

Homework 2

Due: 4 February 2025

Problem 2.1 — theoretical

Suppose x is a real number. Prove that if x is irrational, then $5x$ must be irrational. Use a proof by contradiction (and type it up in \LaTeX); you can present it in either two-column or narrative form, as you prefer.

For both practical problems, include `check-expect` calls that demonstrate the way they work (and a `test`) to demonstrate that you've run them!), and make sure that the requested functions are **provided**.

Note that the comment character in Racket is the semicolon, which comments out everything until the end of the line (like `//` in C++).

Problem 2.2 — practical

Write a Racket function `quadratic` that computes one of the roots of the quadratic equation represented by given a , b , and c values. (Using the quadratic formula. I don't care which of the two roots you return.)

Problem 2.3 — practical

Write a function `middle-character` that finds the middle character of a given odd-length string.

Hand in using the `handin` script:

```
handin cmsc208 hwk2 proofstuff.tex myfile.rkt
```

Collaboration policy: **For Problem 2.1:** group work! If you work with other people on this homework, you can just make one L^AT_EX file and put all your names on top, and only one of the group needs to hand it in. There will be a revision cycle for this. **For Problems 2.2–2.3:** collaborative. You each have to hand in your own version of the assignment, but you can talk to other people about the problems. Mention in a comment who you worked with. (Still no copying, though.)