Homework 4

MATH 261 Computational Geometry
due 5:00pm on Wednesday, January 15

Solve the following problems from the textbook, and write your solutions clearly and neatly. Make sure to explain your reasoning and provide mathematical details that support your answers. For a few tips on writing solutions, see this helpful guide for mathematical writing.

If you are taking this course for elective credit towards the computer science major, then do the problem labeled **CS** and not the problem labeled **math**. Otherwise, you may choose whether to do the **math** problem or the **CS** problem.

You may write or type your solutions electronically, or write them on paper and scan/photograph them. Please use a scanning app to produce a single PDF file containing your solutions. Upload your written solutions (and your code/output if you do the CS problem) to the Homework 4 assignment on Moodle.

1. **all:** Exercise 2.21 — Pseudocode suffices, but be sure to give enough detail to precisely describe your modifications to the algorithm.
2. **all:** Exercise 2.23 — You may assume that the points are in general position. Pseudocode suffices, but give enough detail to precisely describe your algorithm.
3. **CS:** Implement the Graham Scan convex hull algorithm in your favorite programming language. Provide sample input and output to demonstrate that your algorithm works. Include plots of at least three sets of points and the convex hulls of each, as computed by your algorithm.
4. **all:** Exercise 2.31
5. **all:** Exercise 2.38
6. **math:** Exercise 2.43 — Note that the cube is translated but not rotated.
7. **all:** Exercise 3.2
8. **all:** Exercise 3.3
9. **all:** Exercise 3.11 — Say how you would modify the Graham scan algorithm so that it returns a triangulation instead of a convex hull.