Euclidean Geometry

- *The Elements* by Euclid
  This is one of the most published and most influential works in the history of humankind. In our very first lecture, we looked at a small part of Book I from Euclid's Elements, with the main goal being to understand the philosophy behind Euclid's work. In my opinion, The Elements is an incredibly boring read, and there are many better ways to learn mathematics. Still, you might like to look at a copy to get a bit more of a feel for what Euclid was doing. There are many decent translations around, but I like to use the bilingual edition by Richard Fitzpatrick which is available for free on the internet.

  `http://farside.ph.utexas.edu/euclid.html`

- *Encyclopedia of Triangle Centers*
  This website catalogues over 3500 points associated to a triangle. Of course, the circumcentre, orthocentre, incentre and centroid are the most important, but some of these others are quite meritorious as well. The website doesn't make for a particularly interesting read, but should definitely convince you that there's more than meets the eye when it comes to triangles.

  `http://faculty.evansville.edu/ck6/encyclopedia/ETC.html`

- *The Geometer's Sketchpad*
  This is a program for drawing Euclidean geometry diagrams. I haven't used it very much, but from what I've seen, it does a fine job. You can find some information about it at the first link below and the program itself at the second link below.

  `http://www.keypress.com/x5521.xml`
  `http://www.themathlab.com/toolbox/geometrystuff/geosketch.htm`

- *GeoGebra*
  This is another program for drawing Euclidean geometry diagrams which I quite like. Unlike *The Geometer's Sketchpad*, the full program is available for free from the following website. Programs like this may be particularly useful for those who want to teach mathematics.

  `http://www.geogebra.org`

- *Geometry Revisited* by H. S. M. Coxeter and Samuel L. Greitzer
  This is supposedly a classic book which touches many different topics in Euclidean geometry. People who love Euclidean geometry seem to love this book, although I'm not a particular fan.
- *Episodes in Nineteenth and Twentieth Century Euclidean Geometry* by Ross Honsberger
  Euclidean geometry is, in some sense, a lost art. There are very few people who seem to care about it these days, although the few who do seem to keep on coming up with new gems. This book collects together many of these, accompanied with beautiful proofs.

Symmetry in Geometry

- *Groups and Symmetry* by M. A. Armstrong
  It was such a long time ago when I learnt group theory that I don't remember whether I learnt it from a book or not. Anyway, this is a nice, relatively simple, introduction to group theory that you might like to look at. It'll show you a lot more about group theory than we covered in the course. It's part of the *Undergraduate Texts in Mathematics* series which generally has books which are easy to digest.

- *Group Theory in the Bedroom, and Other Mathematical Diversions* by Brian Hayes
  A nice little taste of group theory can be found in a very easy-to-read article *Group Theory in the Bedroom* which appears in *American Scientist*. The article can be found at the following website.

  `http://www.americanscientist.org/issues/pub/group-theory-in-the-bedroom`

  However, it also appears in this collection of articles, all by the same author. I haven't had a chance to look at the book, but I'm hoping that it's pretty good.

Polyhedra, Graphs and Surfaces

- *Graphs and Their Uses* by Oystein Ore
  For things which are as simple as dots and lines, graphs can be very complicated things to study. There is a wealth of literature on graph theory, but one of the simplest books to read is this one. I haven't looked at it in a while, but I remember it being quite a good read, despite being a bit old-fashioned in style.
- *Introduction to Graph Theory* by Robin J. Wilson
  Although an introduction to graph theory, this book is more technical than *Graphs and Their Uses*. I quite like it though, and think that it's a good book to learn graph theory from.
- *Flatland: A Romance of Many Dimensions* by A. Square (otherwise known as Edwin A. Abbott)
  Looking for a book which offers pointed observations on the social hierarchy of Victorian culture while exploring the concept of living in a two-dimensional world? Well, this is the book for you! This is a brief, though very entertaining, novella and, in my opinion, one of the best books that you can buy for $2.75.
- *The Shape of Space* by Jeffrey R. Weeks
  This book deals with some very interesting, crazy, modern geometry. It talks about surfaces, which you should already know about, but also about higher-dimensional versions of surfaces. There are many pretty pictures and the book should help you to visualise geometry much better. I highly recommend this for anyone who is interested in continuing with pure mathematics or theoretical physics.

Tiling and Dissection

- *Tilings and Patterns* by Branko Grunbaum and G.C. Shephard
  At a whopping 720 pages, this is a rather lengthy tome dedicated almost completely to tiling problems. You might like to pick it up and have a browse through it. But I really just wanted to point it out to convince you that there is a lot to say about tiling, a lot more than we've learnt about.
- *Polyominoes: Puzzles, Patterns, Problems, and Packings* by Solomon W. Golomb and Warren Lushbaugh
  Dominoes, trominoes, tetrominoes — these are all just simple examples of what are generally called polyominoes. This book talks all about them and shouldn't be too difficult to read.
- *Polyominoes: A Guide to Puzzles and Problems in Tiling* by George Martin
  Here's another book which deals solely with polyominoes. I've only browsed this book briefly and it seems to contain some interesting information.

Mathematicians

- *The Man Who Loved Only Numbers: The Story of Paul Erdős and the Search for Mathematical Truth* by Paul Hoffman
  In this book, you'll learn about the life, the mathematics and the eccentricities of Paul Erdős. Actually, the book is very light on mathematics, but it does give you some idea of what the world of mathematicians is like. Erdős is a pretty crazy character, so anything you read about him is likely to be entertaining.
- *N is a Number: A Portrait of Paul Erdős* by George Paul Csicsery
  This one hour documentary was made not too long before Erdős passed away. It's pretty entertaining to watch, if you can get your hands on it.
- *The Man Who Knew Infinity: A Life of the Genius Ramanujan* by Robert Kanigel
  Ramanujan was one of the most remarkable mathematicians who ever lived. In his brief thirty-two years on earth, he left us with thousands of results, mostly without proof. People are still working today on deciphering his work and trying to understand how he could possibly have come up with it. This book tells the story of his life and his mathematics.
- *Surely You're Joking, Mr. Feynman* by Richard P. Feynman
  I think that everyone should have this book. It's essentially a very readable collection of anecdotes about the physicist and Nobel laureate Richard Feynman. Mathematicians and scientists should be driven by curiosity and reading this book, you'll see what a crazily curious character Feynman is.
- *The MacTutor History of Mathematics Archive*
  If you want to know more about mathematicians and the history of mathematics, then this is the website for you. If you head into the *Biographies Index* part of the website, then you'll see a long list of mathematicians in alaphebtical order, each of which is accompanied by a short biography.

  `http://www.gap-system.org/~history`
- *Men of Mathematics* by E. T. Bell
  This book is terribly outdated, as you can tell from the rather sexist title. However, it is a classic book to read about the lives of great mathematicians. Many spurious stories about mathematicians have been propagated by this book, but we can forgive the author for wanting to add a few embellishments.
- *Mathematics Genealogy Project*
  This website is dedicated to keeping a register of people's mathematical ancestry. Here, I mean that a mathematician is the parent of another if they were their graduate advisor. You can do things like trace my lineage all the way back to such mathematical greats as Gauss and Euler.

  `http://www.genealogy.ams.org`

Other Stuff

- *Gödel, Escher, Bach: An Eternal Golden Braid* by Douglas R. Hofstadter
  This is a fantastic book, dealing with mathematics, music, art, computer science, cognitive science, language, symmetry and so on. The book's chapters alternate between non-fictional prose and fictional dialogues which are used to demonstrate various ideas. For an example, read the *Crab Canon*, which can be found at the following website.

  `http://www.evl.uic.edu/swami/crabcanon`

- *QED: The Strange Theory of Light and Matter* by Richard P. Feynman
  If you think you are interested in physics at all — even if you've studied it and found it incredibly boring — then you should read this book. Feynman was one of the greatest and most entertaining scientists of the twentieth century. This book is based on four lectures delivered to the public and captures what physics is about more than any other book I've read. It's amazing how much physics Feynman can explain to a layperson in such a short book. If you actually want to see the lectures themselves, then you can find them online at the following website.

  `http://vega.org.uk/video/subseries/8`

- LaTeX
  This is the mathematical typesetting software which has become standard in the mathematical world and is spreading to other areas of science and engineering. If you've ever wondered how I've made my notes so pretty, or why Microsoft Word is so annoying for mathematics, then you should definitely check this out. If you want to continue in mathematics or physics, then you will definitely need it and if you enter into mathematics education, then I would definitely encourage you to use it. LaTeXwas created by Donald Knuth, one of the most famous computer scientists alive today. Two of the hardest things about learning to use LaTeXare installing it on your computer and getting started. There's a heap of information on the internet which will help you with both, but if in doubt, I'm more than happy to help you.

- *The On-Line Encyclopedia of Integer Sequences*
  Say you come across a sequence of integers and want to know some more information about it. Then the first thing you should do is go to this website and type it into the search engine.

  `http://www.research.att.com/~njas/sequences/`

  Or say you want to know how many graphs there are with 11 vertices? Just go to this website and it'll tell you the answer.

- *The Colossal Book of Mathematics: Classic Puzzles, Paradoxes, and Problems* by Martin Gardner
  From 1956 to 1981, Martin Gardner wrote a column entitled *Mathematical Games* in *Scientific American*. His efforts played a great part in renewing and sustaining interest in recreational mathematics, whatever that might mean. This book is a collection of some of his columns and you should find it pretty interesting.

- *Mathellaneous (The Gazette of the Australian Mathematical Society)* by Norman Do
  I have a collection of my own articles, slightly less recreational in nature than those of Martin Gardner, which you might like to peruse. These were all published as part of the *Mathellaneous* column which featured in *The Gazette of the Australian Mathematical Society*.

  `http://www.math.mcgill.ca/ndo/articles.html`