

EXERCISE 2

Let's try use some of the things we learnt in the last section. If you get stuck at any point, get my attention somehow and I will help you.

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 $\sum_{i=1}^N i$ 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: $\int_{-\infty}^{\infty} e^{-x^2} dx$. 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.