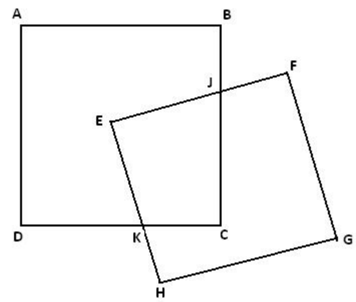
This document [1] and its corresponding .tex file will serve as a template for your future documents in LaTeX. LaTeX is a really cool document writer for manuscripts that contain mathematical expressions, equations, pictures, and plots. It makes mathematics, such as $r \in \mathbb{R}$, $\sqrt{17}$ and $\sin \frac{2\pi}{3}$, look really nice within a manuscript. You can also include plots or pictures like this if you save them in the same folder as the .tex file:



There is also a whole set of Greek letters that you can access by simple LaTeX commands, such as σ, Σ, ρ, ϵ, δ, and Δ. It is also sometimes necessary to add some equations into your document. You can do this by using the align commands, for example

$$F(x) = \int_a^x f'(x)\,dx,$$

or if you want the equation numbered

$$F(x) = \int_a^x f'(x)\,dx. \tag{1}$$

Similarly, you can create a bulleted list using the following commands:

- Math is fun!
- Math 402 is now!
- ◇ Notice this one is different. Check the code for how to change it.

Say you don't want a bulleted list, but would rather number your list instead. You can use the following command:

1. Math is fun!
2. Math 402 is now!

(a) Notice this one is different. Check the code for how to change it.

You can also nest these lists such as the following example:

1. Math is fun!
2. Math 402 is now!
   (a) 2:40-3:50
   (b) MWF in Ivers 218
3. Notice this one is now the same.

If you wanted to add the following table to your document, the corresponding LaTeX code will show you how

Math Course	Emphasis of the course	Months in 2014
402	Presentations on History and Mathematics	January & February
403	Discussions and Writing	March & April

The following is a typical set of paragraphs containing mathematics and text, adapted from [2].

The foundations of the rigorous study of *analysis* were laid in the nineteenth century, notably by the mathematicians Cauchy and Weierstrass. Central to the study of this subject are the formal definitions of *limits* and *continuity*.

Let D be a subset of $\mathbb{R}$ and let $f\colon D \to \mathbb{R}$ be a real-valued function on D. The function f is said to be *continuous* on D if, for all $\epsilon > 0$ and for all $x \in D$, there exists some $\delta > 0$ (which may depend on x) such that if $y \in D$ satisfies

$$|y - x| < \delta$$

then

$$|f(y) - f(x)| < \epsilon.$$

One may readily verify that if f and g are continuous functions on D then the functions $f + g$, $f - g$ and $f \times g$ are continuous. If in addition g is everywhere non-zero then f/g is continuous.

We can also do multi-line mathematical expressions [3] in LaTeX:

$$\begin{aligned} \cos 2\theta &= \cos^2\theta - \sin^2\theta \\ &= 2\cos^2\theta - 1. \end{aligned}$$

References

[1] Math in the City Materials, `http://www.math.unl.edu/~math-mitc/materials/`, accessed January 7, 2014.

[2] A Typical LaTeX Input File, `http://www.maths.tcd.ie/~dwilkins/LaTeXPrimer/TypicalInput.html`, accessed January 7, 2014.

[3] Multiline Formulae in LaTeX, `http://www.maths.tcd.ie/~dwilkins/LaTeXPrimer/Multiline.html`, accessed January 7, 2014.