# Computing for mathematics handout 6 - Sage and the Class test

Lecturer: Vince Knight

Office: M1.30

email: knightva@cf.ac.uk

**Office hours: Thursday 1300-1500**

## What you have learnt this week:

* How to carry out basic algebraic operations in Sage (solve equations, simplify expressions etc...)

## What is Sage?

* Sage is a mathematics package built on Python. This implies that you can use the Python code you learnt in the first weeks of this class in Sage.
* Sage can be used to check formulae. For example: what is the formula for ?
* a = var('a')  
  b = var('b')  
  i = var('i')  
  x = var('x')  
  sum(x^i,i,a,b)
* Sage can also be used to plot functions (this could help when attempting to visualise a particular theorem):
* k = 20  
  p = plot(x^0,color=rainbow(20)[0], legend\_label="$x^0$")  
  for i in range(1,20):  
   p += plot(x^i,color=rainbow(20)[i],legend\_label="$x^{%s}$" % i)  
  p
* Here is something a bit more visually impressive (the code is slightly more compact as it uses some Sage tricks):
* k = 20  
  rb = rainbow(k+1)  
  sum(plot(sin(i\*x)\*i,color=rb[k-i], legend\_label=r"${0}\sin({0}x)$".format(i)) for i in [0..k])
* Sage is a tool available to you to help you through your time at Cardiff.
* Sage allows you to share files with particular people (if you know their username) and also allows you to publish it.

## Sometimes our server is buggy

Our server has been a bit buggy for some of you. I apologise and sadly there's not much I can do about it a part from show you how to get around the bugs.

* **DO NOT USE INTERNET EXPLORER** Internet explorer (IE) does weird things sometimes and so if you've written your code in IE and then opened up your file in a modern browser you might **still need to re-write your code** (not copy and paste) to make it work. **Alternative to IE are available on the networked machines**.
* If sometimes your code seems to work but does not evaluate try the following trick:
* sol = solve(x^2==-1,x)
* Then in another cell simple show sol:
* sol
* If all else fails close down your browser and open it up again. If there are very buggy things happening please let me know.

## Class test

* format
* submitting
* schedule

## What you should do next:

* **Finish revising for the class test**: be sure to be confident with the lab sheets 1 - 5 (Sage is not on the class test).
* **Start the next sheet**: this is a longer one looking at how to differentiate, integrate and plot in Sage.
* Contribute to the wiki.
* To make the best use of the lab sessions turn up having finished your sheets;
* If anything is still unclear **please** come and see me during office hours.