

MAT180 HW01

Solutions

Due 4/7/23 at 11:59 pm on Gradescope

Instructions Create a free Overleaf account, and create a new project (e.g. “MAT180-hw”). Upload the provided HW01.tex file for HW01, and click on it on the sidebar. Then, press the big green “compile” or “recompile” button at the top of the right half of your screen. You should then see the HW01 PDF show up on the right half of your screen.

There are two exercises below. Type your solutions directly into the code, compiling every once in a while to admire your work. When you are done, press the download icon next to the recompile button to download your solutions as a PDF. Submit this PDF to Gradescope.

Reminder. Your homework submission must be typed up in full sentences, with proper mathematical formatting. The following resources may be useful as you learn to use TeX and Overleaf:

- Overleaf’s introduction to LaTeX:
https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes
- Detexify:
<https://detexify.kirelabs.org/classify.html>

Exercise 1

Here’s an example of how I would type up a formula in LaTeX:

Theorem. (Pythagorean Theorem) Let $a, b, c > 0$ denote the side lengths of a right triangle, where c is the length of the hypotenuse. Then

$$a^2 + b^2 = c^2.$$

Use TeX to typeset the quadratic formula. Remember to define your variables and write in full sentences.

SOLUTION.

Let $a, b, c \in \mathbb{R}$ denote the coefficients of the quadratic equation

$$ax^2 + bx + c = 0, \tag{1}$$

where $a \neq 0$. The quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

gives the two roots of the quadratic equation 1.

Exercise 2

Make a folder in Overleaf (click the folder icon in the sidebar) and name it “images”. Then, draw a picture of a knot and upload it to this folder. Finally, insert the image into your TeX’ed document by following the code in my example:

Example. Here is a one-crossing diagram of an unknot that I drew on my tablet, saved as a screenshot, and uploaded to Overleaf:



Later, we will learn how to insert figures that float in the page and have their own captions.

SOLUTION.

(See example above.)