Appendix B

Hints

Chapter 1 Introduction

1. Calculate the distance between successive layers and make a regular tiling of each layer. The answer is $\pi/(3\sqrt{2})$

2. Extend the algorithm given for long division.

Chapter 2 Origins

1. Read about number representation in chapter three.

2. Look at how the series a_k is generated in a coordinate system with two graphs drawn, $y = (x + N/x)/2$ and $y = x$.
   Alternatively, study the Newton-Raphson method for finding roots.

3. Use the greedy algorithm.

4. Derive a new Egyptian fraction from an existing one.

5. Assume a book is a string of symbols with a certain maximal length, An image has a certain maximal resolution in pixels and color and a film has some frame rate and a certain maximal length.

6. Express the unknown values in terms of their equal wealth.

7. Use a binary decimal expansion.

8. Estimate the total volume, mass or area of the monkey army compared to the earth op to the land bridge to Sri Lanka.

9. Draw an extra radius.

10. Use the geometrical constructions of Pythagorean means on page 47.

11. Look at the figures on the bottom of page 52.

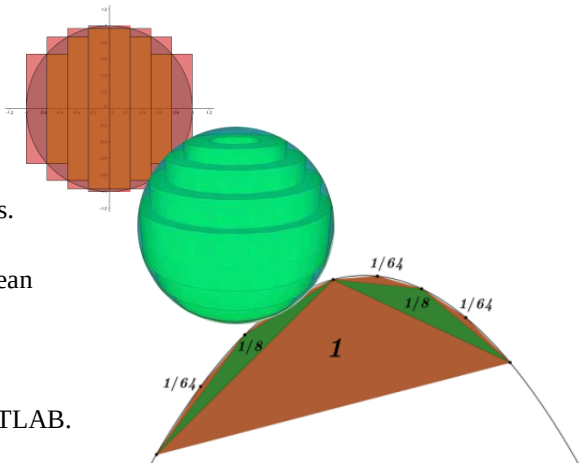
12. Look at page 60.

13. Use integration.

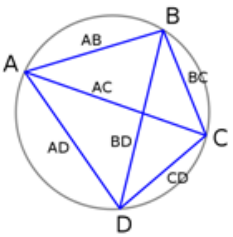
14. Use cylindrical shells.

15. Old points are the mean to get new points.

16. Use a program like Mathematica or MATLAB.



17. Prove and use Ptolemy's theorem for a cyclic quadrilateral:
$|\overline{AC}| \cdot |\overline{BD}| = |\overline{AB}| \cdot |\overline{CD}| + |\overline{AD}| \cdot |\overline{BC}|$



Chapter 3. Basics

1. Logic exercise

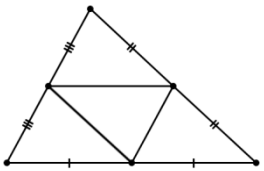
2. Show that $a \to b \to c$ is neither left-associative $(a \to b) \to c$ nor right-associative $a \to (b \to c)$.

3.

4. Back-and-forth is the name of a method that solves the problem.

14. Use the complex plane to locate places.

18. Draw a midpoint triangle.



19. Use the space diagonal.

25. Use a proof by contradiction that start from a global subdivision and iterate through smaller subdivisions that converge to a local property.

Chapter 4. Return

1.Use Fermat’s little theorem.