity of the hypothesis. Thus, **X=**  **For Additional and Supporting Information for Topic 1, See The Following Web-Based Sources**  |||  [Inductive and Deductive Reasoning](http://ocw.usu.edu/English/introduction-to-writing-academic-prose/inductive-and-deductive-reasoning.html)  [Deductive and Inductive Arguments](http://www.iep.utm.edu/ded-ind/)  [Informal prerequisites for informal proofs Aiso Heinze, Jee Yi Kwak, Oldenburg (Germany)](http://subs.emis.de/journals/ZDM/zdm021a2.pdf)  [Journal of Humanistic Mathematics, Volume 1 | Issue 1 January 2011 What Do We Mean by Mathematical Proof? Todd CadwalladerOlsker](http://scholarship.claremont.edu/cgi/viewcontent.cgi?article=1003&context=jhm)  [Non-Deductive Methods in Mathematics](https://plato.stanford.edu/entries/mathematics-nondeductive/)  [Validations of Proofs Considered as Texts: Can Undergraduates Tell Whether an Argument Proves a Theorem? Annie Selden](https://www.math.ksu.edu/~bennett/onlinehw/qcenter/seldenandselden30034698.pdf) |

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| **Topic 2.) Using Mathematics to Support Your Writing**  |||  Mathematics is useful for supporting certain types of claims, arguments, and concepts in a document. The math can be calculations with numbers or symbols, or a mathematical proof, such as with deductive or inductive reasoning. At the simplest level, this can involve arithmetic calculations. An example is a business report, *claiming that the business made 20% more profit this year than the previous year*. Such a claim would have to be supported by relevant money calculations for the previous and current year. Ideally, this should show all the relevant mathematics, and every item that was calculated. This is explained in more detail in the following subtopic.  **Subtopic, The Utility of Explaining How You Derived Your Calculated Results, or Mathematical Conclusions**  |||  It is often beneficial to explain in the document you are writing, how your calculated results and/or mathematical conclusions were derived. For example, in the previous subtopic, on **Mathematics and Inductive Reasoning** there is an example explaining in a step-by-step way of how the answer of **X=65536** was derived. Explanations of this nature, allow the reader to evaluate the validity and accuracy of the mathematics. Another advantage is, when you explain your mathematics in writing, it can help you spot your own errors. Explanations of this nature are especially important when you are using mathematics to support the validity of a claim, or request, such as a request for a business loan.  Of course explaining your calculations and/or mathematical conclusions is not always necessary or feasible. For example, if the mathematics is likely to be obvious to your readers, or if your readers do **not** have an adequate background to understand the mathematics, it may be unnecessary to explain it. This is especially the case, if it is **not** supporting a claim, major argument, or request.  **Subtopic, Examples of Documents that are Likely To Require Mathematics and Writing**  |||  Five examples, of documents that may require mathematics are presented below, with web links for additional information from other authors.   * Writing a document indicating that a budget is balanced, or unbalanced (see [Writing a Budget Justification](https://orsp.appstate.edu/prepare-budget/writing-budget-justification)**,** and [Writing a Budget Narrative](http://grant-central-station.com/articles/33/)) * Writing a document to support a bankruptcy claim (see [Google search pages: bankruptcy claim](https://www.google.com/webhp?sourceid=chrome-instant&rlz=1C1OPRA_enUS705US705&ion=1&espv=2&ie=UTF-8#q=bankruptcy%20claim)) * Writing a document to reveal the estimate startup costs for a new business (see [How to Estimate Startup Costs](https://www.entrepreneur.com/article/220342)**,** and [Video: Business Startup Costs Spreadsheet](https://www.youtube.com/watch?v=bN7ihWXq6QA) ) * Writing a document with the estimated time and money needed to complete a major project (See [How to Estimate Project Cost and Duration, contains text and video](http://4pm.com/estimate-project-duration-cost/)**,** [How to Accurately Estimate Project Cost and Duration](http://www.nutcache.com/blog/how-to-accurately-estimate-project-cost-and-duration/)**,** [Video: How to Costs Estimate Your Project](https://www.youtube.com/watch?v=drjx84Gsqm8)**,** [Estimating Time Accurately Calculating Realistic Project Timelines](https://www.mindtools.com/pages/article/newPPM_01.htm)**,** and [How to Compute PERT Estimation](http://www.had2know.com/business/pert-estimation-formula-calculator.html) ) * Writing a technical report, or scientific article with mathematics ([See Mathematical Writing by Donald E. Knuth](http://jmlr.csail.mit.edu/reviewing-papers/knuth_mathematical_writing.pdf)**,** [A Guide to Writing Mathematics Dr. Kevin P. Lee](https://www.reddit.com/r/math/comments/39u56j/a_guide_to_writing_mathematics_by_dr_kevin_p_lee/)**,** and [How to write mathematics clearly, and keep more readers by Matthew Leitch](http://www.learningideas.me.uk/clearmaths/))   At a more complex level, the writing can include geometry, algebra, trigonometry, and/or calculus, such as for engineering and science documents. In the next three subtopics, software is discussed the can be used to write documents with complex mathematics. |

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| **Topic 3.) Software for Writing Text and Mathematics in the Same Document**  |||  There are software packages that can be used to write text and mathematics in the same document, such as Microsoft Word, Mathcad, and Microsoft Excel. However, there are software add-ins, or special functions, that are required, to write text and mathematics with the above. This is explained in the following three separate.  **Subtopic, Using Microsoft Word to Write Text And Mathematics in the Same Document**  |||  Microsoft Word 2010 or later can be used to write documents with text and mathematics, using [**Microsoft Mathematics Add-In**](https://www.microsoft.com/en-us/download/details.aspx?id=17786). The Add-in is **free**, and it functions with Word, as well as with One Note. It can be downloaded by clicking on the blue underlined words above. For instructions click on, [YouTube search pages: Instructions for Microsoft Mathematics Add-In](https://www.youtube.com/results?search_query=Instructions+for+Microsoft+Mathematics+Add-In). When the add-in is installed, you can write mathematical expressions, and carry out various types of mathematical calculations directly in Microsoft Word. See the following examples:  Note, the red type are calculations  performed by Microsoft Mathematics Add‑In  This equation was automatically  graphed with Microsoft Mathematics    For additional information for **Microsoft Word with the Microsoft Mathematics Add-In** see the following web-based sources.   * [Microsoft Word and mathematics add-in](https://www.microsoft.com/en-us/download/details.aspx?id=17786) * [Video: Microsoft Mathematics Add-In For Word](https://www.youtube.com/watch?v=VDp2DtQyfik) * [Video: Writing Math Equations in Microsoft Word](https://www.youtube.com/watch?v=SRGaW3maK38) * [Video: Type Math Equations using MS Word](https://www.youtube.com/watch?v=lHyC0-SVRtM) * [Video: Microsoft Innovative Educator, Microsoft Math Add-In for Word](https://www.youtube.com/watch?v=JqBlw7pDDwc) * [Resource: Microsoft Mathematics Add-in for Word 2010](https://www.youtube.com/watch?v=nwcdMI6PRdQ) * [Microsoft Equation Editor](https://www.youtube.com/watch?v=KQtJkjimvAE)   **Subtopic, Using Mathcad to Write Text and Mathematics in the Same Document**  |||  Another alternative for writing documents with text and mathematics is Mathcad. I have been using Mathcad 15, and the following information might very slightly with other versions of Mathcad.  When writing text with Mathcad it is necessary to insert a **Text Region.**  However, as soon as you start typing text, the **Text Region** is automatically inserted. The **Text Region** is similar to a text box in Microsoft Word or Excel. At any time, you can move it to any location on the document, and you can change its dimensions to fit the text that you are entering. However, I usually transfer my Mathcad calculations to a Microsoft Word document, because Word has greater versatility for handling text.  One of the major advantages of Mathcad is its versatility with mathematics. With Mathcad you can create, input boxes for equations and other mathematical expressions, such as with When thevalues are change in the input boxes Mathcad automatically changes the numbers in the related mathematical expressions, and recalculates the results.  There are three versions of Mathcad listed below. If you want additional information about any of the following, left click on the blue underlined words.   * [PTC Mathcad 15.0](http://www.ptc.com/engineering-math-software/mathcad/free-trial) * [Free-for-Life Engineering Math Software, PTC Mathcad Express](http://www.ptc.com/engineering-math-software/mathcad/free-download) * [PTC Introduces PTC Mathcad Prime 3.1](http://www.ptc.com/news/2015/ptc-introduces-mathcad-prime3-1) * [YouTube search pages Instructions to use Mathcad](https://www.youtube.com/results?search_query=Instructions+to+use+Mathcad)     **Subtopic, Using Microsoft Excel to Write Text And Mathematics in the Same Document**  |||  Microsoft Excel can be used to write documents with text, and mathematics. This includes lengthy technical reports containing thousands of words. This is especially useful for documents that contain a large amount of business or project management calculations. These documents retain all of the mathematical functionality of a conventional Excel worksheet.  However, there are some disadvantages and minor challenges when using Excel for text, especially if you have several lengthy paragraphs. These difficulties can be resolved by using **text boxes**, **inserting a Microsoft Word document**, and **formatting cells to display text**. How to use these techniques is explained in the following paragraphs.  One of the simplest ways of writing text in **Microsoft Excel is to use text boxes**, which can be inserted directly into the worksheet. The text boxes have all of the functionality needed to write lengthy paragraphs with headings and good paragraph structure.  To insert a text box in a Microsoft Excel worksheet, left click on the home tab, and then left click on the **Text Box** function. See the screenshot at the end of this paragraph. Then you place the cruiser on the worksheet where you want the text box to appear, and trace a rectangle with the mouse cruiser, and then left click. The rectangle you trace should be the size of the text box you want to use. However, the shape and dimensions of the text box can be change at any time, by dragging the ends of the text box with the mouse.  To insert a text box in Microsoft Excel, left click on the **Text Box** icon on the right, and then trace the dimensions of the text box you want on the Excel worksheet. For additional information see [YouTube search pages How to insert a text box in Microsoft Excel](https://www.youtube.com/results?search_query=How+to+insert+a+text+box+in+Microsoft+Excel)  C:\Users\David\Dropbox\Screenshots\Screenshot 2017-01-26 01.51.35.png  To control line spacing, and paragraph placement, left click on the text box, and the following menu will appear:  C:\Users\David\Dropbox\Screenshots\Screenshot 2017-01-27 00.28.50.png  When you see the menu shown above, left click on the word **Paragraph**, and the following dialog box will open.    In a text box, you can set the line spacing, alignment, and the distance of the paragraph from the margin with this dialog box. If you want to change the tab settings, left click on the word **Tabs…,** and the following dialog box will open.    With this dialog box, you can change the tab settings of a text box.  Note, if you insert two or more text boxes in the same Excel worksheet, each text box can be formatted with different line spacing, paragraph placement, and tab settings.  One of the most versatile alternatives for writing text in Microsoft Excel, is to **insert a blank Microsoft Word document into an Excel worksheet**. This is more or less similar to inserting a text box, but it provides all of the functionality of a conventional Word document. This includes the functionality of the [**Microsoft Mathematics Add-In**](https://www.microsoft.com/en-us/download/details.aspx?id=17786). To use this technique, you must have both Microsoft Word and Excel in your computer.  To insert a Microsoft Word document into an Excel worksheet, left click on the insert tab, and then left click on the word **Object,** and a dialog box will open. The dialog box will contain a list of programs. Scroll down until you see the words Microsoft Word Document highlighted. Then click on the okay button. See the following screenshots.  C:\Users\David\Dropbox\Screenshots\Screenshot 2017-01-26 01.56.34.png  The following dialog box should have the words **Microsoft Word Document**.highlighted, as shown below. Then click on the okay button, and a rectangle will appear on your worksheet that contains a Microsoft Word document. The location, size and shape of this rectangle, can be changed at any time, by dragging with the mouse.  C:\Users\David\Dropbox\Screenshots\Screenshot 2017-01-26 01.57.15.png  For additional information see [Insert a blank Excel spreadsheet and create your data while in Word.](http://www.ctas.co.nz/StepsTo/Steps%20to%20insert%20an%20Excel%20Document%20in%20word.htm)  Another alternative for **writing text in a Microsoft Excel worksheet is to format one or more cells specifically for text.** I frequently use this technique. This usually requires merging a number of cells for each paragraph. This is the ideal technique when the text must be placed on different sections of the worksheet, such as to explain calculated results. It is also very useful when the text you are writing is very brief. However, I have used this technique successfully with Excel worksheets that contain a great deal of text, such as the following examples:   * [www.TechForText.com/Multiple-Calculation-Software-with-A-Semi-Random-Number-Generator-Based-On-Time/P/index.htm](http://www.TechForText.com/Multiple-Calculation-Software-with-A-Semi-Random-Number-Generator-Based-On-Time/P/index.htm) This Excel worksheet was converted to JavaScript so it and function online, and it contains about 3000 words. * [www.TechForText.com/DP/Chapter-14/ProfitabilityCalc.xlsx](http://www.TechForText.com/DP/Chapter-14/ProfitabilityCalc.xlsx) This Excel worksheet contains over 1000 words. * [www.TechForText.com/DP/Chapter-14/S-DiagramAndCalc.xlsx](http://www.TechForText.com/DP/Chapter-14/S-DiagramAndCalc.xlsx) contains over 600 words * Following examples contain less than 150 words, but the text is scattered on different sections of the worksheets to explain diagrams.   [www.TechForText.com/DP/chapter-14/Electric-Arc.xlsx](http://www.TechForText.com/DP/chapter-14/Electric-Arc.xlsx)  [www.TechForText.com/DP/chapter-14/Electronic-Noisemaker.xlsx](http://www.TechForText.com/DP/chapter-14/Electronic-Noisemaker.xlsx)  To format Microsoft Excel cells for text is slightly more complicated than the other techniques presented above. However, it only requires four steps, as shown below.  **Step 1)** To write text in Microsoft Excel, you have to merge enough cells to write the text. This can be done with the **Merge & Center** function, displayed on the screenshot below.  C:\Users\David\Dropbox\Screenshots\Screenshot 2017-01-25 10.04.46.png  If you need additional information for this step see the following: [YouTube search pages: How to merge cells in Microsoft Excel](https://www.youtube.com/results?search_query=How+to+merge+cells+in+Microsoft+Excel), and [Video: Microsoft Excel - Merging Cells](https://www.youtube.com/watch?v=r-zILF-ChUg)  **Step 2)** Aligned the text to the left, which can be done with the **Align Text Left**, function displayed in the screenshot below.  C:\Users\David\Dropbox\Screenshots\Screenshot 2017-01-25 09.41.29.png  If you need additional information for this step see the following: [Google search pages: How to align text to the left in Microsoft Excel](https://www.google.com/webhp?sourceid=chrome-instant&rlz=1C1OPRA_enUS705US705&ion=1&espv=2&ie=UTF-8#q=How+to+align+text+to+the+left+in+Microsoft+Excel), and [Video: Microsoft Excel Tips : How to Align Text in Excel Cells](https://www.youtube.com/watch?v=OgxcrXqangU)  **Step 3)** Use the **Wrap Text** function, so the text can be displayed on multiple lines.  C:\Users\David\Dropbox\Screenshots\Screenshot 2017-01-25 09.27.00.png  If you need additional information for this step see the following: [YouTube search pages: How to align text in Microsoft Excel](https://www.youtube.com/results?search_query=How+to+align+text+in+Microsoft+Excel)**,** and [Video: Microsoft® Excel 2010: How to use 'Wrap Text'](https://www.youtube.com/watch?v=bqpYR0cyynI)  **Step 4)** To Position the text, in the conventional way, use the Top Aline setting, as shown in the screenshot below:  C:\Users\David\Dropbox\Screenshots\Screenshot 2017-01-26 01.06.16.png  If you need additional information for this step see the following: [YouTube search pages: How to "Top Aline" text in Microsoft Excel](https://www.youtube.com/results?search_query=How+to+%22Top+Aline%22+text+in+Microsoft+Excel)**,** and [Video: Microsoft® Excel 2010: How to use 'Wrap Text'](https://www.youtube.com/watch?v=bqpYR0cyynI)  **Additional and Supporting Information for this Chapter, From Web-Based Articles, and Related Software**  |||  [Google search pages: Writing mathematical articles](https://www.google.com/webhp?sourceid=chrome-instant&rlz=1C1OPRA_enUS705US705&ion=1&espv=2&ie=UTF-8#q=Writing+mathematical+articles)  [Mathematics: How to Write Your First Paper, Steven G. Krantz](http://www.ams.org/notices/200711/tx071101507p.pdf)  [Writing Mathematical Papers, a Few Tips Jerzy](https://www.impan.pl/wydawnictwa/dla-autorow/writing.pdf)  [Mathematical Writing by Donald E. Knuth](http://tex.loria.fr/typographie/mathwriting.pdf)  [How to write proofs: a quick guide Eugenia Cheng Department of Mathematics, University of Chicago](http://cheng.staff.shef.ac.uk/proofguide/proofguide.pdf)  [wikiHow to Do Math Proofs](http://www.wikihow.com/Do-Math-Proofs)  [Proof writing](https://www.artofproblemsolving.com/wiki/index.php/Proof_writing)  [Introduction to mathematical arguments, by Michael Hutchings](https://math.berkeley.edu/~hutching/teach/proofs.pdf)  [A Guide to Writing Mathematics, Dr. Kevin P. Lee](http://web.cs.ucdavis.edu/~amenta/w10/writingman.pdf)  [Mathematics: Formal Proof Thomas C. Hales](http://www.maths.ed.ac.uk/~aar/papers/hales2.pdf)  [MathType free for 30 days!](http://www.dessci.com/en/products/MathType/trial.asp)  [Alternatives to MathType for all platforms with any license](http://alternativeto.net/software/mathtype/)  [Mathematics: What is a formal proof?](http://math.andrej.com/2016/08/09/what-is-a-formal-proof/)  [Open source mathematical software](http://mathoverflow.net/questions/19046/open-source-mathematical-software)  [List of open-source software for mathematics](https://en.wikipedia.org/wiki/List_of_open-source_software_for_mathematics)  [Top 30 Best Free Math software](http://merabheja.com/best-free-math-softwares/)  [3 awesome free Math programs](http://math-blog.com/3-awesome-free-math-programs/)  [Wolfram Math Education Software](http://www.wolfram.com/products/mathematica/analysis/content/MathEducationSoftware.html)  [Word Processing Options in Excel](http://www.accountingweb.com/community-voice/blogs/admin/word-processing-options-in-excel)  [Topology Without Tears by Sidney A. Morris](http://www.topologywithouttears.net/)  [Types of Proofs - Direct](https://mathbitsnotebook.com/Geometry/BasicTerms/BTproofs.html)  [The Argument of Mathematics](http://ndpr.nd.edu/news/48625-the-argument-of-mathematics/)  **Additional and Supporting Information For This Chapter, from Web-Based Videos**  ||||  [Google **video** search: How to write mathematical proofs](https://www.google.com/webhp?sourceid=chrome-instant&rlz=1C1OPRA_enUS705US705&ion=1&espv=2&ie=UTF-8#q=How+to+write+mathematical+proofs&tbm=vid)  [Intro to Mathematical Proof Techniques, Julian Park](https://www.youtube.com/watch?v=gXxTnkMoGU8)  [Proof by Mathematical Induction - How to do a Mathematical Induction Proof](https://www.youtube.com/watch?v=dMn5w4_ztSw)  [Two-Column Proof Practice I, Ms. Milkosky](https://www.youtube.com/watch?v=uM0xS-XXytY)  [Combining Writing and Math](https://www.youtube.com/watch?v=Vq9wGg24tVI)  [Writing Matters: Ravi Vakil, Professor of Mathematics at Stanford University](https://www.youtube.com/watch?v=UN-nRM_ZCGs)  [YouTube search pages: Mathcad](https://www.youtube.com/results?search_query=Mathcad)  [YouTube search pages: Wolfram Mathematica](https://www.youtube.com/results?search_query=Wolfram+Mathematica)  [YouTube search pages: Writing and mathematics](https://www.youtube.com/results?search_query=Writing+and+mathematics)  [Mathematical Reasoning, YouTube search page Microsoft Mathematics 4.0](https://www.youtube.com/watch?v=uPpoPJfU1tI)  [SpaceTime Tutorial - Calculus](https://www.youtube.com/watch?v=VylmzyOd8NE)  [Microsoft Math, MSFTEducation](https://www.youtube.com/watch?v=DyYacuhyPXw)  [Topology Without Tears - Video 4a - Writing Proofs in Mathematics, Sidney Morris](https://www.youtube.com/watch?v=T1snRQEQuEk)  [Math Terminology 7: How to write mathematics at the College level](https://www.youtube.com/watch?v=p8LIJVmPj6g)  ["How to write mathematics badly" by Jean Pierre Serre](https://www.youtube.com/watch?v=ECQyFzzBHlo)  [Writing Proofs in Mathematics, Sidney Morris](https://www.youtube.com/watch?v=T1snRQEQuEk)  **If you want to go to chapter 16 of this e-book, left click on the following link:**  [**www.TechForText.com/DP/chapter-16**](http://www.TechForText.com/DP/chapter-16) |