

## Homework

due on Wednesday, April 15

Read carefully chapter 5 of Hartshorne's book (especially sections 22,23,24). and section 37 to chapter 7. Solve the following problems.

Problem 37.1

Problem 37.3

Problem 24.16. Hint: Let  $b$  be the longest side of the triangle. Use the method from class to dissect the triangle into 3 pieces and assemble them into a rectangle with one side  $b$ . Then follow the proof of Proposition 24.8 (explain why it can be used).

Problem 24.17 Hint: compare the longest side of the triangle to the diameter of the square. You need to assume  $\tan \alpha > 0$  (i.e.  $\alpha$  is acute). It may be easier to show that the number of pieces is at least  $1/\sqrt{\sin \alpha}$ , which is a better estimate.

**Problem 1.** Consider an isosceles triangle with base of length 18 and height of length 16. Divide this triangle into several polygonal pieces from which a square of side 12 can be assembled (use 1 cm as a unit). Explain your solution carefully and provide the actual pieces made out of a thin cardboard (or paper).