Example

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fuck off

Example of a LaTeX document

Introduction

Definition Title
This is a definition.
- This is an itemized list
- Should provide a concise explanation

Concept Title
This is a concept. This describes more general concepts and ideas.

Lemma Title
This is a lemma.

Theorem Title
This is a theorem. Also use this for certain explanations that are more on the mathematical side, even if they are not theorems.

Corollary Title
This is a corollary. Also use this for certain explanations that are more on the mathematical side, even if they are not corollaries. Especially in context to a theorem block above, this adds further information or explanations.
1. This is an enumerated item.
2. This is another enumerated item.

this is a simple example. no title required.

Example Title
this is a more complex example. title required.

Example Title
One can achieve better readability by seperating the task definition (exercise)

from the solution (solution).

Code and Formulas

Code Title
This is a code block, where general concepts are explained.

```
// Indentation matters in these blocks, so all the way to the left!
def exampleFunction(param1, param2):
    // This is a comment
    return param1 + param2
```

Depending on the programming language, we need to specify the language for the code block. Style should always be set to style=basesmol.

```
// Indentation matters in these blocks, so all the way to the left!
int example_function(int param1, int param2) {
    // This is a comment
    return param1 + param2;
}
```

Important note: Within lstlisting blocks we should only include ENGLISH comments. Within the lstlisting environment letters like ä, ö, ü, ß are not supported.

Example Code Title
This is an example code block. This should show specific implementations or examples.

```
# Indentation matters in these blocks, so all the way to the left!
def example_function(param1, param2):
    # This is a comment
    return param1 + param2
```

Formula Title
This is a formula. This should be used for very important formulas and concepts that can be simplified into a step-by-step process.
Short formula: $E = mc^2$
Complex formula:

$$\int_a^b f(x)\,dx = F(b) - F(a)$$

do not use the `equation` environment, as I prefer working with $ and $$ for inline and block formulas.

KR Title
This is a KR. This "Kochrezeptïs a recipe for a specific exercise type. It should be used for very important recipes and concepts.

First step
This is the first step of the recipe.
- Paragraphs are used to achieve coarse-grained separation of the steps.
- Lists within the paragraphs are used to achieve fine-grained separation of the steps.

Second step
and so on.

conclusion
This is the conclusion of the recipe. It should summarize the steps and provide a final overview of the process.

Special Cases

Definition Title
- this is an itemized list

if after a title there is a list, no need to add a new line manually.

Definition Title

before and after an image, we need to add a new line manually.

Some characters are treated as special characters in LaTeX. For example, the dollar sign ($) is used to indicate math mode, and the backslash (\) is used to escape special characters. To include these characters in your text, you need to use a backslash before them. For example, to include a dollar sign in your text, you would write $. More examples:
- &
- %
- {}
- _
- \
- ~
- ^

Some characters even need to be defined within a math environment. This can be done inline to show things like θ or α. Examples:
- $\neq$
- $\sim$
- $\approx$
- $\vee \wedge \uplus$
- $\forall \sqcap \sharp \cup \biguplus$
- $\otimes$

We also use $\rightarrow$ and $\Rightarrow$ for arrows. The first one is a single arrow, the second one is a double arrow. These are nice to use in all kinds of contexts, especially when we want to show a transition from one state to another, or some kind of conclusion or extra information.

Formula Title

In formulas, we have LateX functions that are used to create nice looking formulas. examples:

- `frac` for fractions: $\frac{a}{b}$
- `sqrt` for square roots: $\sqrt{a}$
- `sqrt[n]` for n-th roots: $\sqrt[n]{a}$
- `abs` for absolute values: $|a|$
- `sum` for summation: $\sum_{i=1}^{n} i$
- `prod` for product: $\prod_{i=1}^{n} i$
- `int` for integrals: $\int_{a}^{b} f(x)\,dx$
- `lim` for limits: $\lim_{x \to \infty} f(x)$
- `log` for logarithms: $\log_{b}(a)$
- `ln` for natural logarithms: $\ln(a)$
- `exp` for exponentials: e^{x}
- `overline` for overlines: $\overline{a}$
- `underline` for underlines: $\underline{a}$
- `vec` for vectors: $\vec{a}$
- `hat` for hats: $\hat{a}$
- `underbrace` for underbraces: $\underbrace{a}_{b}$
- `overbrace` for overbraces: $\overbrace{a}^{b}$

If we want to display vectors or matrices, we can use the `pmatrix` environment. This is a nice way to display matrices in a clean and readable way.

This is a matrix with m rows and n columns. The `pmatrix` environment is used to create a matrix with parentheses around it. We can also use the `bmatrix` environment for square brackets, or the `vmatrix` environment for vertical bars.

Personally, I prefer using `psmallmatrix`, `bsmallmatrix`, `vsmallmatrix` for my summaries. This is a nice way to display matrices in a clean and readable way.

Generally I use psmallmatrix for vectors, and bsmallmatrix for matrices. vsmallmatrix is usually used in a context where I want to display multiple matrices next to each other (like when showing how the Gauss algorithm works).

$\left(\begin{smallmatrix} 1 & 2 & 3 \end{smallmatrix}\right)$ and $\left(\begin{smallmatrix} 1 \\ 2 \\ 3 \end{smallmatrix}\right)$ are both vectors, but the first one is a row vector and the second one is a column vector.

$$\left[\begin{smallmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{smallmatrix}\right]$$

is a matrix with 2 rows and 3 columns.

$$\left|\begin{smallmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{smallmatrix}\right|$$

is a matrix with 2 rows and 3 columns, but it is displayed in a different way.