Exercise 2

Let's try use some of the things we learnt in the last section. If you get stuck at any point put your hand up and I'll come over to help.

1. Within the `sage_latex` folder create the file `macros.tex`.
2. Give `macros.tex` a `documentclass`. Ensure you can compile `macros.tex` with some dummy text in the document body.
3. Create a macro `\newt` which typesets the equation $F = m\ddot{x}$. *Hint:* In math-mode two dots can be typeset above a letter with `\ddot`.
4. Add the line "`From Newton's second law we have that \newt.`" to the body of `macros.tex`. Ensure that `macros.tex` compiles.
5. Create a macro `\triang` which takes one argument. This macro should typeset the summation $\Sigma_{i=1}^{N} i$ where N is specified by a parameter passed to `\triang`.
6. Add the line "`The triangular numbers \triang{3}=6, \triang{7}=28 and \triang{31}=496 are also examples of perfect numbers.`" to `macros.tex`. Ensure you can compile `macros.tex`.
7. Create a macro `\gauss` to typeset the integral: $\int_{-\infty}^{\infty} e^{-x^2}\mathrm{d}x$. Change `\gauss` so that it takes a parameter which sets the symmetric limits of the integral. Finally, alter `\gauss` so that its default parameter is `\infty`.
8. Add the line "`The Gaussian integral, also known as the Euler-Poisson integral, evaluates to \gauss=$\sqrt{\pi}$. For a complete proof of this result we shall consider $I(a)$=\gauss[a] and the limit $\lim_{a\rightarrow\infty} I(a)$`". Again, ensure that you can compile `macros.tex` with this line included.