

## Homework 3

Math 282 Computational Geometry  
Spring 2019

Solve the following problems from the textbook, and submit your solutions either on Moodle or in the homework mailbox (RMS level 3, near the fireplace) by 4:00pm on **Friday, March 1**.

If you are taking this course for elective credit towards the computer science major, then do the problem labeled **CS only** and not the problems labeled **math only**.

1. Exercise 1.52
2. Exercise 2.1 — Note that  $\text{conv}(S)$  is defined in terms of intersections. Show that if  $a$  and  $b$  are points in  $\text{conv}(S)$ , then the line segment with endpoints  $a$  and  $b$  is also in  $\text{conv}(S)$ .
3. Exercise 2.4
4. **Math only:** Exercise 2.5
5. Consider the following naive convex hull algorithm: For each pair of points  $a$  and  $b$ , if every other point  $c$  is left of the segment  $ab$ , then  $ab$  is a hull edge.
  - What is the computational complexity of this algorithm?
  - **CS only:** Implement this algorithm in your favorite programming language. You may assume that no three points are collinear (i.e., the points are in general position). You may output the hull edges in any order. Turn in your code, as well as sample input and output to show that your code works.