

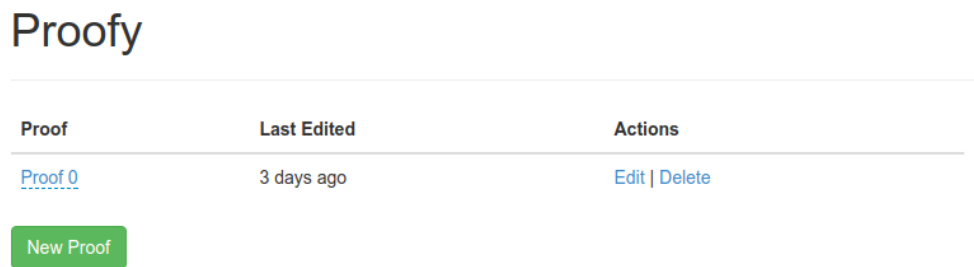
Proofy Tutorial

This quarter, you will have the opportunity to use Proofy as a proof-writing tool. This tool aims to help you construct and organize the different parts of a proof and easily output the final version as a PDF. To demonstrate the different features Proofy has to offer, we will use the following simple proof as an example:

Prove that the square of any odd integer is also odd.

Getting Started: Proofy Home Page

You can access Proofy by going to <https://grinch.cs.washington.edu/proofy>. From there, log in using your CSE or UW netid and you will then be directed to the Proofy Home Page:

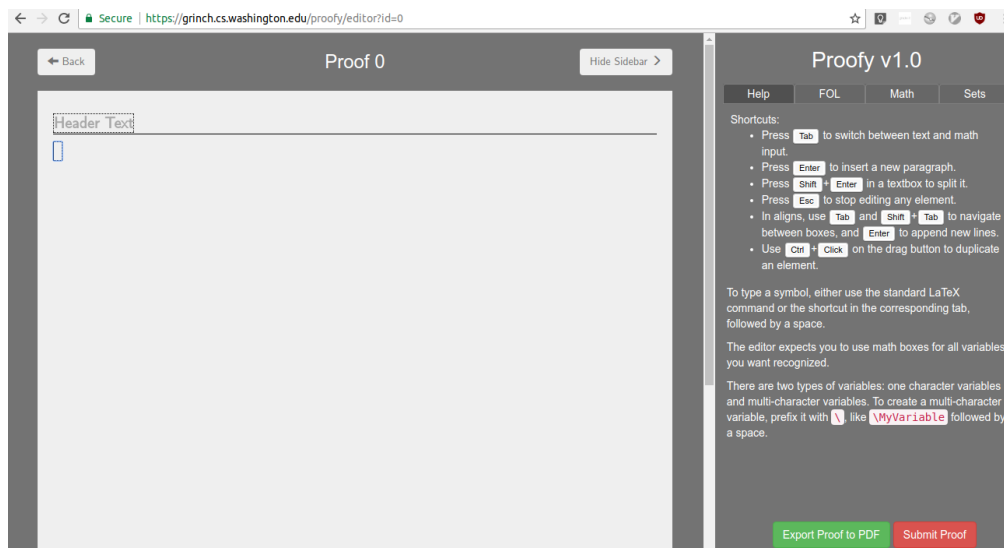


This home page lists all of your created proofs. To make a new proof, simply click the “New Proof” button and click on the new proof’s underlined name to edit it as you’d like. Clicking “Edit” under the **Actions** column will direct you to your new proof on the Proofy Editor.

Writing a Proof Using the Proofy Editor

The main component of a proof on Proofy is a section, which contains a single header (optional) and one or more paragraphs. A section may also contain a sequence of mathematical equations (useful for direct proofs, logical equivalences, etc.) using the Align Mode feature, described later on page 3.

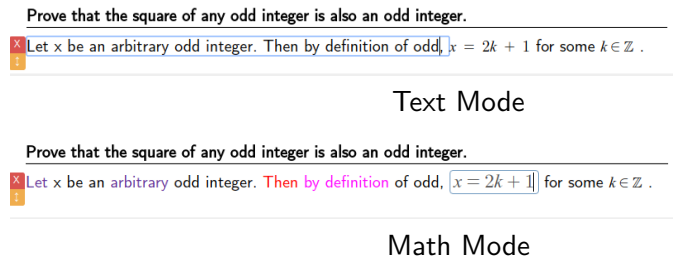
When starting a new proof, the Proofy editor displays an empty header and paragraph placeholder for the first section, as shown below:



As with other editors, the way you design and construct your proof is ultimately up to you - there are no restrictions on the number of sections, headers, paragraphs, or equations to use, as long as your proof is clear, unambiguous, and follows the proof-constructing guidelines discussed in class.

Modes

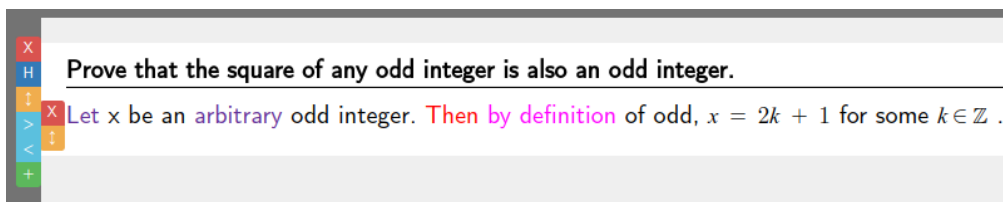
Proofy has two input modes: Text Mode and Math Mode. Text Mode should be used for the “English” parts of your proof. For example the statement, “Let x be an arbitrary odd integer”. Math Mode should be used for the mathematical formulae you use to construct your proof. For example, $x = 2k + 1$ or $k \in \mathbb{Z}$. To format your mathematical equations, you can use the keywords listed in the sidebar. Proofy supports all of the notations you will need for this course, including first-order logic, math, and set notation.



Use the Tab key to toggle between the two modes.

Section Actions

When hovering over a section, you should see a column of colored buttons appear on the left (the two buttons to the right of this column have the same function as their counterparts in the column, only for a single paragraph):

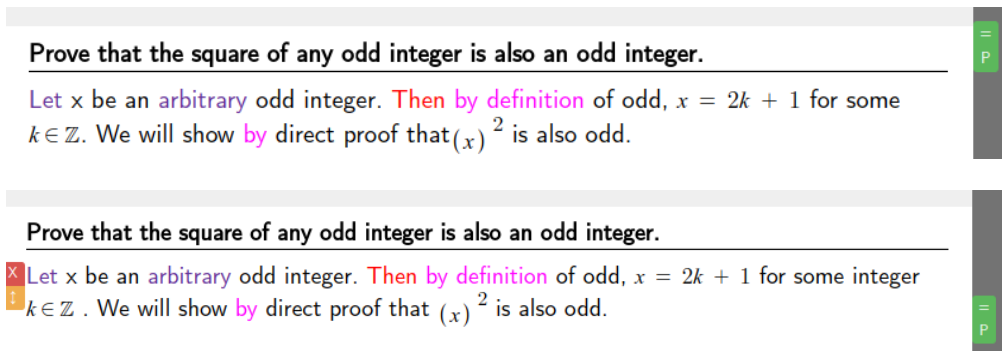


These buttons are used to common text-editing actions on a section, including removing a paragraph and/or its header, rearranging sections, indenting sections, and adding new sections. Most of these buttons should be straightforward, but we will elaborate on their intended functionality, starting with the top button (the red 'x') and ending the bottom (the green '+'):

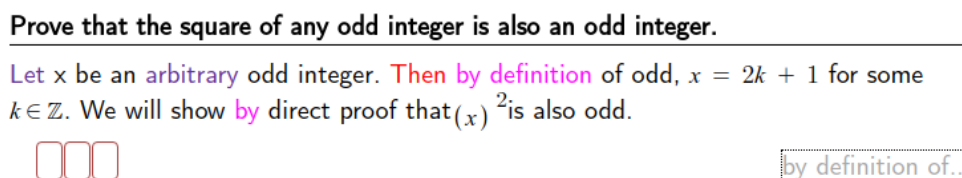
- Remove Section:** Removes the associated proof section. Hovering over this button will preview the deleted text with a faded color and strikethroughs.
- Toggle Header Visibility:** Shows or hides the header for the associated section. The header will still be output in an exported PDF, so if you really do not want it in your final proof, you should use the remove button instead of hiding it.
- Move a Section:** When clicked and dragged, moves the associated section vertically to a different position in the section order (use only when you have more than one section). This action is helpful when you decide a section is better positioned before/after another. You can alternatively hold the **Ctrl** key to make a copy of the current section instead, positioning the copy below the original. You will see the icon for this orange button change to be green with a scissor ('cut') icon when pressing **Ctrl**.
- Indent/Unindent:** The next two light blue buttons indent or reindent a section (the '<' button unindents once to the left, and the '>' button indents once to the right).
- Add a New Section:** Adds an empty new section with header and paragraph placeholders after the section this button was clicked for.

Paragraph/Header Actions

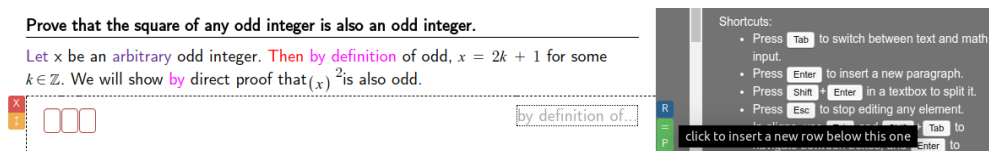
As mentioned in the previous section, each paragraph has the remove (red) and move (yellow) buttons to the left. In addition to these, there are actions that can be used just for paragraphs and headers. When hovering over a paragraph or header, you will see two green buttons on the far right of the text. Below are screenshots of these actions appearing for a header (first) and a paragraph (second):



The second button (with a 'P' icon) adds a new paragraph section below the header/paragraph being hovered over (note that you cannot add more than one header to a section). The first button (with a '=' icon) activates "Align Mode", as shown below:



This mode is useful for constructing a proof which starts with an initial statement and uses different proof techniques to reach a desired result. Each row in this Align Mode has a left-hand side, a relation symbol (e.g., =, <, >), a right-hand side, and a description. The first row should have an expression on the left-hand side, while subsequent rows will by default, omit this side of the equation, implicitly 'carrying' it over. To add more rows, click the blue 'R' button on the right of the row you want to add below, as shown in the following screenshot:



Below is an example of using this mode to help construct this tutorial's proof:

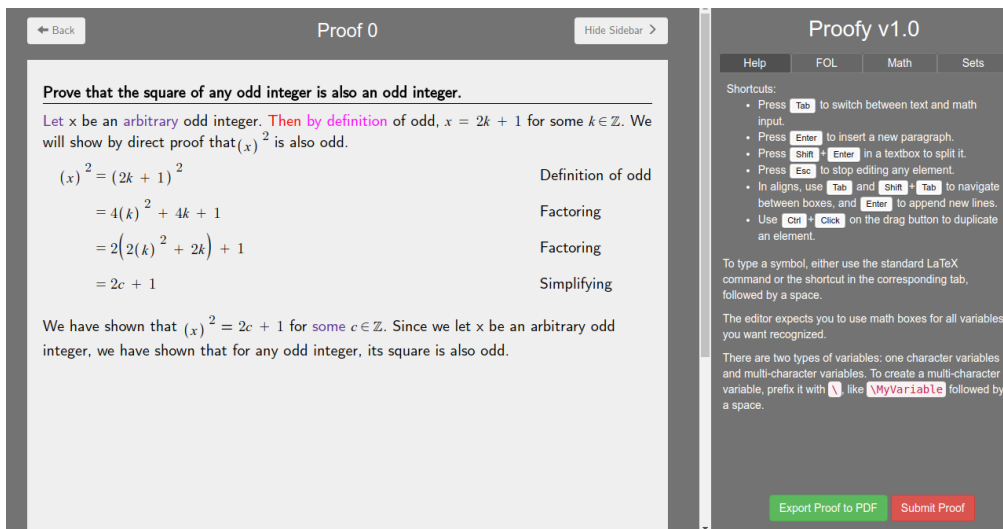
Prove that the square of any odd integer is also an odd integer.

Let x be an arbitrary odd integer. Then by definition of odd, $x = 2k + 1$ for some $k \in \mathbb{Z}$. We will show by direct proof that $(x)^2$ is also odd.

$(x)^2 = (2k + 1)^2$	Definition of odd
$= 4(k)^2 + 4k + 1$	Factoring
$= 2(2(k)^2 + 2k) + 1$	Factoring
$= 2c + 1$	Simplifying

Note that the descriptions for each row should specify the rule(s) or technique(s) applied to the previous row. These descriptions should be in English without equations (as a result, there is only Text Mode available for row descriptions).

Finally, you can add a new paragraph to complete your proof after using the Align Mode feature. The best way to do this is to click the green 'P' on the last row's rightmost action buttons to add a new paragraph below. The following screenshot shows the finished proof for this tutorial.



Saving and Submitting Your Proof

Once you're satisfied with your proof, you may export it as a PDF (which is downloaded on your browser upon success) and/or submit it to Canvas. Buttons for these actions are located at the bottom of the sidebar:



And that's it! After exiting the Proofy Editor, you can return to continue/edit your work from the Proofy Home Page (your work will be saved automatically).