

[Your Name Here]

Math 175

Homework 1

You can start writing in this file, but first save it as “homework1.tex” or something, and put your name into the file(up near the top, where all the percent signs are). You should look at the .tex source of this file, so you can see how I made it look the way it does. You can always e-mail me (Tom) if you have questions about latex.

**Question 1.** It’s a good idea to restate the question here.

*Proof.* Insert your proof here. ☐

**Question 2.**

*Proof.* ☐

**Question 2b.**

*Proof.* ☐

**Question 57.**

*Proof.* ☐

You can copy-and-paste this block as many times as you need.

## For the journal

We have similar environments for Theorems, Exercises, and Challenge Problems.

**Theorem 1.32.** You should restate the theorem here.

*Proof.* Insert your proof here. ☐

**Exercise 1.22.**

*Proof.* ☐

**Challenge Problem 1.14.**

*Proof.* ☐

## Writing in math mode

When you want to write something in “math mode”, you should enclose it in dollar signs:  $x + y = a^2 + b^2$ . If it’s an important equation and you want to set it off, you can do it like this:

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

If you have a chain of deductions, you can line them up like this. (The ampersand & tells it where to line up—usually you will want it right before the equals sign. You should have an ampersand in each line. The double-backslash `\\` tells it to move to the next line.)

$$\begin{aligned} 2x &= 2y - 10 \\ x &= y - 5 \\ z + x &= y - 5 + z \end{aligned}$$

If you want to include justifications, one way is like this:

$$\begin{aligned} 2x &= 2y - 10 & (A5) \\ x &= y - 5 & (A4) \\ z + x &= y - 5 + z & (W) \end{aligned}$$

You can also include words:

$$\begin{array}{ll} 2x = 2y - 10 & \text{by commutativity} \\ x = y - 5 & \text{since } y \text{ is the GCD} \\ z + x = y - 5 + z & \text{because 2 is prime} \end{array}$$

Here are some symbols that might come up in the homeworks and journals (but remember you can view the source of the scripts and homeworks on the course webpage).

Let  $x \in \mathbb{Z}[i]$  and  $y \in \mathbb{Q}[i]$ . Then  $x^2 + y^2 \in \mathbb{Q}[i]$ . If you have two numbers  $n_1 \in \mathbb{Z}$  and  $n_2 \in \mathbb{Z}$ , then you should be satisfied. Many students don’t have it so good. You can ask whether  $n_1 < n_2$ , or even if  $n_1 \leq n_2$ . I wonder if  $a|b$ ? Greek letters:  $\alpha, \beta, \gamma, \pi, \Gamma, \Delta$ .

Maybe you want to talk about the set  $S = \{x \in \mathbb{Z} | x^2 = 2\}$ , or maybe the set  $T = \{x \in \mathbb{Z} | x^2 \text{ is even}\}$ . Did you notice that  $S \subseteq T$ ? It’s also true that  $S \neq T$ .

You might need to write fractions like  $\frac{p}{q}$ , or even  $\frac{a}{a^2+b^2}$ . If this fractions are too small, you can display them like this (see how I made those big parentheses?):

$$\left(\frac{p}{q}\right) \cdot \left(\frac{t}{u}\right) = \frac{a}{a^2 + b^2}$$

If you can’t figure out a symbol, you should google “Detexify”. All you have to do is draw the symbol using your mouse, and it tells you the latex command.