

# GSNS L<sup>A</sup>T<sub>E</sub>X course

T<sub>E</sub>XniCie

7 September 2021

## Schedule

- Introduction
  - Text formatting
  - Structure of a document
  - ⟨Exercises!⟩
  - Images
  - Formulas
  - ⟨Exercises!⟩
  - Good to know

# LAT<sub>E</sub>X vs Word

## My document

**Section 1**

*...lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean commodo ligula eget dolor. Aenean massa. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Donec quam felis, ultricies nec, pellentesque eu, pretium quis, sem. Nulla consequat massa quis enim.*

**Donec pede justo**  
Fringilla vel, aliquet nec, vulputate eget, arcu. In enim justo, rhoncus ut, imperdiet a, venenatis vitae, iusto.

Nullam dictum felis eu pede mollis pretium. Integer tincidunt.

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

Cras dapibus. Vivamus elementum semper nisi. Aenean vulputate eleifend tellus. Aenean leo ligula, porttitor eu, consequat vitae, eleifend ac, enim. Aliquam lorem ante, dapibus in, viverra quis, feugiat a, tellus.



Figure 1: Bengaalse tijger

## My document

Vincent Kuhlmann

3 May 2021

1 Lorem ipsum

*Quam felix, ultricies nec, pellentesque eu, pretium quis, sem. Nulla consequat massa quis enim.*

### 1.1 Donec pede justo

Fringilla vel, aliquet nec, vulputate eget, arcu. In enim justo, rhoncus ut, imperdiet a, venenatis vitae, justo,

Nullam dictum felis eu pede mollis pretium. Integer tincidunt.

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}(\frac{x-\mu}{\sigma})^2} \quad (1)$$

Cras dapibus. Vivamus elementum semper nisi. Aenean vulputate eleifend tellus. Aenean leo ligula, porttitor eu, consequat vitae, eleifend ac, enim. Aliquam lorem ante, dapibus in, viverra quis, feugiat a, tellus.



Figure 1: Bengaalse tijgo

# LAT<sub>E</sub>X vs Word

Inner workings: big difference.

## Word: Edit visually

## LATEX: Edit code (text)

```
\title{My document}
\author{Vincent Kuhlmann}
\date{3 May 2021}

\begin{document}
\maketitle
\section{Lorem ipsum}
Lorem ipsum dolor sit amet, consectetur

\begin{align}
f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}
\end{align}
\end{document}
```

## My document

Vincent Kuhlmann

3 May 2021

## 1 Lorem ipsum

*...lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean commodo ligula eget dolor. Aenean massa. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Donec quam felis, ultricies nec, pulvinar eu, pretium quis, sem. Nulla consequat massa quis enim.*

### 1.1 Donec pede justo

Fringilla vel, aliquet nec, vulputate eget, arcu. In enim justo, rhoncus ut, imperdiet a, venenatis vitae, justo.

Nullam dictum felis eu pede mollis pretium. Integer tincidunt.

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2} \quad (1)$$

Cras dapibus. Vivamus elementum semper nisi. Aenean vulputate eleifend tellus. Aenean leo ligula, porttitor eu, consequat vitae, eleifend ac, enim. Aliquam lorem ante, dapibus in, viverra quis, feugiat a, tellus.



Figuur 1: Bengaalse tijger

# Code vs Visual

Bekijk hele assortiment ▾ Zoeken naar...

✓ Voor 23.59 uur besteld, morgen gratis bezorgd ✓ Gratis retourneren

Extern geheugen WD LaCie Seagate Toshiba Top

Geheugen & opslag

Externe harde schijven (HDD)

- 1 TB externe harde schijven
- 2 TB externe harde schijven
- 4TB externe harde schijven
- Externe HDD bundels
- Externe harde schijven voor Windows

▼ Bekijk meer

## Externe harde schijven

Een externe harde schijf geheugen voor je compi maar 1 kabel voor besta het stopcontact nodig er

# Code vs Visual

```
\begin{lemma}
    Lorem ipsum dolor sit
    ... eget dolor.

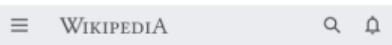
    \begin{proof}
        Aenean massa. Cum
        ... quis enim.
    \end{proof}
\end{lemma}
```

**Lemma 1.9.** *Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean commodo ligula eget dolor.*

*Proof.* Aenean massa. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Donec quam felis, ultricies nec, pellentesque eu, pretium quis, sem. Nulla consequat massa quis enim. □

# Code vs Visual

- Websites & Apps  
**Complex**
- Wikipedia  
**Consistent**



De **Ninglinspo** is een zijriviertje van de **Amblève** nabij het **Luikse** plaatsje **Nonceveux** bij **Remouchamps** in de gemeente **Aywaille** en vormt de benedenloop van de (Ruisseau de) **Hornay** die ten zuiden van het plaatsje **Vert Buisson** in de gemeente **Theux** ontspringt.

**Ninglinspo**

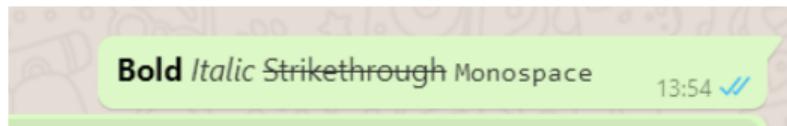
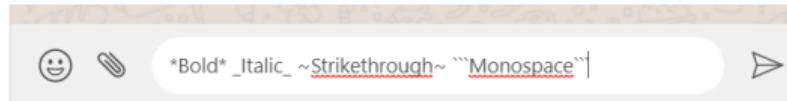


De Ninglinspo niet ver van haar monding in de Amblève

<b>Lengte</b>	15 km
<b>Hoogte (bron)</b>	420 m

# Code vs Visual

- Websites & Apps  
**Complex**
- Wikipedia  
**Consistent**
- WhatsApp  
**Expandable**



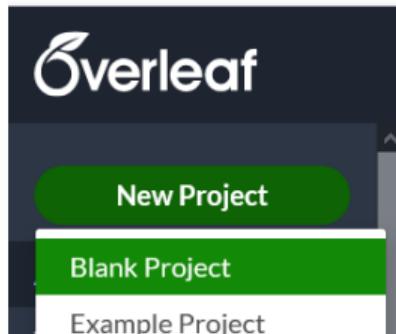
# Overleaf

**LaTeX** is the programming language.

**Overleaf** is a website where you can write and compile LaTeX.

**Visual Studio Code** is a desktop app where you can write and compile LaTeX.

**MiKTeX** does compilation for Visual Studio code.



For now: Overleaf.

Want VS Code? Instructions at  
[vkuhlmann.com/latex/installation](http://vkuhlmann.com/latex/installation)

# Simple document

```
\documentclass{article}
\usepackage [utf8]{inputenc}

\title{My document}
\author{Vincent Kuhlmann}
\date{1 May 2021}

\begin{document}
\maketitle
\section{Introduction}

Hello everyone!

\end{document}
```

My document

Vincent Kuhlmann

7 September 2021

## 1 Introduction

Hello everyone!

\textbf{f}

# Text effects

---

Result	Code
<b>Text</b>	
<i>Text</i>	
TEXT	
<u>Text</u>	

---

Result	Code
<b>Text</b>	
Text	
Text	
Text	

# Text effects

---

Result	Code
<b>Text</b>	<code>\textbf{Text}</code>
<i>Text</i>	
TEXT	
<u>Text</u>	

---

Result	Code
Text	
Text	
Text	
Text	

---

**bf** = **boldface** | **it** = **italics** | **sc** = **smallcaps** | **tt** = **teletype** (a.k.a. monospace)

## Text effects

Result	Code	Result	Code
<b>Text</b>	<code>\textbf{Text}</code>	Text	<code>\texttt{Text}</code>
<i>Text</i>	<code>\textit{Text}</code>	Text	<code>{\tiny Text}</code>
TEXT	<code>\textsc{Text}</code>	<big>Text</big>	<code>{\LARGE Text}</code>
<u>Text</u>	<code>\underline{Text}</code>	Text	<code>\textcolor{red}{Text}</code> <sup>1</sup>

Huge, huge, LARGE, Large, large, normalsize, small,  
footnotesize, scriptsize, tiny

---

<sup>1</sup>`\usepackage{xcolor}`

\textbf{\{}}

---

  Lorem ipsum **\tiny** dolor sit amet, consectetur adipiscing elit. Phasellus elementum, lacus quis tempus scelerisque, elit diam vulputate ex, semper elementum massa odio in ante.

---

**Lorem ipsum** dolor sit amet, consectetur adipiscing elit. Phasellus elementum, lacus quis tempus scelerisque, elit diam vulputate ex, semper elementum massa odio in ante.

\textbf{\{}}

---

```
 Lorem \{ipsum \tiny dolor sit amet, consectetur
adipiscing elit. Phasellus \{elementum\}, lacus quis
tempus scelerisque, \{elit diam vulputate ex, semper\}
elementum massa odio in ante.
```

---

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Phasellus elementum, lacus quis tempus scelerisque, elit diam vulputate ex, semper elementum massa odio in ante.

# Paragraphs

```
 Lorem ipsum dolor sit amet,  
 ... ornare sit amet.  
 In ipsum ante, sollicitudin  
 ... sit amet augue.
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer id erat leo. Suspendisse sit amet ligula turpis. Duis congue turpis odio, non ornare elit ornare sit amet. In ipsum ante, sollicitudin at euismod vitae, tincidunt vitae massa. Aenean metus lectus, porta at tempor at, dapibus sit amet augue.

# Paragraphs

```
 Lorem ipsum dolor sit amet,  
 ... ornare sit amet.  
 In ipsum ante, sollicitudin  
 ... sit amet augue.
```

```
 Lorem ipsum dolor sit amet,  
 ... ornare sit amet.
```

```
 In ipsum ante, sollicitudin  
 ... sit amet augue.
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer id erat leo. Suspendisse sit amet ligula turpis. Duis congue turpis odio, non ornare elit ornare sit amet. In ipsum ante, sollicitudin at euismod vitae, tincidunt vitae massa. Aenean metus lectus, porta at tempor at, dapibus sit amet augue.

# Paragraphs

```
 Lorem ipsum dolor sit amet,  
 ... ornare sit amet.  
 In ipsum ante, sollicitudin  
 ... sit amet augue.
```

```
 Lorem ipsum dolor sit amet,  
 ... ornare sit amet.  
 In ipsum ante, sollicitudin  
 ... sit amet augue.
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer id erat leo. Suspendisse sit amet ligula turpis. Duis congue turpis odio, non ornare elit ornare sit amet. In ipsum ante, sollicitudin at euismod vitae, tincidunt vitae massa. Aenean metus lectus, porta at tempor at, dapibus sit amet augue.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer id erat leo. Suspendisse sit amet ligula turpis. Duis congue turpis odio, non ornare elit ornare sit amet.

In ipsum ante, sollicitudin at euismod vitae, tincidunt vitae massa. Aenean metus lectus, porta at tempor at, dapibus sit amet augue.

# Paragraphs

```
...
\usepackage{parskip}
\begin{document}
Lorem ipsum dolor sit amet,
... ornare sit amet.

In ipsum ante, sollicitudin
... sit amet augue.
\end{document}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer id erat leo. Suspendisse sit amet ligula turpis. Duis congue turpis odio, non ornare elit ornare sit amet.

In ipsum ante, sollicitudin at euismod vitae, tincidunt vitae massa. Aenean metus lectus, porta at tempor at, dapibus sit amet augue.

# Paragraphs

```
\noindent Lorem ipsum dolor  
sit amet, ... ornare sit  
amet.
```

```
In ipsum ante, sollicitudin  
... sit amet augue.
```

# Paragraphs

```
\noindent Lorem ipsum dolor  
sit amet, ... ornare sit  
amet.
```

```
In ipsum ante, sollicitudin  
... sit amet augue.
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer id erat leo. Suspendisse sit amet ligula turpis. Duis congue turpis odio, non ornare elit ornare sit amet.

In ipsum ante, sollicitudin at euismod vitae, tincidunt vitae massa. Aenean metus lectus, porta at tempor at, dapibus sit amet augue.

# Paragraphs

```
 Lorem ipsum dolor sit amet,  
 ... ornare sit amet.
```

```
\vspace{1cm}
```

```
In ipsum ante, sollicitudin  
... sit amet augue.
```

(From now on, always parskip)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer id erat leo. Suspendisse sit amet ligula turpis. Duis congue turpis odio, non ornare elit ornare sit amet.

In ipsum ante, sollicitudin at euismod vitae, tincidunt vitae massa. Aenean metus lectus, porta at tempor at, dapibus sit amet augue.

# Lists

These are the ingredients:

```
These are the ingredients:  
\begin{enumerate}  
    \item Carrots  
    \item Onions  
  
    Lipsum dolor sit amet.  
    \item Potatoes  
\end{enumerate}
```

1. Carrots

2. Onions

Lipsum dolor sit amet.

3. Potatoes

# Lists

These are the ingredients:

```
\begin{enumerate}
    \item Carrots
    \begin{enumerate}
        \item Buy
        \item Peel
        \item Chop
    \end{enumerate}
    \item Onions

    Lipsum dolor sit amet.
    \item Potatoes
\end{enumerate}
```

These are the ingredients:

1. Carrots
  - (a) Buy
  - (b) Peel
  - (c) Chop
2. Onions
- Lipsum dolor sit amet.
3. Potatoes

# Lists

These are the ingredients:

```
\begin{itemize}
    \item Carrots
    \begin{enumerate}
        \item Buy
        \item Peel
        \item Chop
    \end{enumerate}
    \item Onions

    Lipsum dolor sit amet.
    \item Potatoes
\end{itemize}
```

These are the ingredients:

- Carrots
  1. Buy
  2. Peel
  3. Chop
- Onions
- Potatoes

Lipsum dolor sit amet.

# Lists

These are the ingredients:

```
\begin{itemize}
    \item Carrots
    \begin{itemize}
        \item Buy
        \item Peel
        \item Chop
    \end{itemize}
    \item Onions

    Lipsum dolor sit amet.
    \item Potatoes
\end{itemize}
```

These are the ingredients:

- Carrots
  - Buy
  - Peel
  - Chop
- Onions
  - Lipsum dolor sit amet.
- Potatoes

## Special characters

Code	Result	Code	Result
\{	{	{	Begin group
\}	}	}	End group
\%	%	%	Comment
\_	-	-	Used in maths
\textasciicircum	^	^	Used in maths
\\$	\$	\$	Math mode
\textbackslash	\	\	Command
\&	&	&	Column separation
\#	#	#	Parameter
\textgreater	>	>	i
\textless	<	<	j

## Special characters

Code	Result	Code	Result
\{	{	{	Begin group
\}	}	}	End group
\%	%	%	Comment
\_	-	-	Used in maths
\textasciicircum	<sup>^</sup>	<sup>^</sup>	Used in maths
\\$	\$	\$	Math mode
\textbackslash	\	\	Command
\&	&	&	Column separation
\#	#	#	Parameter
\textgreater	>	>	i
\textless	<	<	j

## Comments

```
% Make soul package work in beamer presentations
% Source: https://tex.stackexchange.com/...
\let\UL\ul
\makeatletter
\renewcommand\ul{
    \let\set@color\beamerorig@set@color
    \let\reset@color\beamerorig@reset@color
    \UL
}
...
```

## Comments

```
% TODO Translate to english
\section{Nonsense}

Lorem ipsum dolor sit amet,
\textbf{ornare} sit amet.

\subsection{About  $\sqrt{2}$ }
```

Error! Undefined control sequence

# Comments

```
% TODO Translate to english
\section{Nonsense}

%Lorem ipsum dolor sit amet,
%\textfb{ornare} sit amet.
%
%\subsection{About $ \sqrt{2} $}
```

## 1 Nonsense

## Comments

```
% TODO Translate to english
\section{Nonsense}

Lorem ipsum dolor sit amet,
\textfb{ornare} sit amet.

%\subsection{About $ \sqrt{2} $}
```

Error! Undefined control sequence

# Comments

```
% TODO Translate to english
\section{Nonsense}

Lorem ipsum dolor sit amet,
\textbf{ornare} sit amet.

\subsection{About  $\sqrt{2}$ }
```

## 1 Nonsense

Lorem ipsum dolor sit amet,  
**ornare** sit amet.

### 1.1 About $\sqrt{2}$

## Quotes

'LaTeX' : 'LaTeX'

`LaTeX' : 'LaTeX'

``LaTeX'': "LaTeX"

# Whitespace

- a...b..c

a b c.

# Whitespace

- a\_\_\_\_\_b\_c
- a\\_\\_\\_b\_c

a b c.

a b c.

# Whitespace

- a\\_\\_b\\_c a b c.
- a\\_\\_\\\_\\_b\\_c a b c.
- a\quad b c\,,d\;e a b c d e
- a\hspace{2cm}b a b

# Whitespace

- a\\_c b\\_c a b c.
- a\\_\\_\\\_\\_\\\_\\_b\\_c a b c.
- a\quad b c\,,d\;;e a b c d e
- a\hspace{2cm}b a b
- \LaTeX is cool! \LaTeX is cool!
- Vincent is a member of the \TeX niCie. Vincent is a member of the TeXniCie.

# Whitespace

- a\\_c b\\_c a b c.
- a\\_\\_\\\_\\_\\\_\\_b\\_c a b c.
- a\quad b c\,,d\;;e a b c d e
- a\hspace{2cm}b a b
- \LaTeX is cool! \LaTeX is cool!
- Vincent is a member of the \TeX niCie. Vincent is a member of the TeXniCie.
- \LaTeX{} is cool! \LaTeX is cool!

# Whitespace

- `a\u0009b\u0009c`  
a b c.
- `a\u0009\u0009\u0009b\u0009c`  
a b c.
- `a\quad b c\,,d\;e`  
a b c d e
- `a\hspace{2cm}b`  
a b
- `\LaTeX is cool!`  
\ATEXis cool!
- Vincent is a member of the `\TeX niCie.`  
Vincent is a member of the \TeXniCie.
- `\LaTeX{} is cool!`  
\ATEX is cool!

---

- `Hello,\u0009my\u0009name  
is\u0009\textrm{ellipsis}.`  
Hello, my name is ...

---

- `Hello,\u0009my\u0009name%  
is\u0009\textrm{ellipsis}.`  
Hello, my nameis ...

# Simple document

```
\documentclass{article}

\usepackage [utf8]{inputenc}

\title{My document}
\author{Vincent Kuhlmann}
\date{1 May 2021}
```

## Preamble

My document

Vincent Kuhlmann

1 May 2021

```
\begin{document}
\maketitle
\section{Introduction}

Hello everyone!
\end{document}
```

## 1 Introduction

Hallo iedereen!

## Document

# Page margins

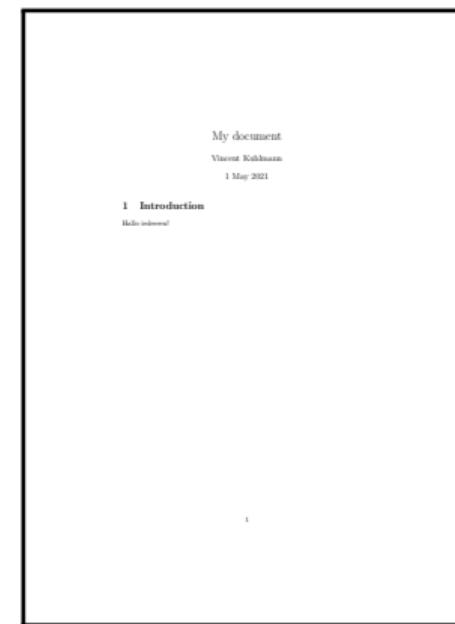
```
\documentclass{article}
\usepackage[utf8]{inputenc}

\title{My document}
\author{Vincent Kuhlmann}
\date{1 May 2021}

\begin{document}
    \maketitle
    \section{Introduction}

    Hello everyone!

\end{document}
```



# Page margins

```
\documentclass[a4paper]{article}
\usepackage[utf8]{inputenc}
\usepackage[margin=2.54cm]{geometry}

\title{My document}
\author{Vincent Kuhlmann}
\date{1 May 2021}

\begin{document}
    \maketitle
    \section{Introduction}

    Hello everyone!

\end{document}
```



# Page margins

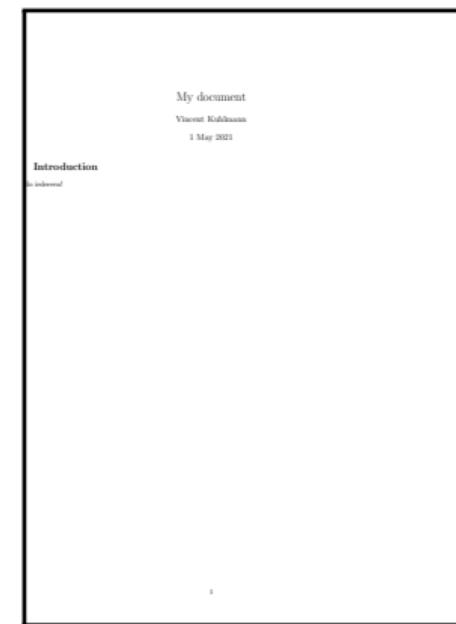
```
\documentclass[a4paper]{article}
\usepackage[utf8]{inputenc}
\usepackage[margin=2.54cm, left=-0.5cm]
{geometry}

\title{My document}
\author{Vincent Kuhlmann}
\date{1 May 2021}

\begin{document}
    \maketitle
    \section{Introduction}

    Hello everyone!

\end{document}
```



# Section commands

```
\section{AA}
```

```
  Lorem ipsum dolor sit amet,  
  consectetur adipiscing elit.
```

```
\section{BB}
```

```
\subsection{CC}
```

```
\subsubsection{DD}
```

```
\subsection{EE}
```

```
  Nullam a risus at arcu  
  lobortis viverra vel  
  volutpat diam.
```

```
\section{FF}
```

```
\subsubsection{GG}
```

## 1 AA

  Lorem ipsum dolor sit amet, consectetur adipiscing elit.

## 2 BB

### 2.1 CC

#### 2.1.1 DD

### 2.2 EE

  Nullam a risus at arcu lobortis viverra vel volutpat diam.

## 3 FF

### 3.0.1 GG

# Contents

```
\begin{document}
    \maketitle
    \tableofcontents

    \section{AA}
    ...
\end{document}
```

## Contents

1	AA	1
2	BB	2
2.1	CC . . . . .	2
2.1.1	DD . . . . .	2
2.2	EE . . . . .	2
3	FF	2
3.0.1	GG . . . . .	2

## 1 AA

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

# Contents

```
\begin{document}
    \maketitle
    \tableofcontents
    \newpage

    \section{AA}
    ...

\end{document}
```

## Contents

1	AA	2
2	BB	2
2.1	CC . . . . .	2
2.1.1	DD . . . . .	2
2.2	EE . . . . .	2
3	FF	2
3.0.1	GG . . . . .	2

# Contents

```
...
\usepackage[dutch]{babel}

\begin{document}
  \maketitle
  \tableofcontents
  \newpage

  \section{AA}
  ...

\end{document}
```

## Inhoudsopgave

1	AA	2
2	BB	2
2.1	CC . . . . .	2
2.1.1	DD . . . . .	2
2.2	EE . . . . .	2
3	FF	2
3.0.1	GG . . . . .	2

# Partial numbering

```
\setcounter{secnumdepth}{3}
\section{AA}
Lorem ipsum dolor sit amet,
consectetur adipiscing elit.

\section{BB}
\subsection{CC}
\subsubsection{DD}
\subsection{EE}

Nullam a risus at arcu
lobortis viverra vel
volutpat diam.

\section{FF}
\subsubsection{GG}
```

## 1 AA

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

## 2 BB

### 2.1 CC

#### 2.1.1 DD

#### 2.2 EE

Nullam a risus at arcu lobortis viverra vel volutpat diam.

## 3 FF

### 3.0.1 GG

# Partial numbering

```
\setcounter{secnumdepth}{2}
\section{AA}
Lorem ipsum dolor sit amet,
consectetur adipiscing elit.

\section{BB}
\subsection{CC}
\subsubsection{DD}
\subsection{EE}
Nullam a risus at arcu
lobortis viverra vel
volutpat diam.

\section{FF}
\subsubsection{GG}
```

## 1 AA

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

## 2 BB

### 2.1 CC

DD

### 2.2 EE

Nullam a risus at arcu lobortis viverra vel volutpat diam.

## 3 FF

GG

# Partial numbering

```
\setcounter{secnumdepth}{1}
\section{AA}
Lorem ipsum dolor sit amet,
consectetur adipiscing elit.

\section{BB}
\subsection{CC}
\subsubsection{DD}
\subsection{EE}

Nullam a risus at arcu
lobortis viverra vel
volutpat diam.

\section{FF}
\subsubsection{GG}
```

## 1 AA

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

## 2 BB

CC

DD

EE

Nullam a risus at arcu lobortis viverra vel volutpat diam.

## 3 FF

GG

# Partial numbering

```
\setcounter{secnumdepth}{0}
\section{AA}
Lorem ipsum dolor sit amet,
consectetur adipiscing elit.

\section{BB}
\subsection{CC}
\subsubsection{DD}
\subsection{EE}

Nullam a risus at arcu
lobortis viverra vel
volutpat diam.

\section{FF}
\subsubsection{GG}
```

AA

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

BB

CC

DD

EE

Nullam a risus at arcu lobortis viverra vel volutpat diam.

FF

GG

# Partial numbering

```
\section{AA}
```

```
    Lorem ipsum dolor sit amet,  
    consectetur adipiscing elit.
```

```
\section*{BB}
```

```
\subsection*{CC}
```

```
\subsubsection{DD}
```

```
\subsection*{EE}
```

```
    Nullam a risus at arcu  
    lobortis viverra vel  
    volutpat diam.
```

```
\section{FF}
```

```
\subsubsection{GG}
```

## 1 AA

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

## BB

### CC

#### 1.0.1 DD

#### EE

Nullam a risus at arcu lobortis viverra vel volutpat diam.

## 2 FF

#### 2.0.1 GG

# My favorite package: \usepackage[bookmarksnumbered]{hyperref}

The screenshot shows a LaTeX editor interface. On the left is a sidebar with a tree view of the document structure. The visible parts include:

- Preface
- Introduction
  - Hilbert and the Motivation for Logic
  - What Is to Be Found in This Book?
- Contents
- 1 Sets
  - 1.1 Cardinal Numbers
    - 1.1.1 The Continuum Hypothesis
  - 1.2 The Axiom of Choice
  - 1.3 Partially Ordered Sets and Zorn's Lemma
  - 1.4 Well-Ordered Sets
  - 1.5 Principles Equivalent to the Axiom of Choice
- 2 Models
  - 2.1 Rings and Orders: Examples
  - 2.2 Languages of First-Order Logic
    - 2.2.1 Free and Bound Variables
    - 2.2.2 Legitimate Substitutions** (highlighted)
    - 2.2.3 First-Order Logic and Other Kinds of Logic
  - 2.3 Structures for First-Order Logic
    - 2.3.1 Validity and Equivalence of Formulas
  - 2.4 Examples of Languages and Structures

The main document area contains the following text:

Write  $\vec{a} \equiv_{\Gamma} \vec{b}$  if for every formula  $\phi(x_1, \dots, x_n)$  from  $\Gamma$  we have:

$$M \models \phi(a_1, \dots, a_n) \Leftrightarrow N \models \phi(b_1, \dots, b_n).$$

We shall apply this for  $\Gamma$  the set of quantifier-free  $L$ -formulas and for  $1$  simple  $L$ -formulas; in which case we write  $\vec{a} \equiv_{\text{qf}} \vec{b}$ ,  $\vec{a} \equiv_{\text{simple}} \vec{b}$ , respect

**Lemma 2.7.4** *Let  $L$  be an arbitrary language. Suppose that an  $L$ -theor following property:*

Whenever  $M$  and  $N$  are models of  $T$ , and  $\vec{a} = a_1, \dots, a_n, \vec{b} = b_1, \dots, b_n$  tuples of elements of  $M$  and  $N$ , respectively, then  $\vec{a} \equiv_{\text{qf}} \vec{b}$  implies  $\vec{a} \equiv_{\text{simple}} \vec{b}$ .

*Then  $T$  has quantifier elimination.*

**Proof.** Assume that  $T$  has the property in the statement of the L Lemma 2.7.2 we have to show that every simple  $L$ -formula is  $T$ -equi quantifier-free formula in the same free variables. So, let  $\exists v\phi(v, \vec{w})$  be a formula, with  $\vec{w} = w_1, \dots, w_n$  the free variables. Let  $\vec{c} = c_1, \dots, c_n$  constants; we write  $L_{\vec{c}}$  for  $L \cup \{c_1, \dots, c_n\}$ .

Let  $\Gamma$  be the set of all quantifier-free  $L$ -formulas  $\psi(\vec{w})$  such that

$$T \models (\exists v\phi(v, \vec{c})) \rightarrow \psi(\vec{c})$$

```
\documentclass[a4paper]{article}

\usepackage[margin=2.54cm]{geometry}
\usepackage{parskip}
\usepackage{xcolor}
\usepackage{hyperref}
```

```
\setcounter{secnumdepth}{1}

\section{AA}
\subsection{BB}
\subsubsection{CC}
\subsection*{BB}
\tableofcontents
\newpage
```

Lorem \textbf{ipsum} \\ \underline{dolor} \emph{sit} amet.

Fusce \textcolor{red}{red} {ac risus} ...

\includegraphics

\includegraphics

Here you see a penguin:

\includegraphics [height=2cm]{penguin.jpg}

Photo by Sue Flood.

\includegraphics

\includegraphics

Here you see a penguin:

\includegraphics [height=2cm]{penguin.jpg}

Photo by Sue Flood.



Here you see a penguin:

Photo by Sue Flood.

<https://www.pinterest.co.kr/pin/645844402812554993/>

\includegraphics

| as paragraph

## \includegraphics

Here you see a penguin:

```
\includegraphics [height=2cm]{penguin.jpg}
```

Photo by Sue Flood.

---

Here you see a penguin:



Photo by Sue Flood.

\includegraphics

| as paragraph

| center

## \includegraphics

Here you see a penguin:

```
\begin{center}
    \includegraphics[height=2cm]{penguin.jpg}
\end{center}
```

Photo by Sue Flood.

---

Here you see a penguin:



Photo by Sue Flood.

\includegraphics

| as paragraph

| center

| figure

## \includegraphics

You can see a penguin in Figure~\ref{fig:penguin}.

```
\begin{figure}[h]
    \centering
    \includegraphics[height=2cm]{penguin.jpg}
    \caption{A cute penguin. Photo by Sue Flood.}
    \label{fig:penguin}
\end{figure}
```

You can see a penguin in Figure 1.



Figure 1: A cute penguin. Photo by Sue Flood.

# Figure placement

- h (HERE): Figure can come here.
- t (TOP): Figure can come at the top of the page.
- b (BOTTOM): Figure can come at the bottom of the page
- p (PAGE): Figure can come on a special page for figures.
- H (HERE): No floating, always here. (`\usepackage{float}`)

Figure appearing too late? Try placing `figure` to a point earlier in the code.

# Figure placement

- h (HERE): Figure can come here.
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- p (PAGE): Figure can come on a special page for figures.
- H (HERE): No floating, always here. (`\usepackage{float}`)

Figure appearing too late? Try placing `figure` to a point earlier in the code.

When working with images: `\usepackage{graphicx}`

\includegraphics

as paragraph

center

figure

htbp

## Dimensions

- Full linewidth

```
\includegraphics[width=\linewidth]{assets/pinguin.jpg}
```

- 90% linewidth

```
\includegraphics[width=0.9\linewidth]{assets/pinguin.jpg}
```

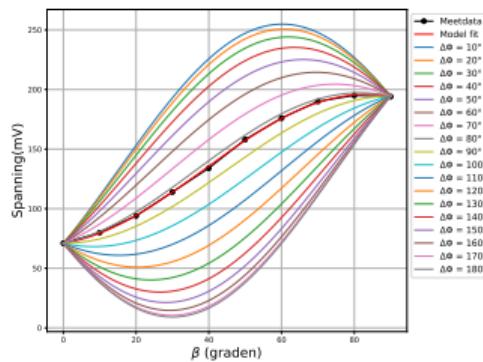
- Width maximally 90% linewidth and height maximally 5 cm

```
\includegraphics[  
    width=0.9\linewidth, height=5cm, keepaspectratio  
]{assets/penguin.jpg}
```

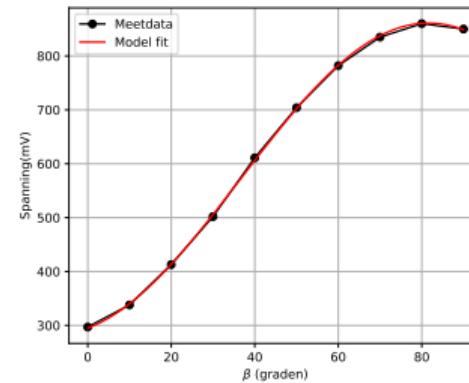
## Subfigure (\usepackage{subcaption})

```
\begin{figure}[htbp]
    \centering
    \begin{subfigure}[b]{0.45\textwidth}
        \includegraphics[width=\textwidth]{AA}
        \caption{BB}
        \label{fig:dphiExample}
    \end{subfigure}\quad
    \begin{subfigure}[b]{0.45\textwidth}
        \includegraphics[width=\textwidth]{CC}
        \caption{CC}
        \label{fig:fitExample}
    \end{subfigure}
    \caption{Multiple images next to each other!}
\end{figure}
```

## Subfigure (\usepackage{subcaption})



(a) BB



(b) CC

Figuur 1: Multiple images next to eachother!

# Formulas

The trigonometric identity is  $\sin^2(\theta) + \cos^2(\theta) = 1$ .

# Formulas

The trigonometric identity is  $\sin^2(\theta) + \cos^2(\theta) = 1$ .

---

The trigonometric identity  
is  $\$ \sin^2(\theta) + \cos^2(\theta) = 1 \$.$

---

# Formulas

The trigonometric identity is  $\sin^2(\theta) + \cos^2(\theta) = 1$ .

---

The trigonometric identity  
is  $\sin^2(\theta) + \cos^2(\theta) = 1$ .

---

---

```
\usepackage{amsmath, amssymb}
\usepackage{commath, mathtools}
```

---

# Formulas: The basics

---

Formula	Code	Formula	Code
$\sqrt{2}$	\$	$\sqrt[3]{8}$	\$
$\frac{2}{3}$	\$	$x_1$	\$
$6 \geq 3$	\$	$x_1^2$	\$
$a^2 + b^2$	\$	$a^{2+b^2}$	\$

---

# Formulas: The basics

---

Formula	Code	Formula	Code
$\sqrt{2}$	<code>\$ \sqrt{2} \$</code>	$\sqrt[3]{8}$	<code>\$</code>
$\frac{2}{3}$	<code>\$</code>	$x_1$	<code>\$</code>
$6 \geq 3$	<code>\$</code>	$x_1^2$	<code>\$</code>
$a^2 + b^2$	<code>\$</code>	$a^{2+b^2}$	<code>\$</code>

---

# Formulas: The basics

---

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$6 \geq 3$	<code>\$</code>	$x_1^2$	<code>\$</code>
$a^2 + b^2$	<code>\$</code>	$a^{2+b^2}$	<code>\$</code>

---

# Formulas: The basics

---

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---

# Formulas: The basics

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$6 \geq 3$	<code>\$ 6\geq 3 \$</code>	$x_1^2$	<code>\$</code>
$a^2 + b^2$	<code>\$ a^2 + b^2 \$</code>	$a^{2+b^2}$	<code>\$</code>

---

# Formulas: The basics

---

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$\sqrt{2}$	<code>\$ \sqrt{2} \$</code>	$\sqrt[3]{8}$	<code>\$ \sqrt[3]{8} \$</code>
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---

# Formulas: The basics

---

Formula	Code	Formula	Code
$\sqrt{2}$	<code>\$ \sqrt{2} \$</code>	$\sqrt[3]{8}$	<code>\$ \sqrt[3]{8} \$</code>
$\frac{2}{3}$	<code>\$ \frac{2}{3} \$</code>	$x_1$	<code>\$ x\_1 \$</code>
$6 \geq 3$	<code>\$ 6\geq 3 \$</code>	$x_1^2$	<code>\$ x_1^2 \$</code>
$a^2 + b^2$	<code>\$ a^2 + b^2 \$</code>	$a^{2+b^2}$	<code>\$ a^{2+b^2} \$</code>

---

# Formulas: The basics

---

Formula	Code	Formula	Code
$\sqrt{2}$	<code>\$ \sqrt{2} \$</code>	$\sqrt[3]{8}$	<code>\$ \sqrt[3]{8} \$</code>
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$6 \geq 3$	<code>\$ 6\geq 3 \$</code>	$x_1^2$	<code>\$ x_1^2 \$</code>
$a^2 + b^2$	<code>\$ a^2 + b^2 \$</code>	$a^{2+b^2}$	<code>\$</code>

---

# Formulas: The basics

---

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$\sqrt{2}$	<code>\$ \sqrt{2} \$</code>	$\sqrt[3]{8}$	<code>\$ \sqrt[3]{8} \$</code>
$\frac{2}{3}$	<code>\$ \frac{2}{3} \$</code>	$x_1$	<code>\$ x_1 \$</code>
$6 \geq 3$	<code>\$ 6\geq 3 \$</code>	$x_1^2$	<code>\$ x_1^2 \$</code>
$a^2 + b^2$	<code>\$ a^2 + b^2 \$</code>	$a^{2+b^2}$	<code>\$ a^{2+b^2} \$</code>

---

# Formulas: The basics

---

Formula	Code	Formula	Code
$\sqrt{2}$	<code>\$ \sqrt{2} \$</code>	$\sqrt[3]{8}$	<code>\$ \sqrt[3]{8} \$</code>
$\frac{2}{3}$	<code>\$ \frac{2}{3} \$</code>	$x_1$	<code>\$ x_1 \$</code>
$6 \geq 3$	<code>\$ 6\geq 3 \$</code>	$x_1^2$	<code>\$ x_1^2 \$</code>
$a^2 + b^2$	<code>\$ a^2 + b^2 \$</code>	$a^{2+b^2}$	<code>\$ a^{2+b^2} \$</code>
<code>\$ x^22 \$</code>	: $x^22$		

---

# Formulas: The basics

---

Formula	Code	Formula	Code
$\sqrt{2}$	<code>\$ \sqrt{2} \$</code>	$\sqrt[3]{8}$	<code>\$ \sqrt[3]{8} \$</code>
$\frac{2}{3}$	<code>\$ \frac{2}{3} \$</code>	$x_1$	<code>\$ x_1 \$</code>
$6 \geq 3$	<code>\$ 6 \geq 3 \$</code>	$x_1^2$	<code>\$ x_1^2 \$</code>
$a^2 + b^2$	<code>\$ a^2 + b^2 \$</code>	$a^{2+b^2}$	<code>\$ a^{2+b^2} \$</code>

---

`$ x^22 $`:  $x^22$  | `$ x^{22} $`:  $x^{22}$

\$\$ | ^\_-

## Formulas: Symbols

---

Formula	Code	Formula	Code
$x_1, \dots, x_n$	$\$$	$5 \cdot 6$	$\$$
$\alpha, \beta, \gamma$	$\$$	$A, B, \Gamma$	$\$$
$\epsilon, \varepsilon$	$\$$	$\mathcal{P}$	$\$$
$\phi, \varphi$	$\$$	$\mathbb{P}$	$\$$

---

# Formulas: Symbols

---

Formula	Code	Formula	Code
$x_1, \dots, x_n$	<code>\$ x\_1, \dots, x\_n \$</code>	$5 \cdot 6$	<code>\$ 5 \cdot 6 \$</code>
$\alpha, \beta, \gamma$	<code>\$ \alpha, \beta, \gamma \$</code>	$A, B, \Gamma$	<code>\$ A, B, \Gamma \$</code>
$\epsilon, \varepsilon$	<code>\$ \epsilon, \varepsilon \$</code>	$\mathcal{P}$	<code>\$ \mathcal{P} \$</code>
$\phi, \varphi$	<code>\$ \phi, \varphi \$</code>	$\mathbb{P}$	<code>\$ \mathbb{P} \$</code>

---

# Formulas: Symbols

---

Formula	Code	Formula	Code
$x_1, \dots, x_n$	<code>\$ x\_1, \dots, x\_n \$</code>	$5 \cdot 6$	<code>\$ 5 \cdot 6 \$</code>
$\alpha, \beta, \gamma$	<code>\$ \alpha, \beta, \gamma \$</code>	$A, B, \Gamma$	<code>\$ A, B, \Gamma \$</code>
$\epsilon, \varepsilon$	<code>\$ \epsilon, \varepsilon \$</code>	$\mathcal{P}$	<code>\$ \mathcal{P} \$</code>
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---

# Formulas: Symbols

---

Formula	Code	Formula	Code
$x_1, \dots, x_n$	<code>\$ x\_1, \dots, x\_n \$</code>	$5 \cdot 6$	<code>\$</code>
$\alpha, \beta, \gamma$	<code>\$ \alpha, \beta, \gamma \$</code>	$A, B, \Gamma$	<code>\$</code>
$\epsilon, \varepsilon$	<code>\$ \epsilon, \varepsilon \$</code>	$\mathcal{P}$	<code>\$</code>
$\phi, \varphi$	<code>\$</code>	$\mathbb{P}$	<code>\$</code>

---

## Formulas: Symbols

---

Formula	Code	Formula	Code
$x_1, \dots, x_n$	$\$ x\_1, \dots, x\_n \$$	$5 \cdot 6$	$\$ \cdot \$$
$\alpha, \beta, \gamma$	$\$ \alpha, \beta, \gamma \$$	$A, B, \Gamma$	$\$ , \$$
$\epsilon, \varepsilon$	$\$ \epsilon, \varepsilon \$$	$\mathcal{P}$	$\$ \mathcal{P} \$$
$\phi, \varphi$	$\$ \phi, \varphi \$$	$\mathbb{P}$	$\$ \mathbb{P} \$$

---

## Formulas: Symbols

---

Formula	Code	Formula	Code
$x_1, \dots, x_n$	<code>\$ x\_1, \dots, x\_n \$</code>	$5 \cdot 6$	<code>\$ 5 \cdot 6 \$</code>
$\alpha, \beta, \gamma$	<code>\$ \alpha, \beta, \gamma \$</code>	$A, B, \Gamma$	<code>\$ A, B, \Gamma \$</code>
$\epsilon, \varepsilon$	<code>\$ \epsilon, \varepsilon \$</code>	$\mathcal{P}$	<code>\$ \mathcal{P} \$</code>
$\phi, \varphi$	<code>\$ \phi, \varphi \$</code>	$\mathbb{P}$	<code>\$ \mathbb{P} \$</code>

---

# Formulas: Symbols

---

Formula	Code	Formula	Code
$x_1, \dots, x_n$	<code>\$ x\_1, \dots, x\_n \$</code>	$5 \cdot 6$	<code>\$ 5\cdot 6 \$</code>
$\alpha, \beta, \gamma$	<code>\$ \alpha, \beta, \gamma \$</code>	$A, B, \Gamma$	<code>\$ A, B, \Gamma \$</code>
$\epsilon, \varepsilon$	<code>\$ \epsilon, \varepsilon \$</code>	$\mathcal{P}$	<code>\$ \mathcal{P} \$</code>
$\phi, \varphi$	<code>\$ \phi, \varphi \$</code>	$\mathbb{P}$	<code>\$ \mathbb{P} \$</code>

---

# Formulas: Symbols

---

Formula	Code	Formula	Code
$x_1, \dots, x_n$	<code>\$ x\_1, \dots, x\_n \$</code>	$5 \cdot 6$	<code>\$ 5\cdot 6 \$</code>
$\alpha, \beta, \gamma$	<code>\$ \alpha, \beta, \gamma \$</code>	$A, B, \Gamma$	<code>\$ A, B, \Gamma \$</code>
$\epsilon, \varepsilon$	<code>\$ \epsilon, \varepsilon \$</code>	$\mathcal{P}$	<code>\$ \mathcal{P} \$</code>
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---

# Formulas: Symbols

---

Formula	Code	Formula	Code
$x_1, \dots, x_n$	<code>\$ x\_1, \dots, x\_n \$</code>	$5 \cdot 6$	<code>\$ 5\cdot 6 \$</code>
$\alpha, \beta, \gamma$	<code>\$ \alpha, \beta, \gamma \$</code>	$A, B, \Gamma$	<code>\$ A, B, \Gamma \$</code>
$\epsilon, \varepsilon$	<code>\$ \epsilon, \varepsilon \$</code>	$\mathcal{P}$	<code>\$ \mathcal{P} \$</code>
$\phi, \varphi$	<code>\$ \phi, \varphi \$</code>	$\mathbb{P}$	<code>\$ \mathbb{P} \$</code>

---

## Formulas: Vectors

Formule	Code	Formule	Code
$\vec{x}$	<code>\$ \vec{x} \$</code>	$\vec{F}_{\text{tot}}$	<code>\$ \vec{F}_{\text{tot}} \$</code>
$\mathbf{x}$	<code>\$ \mathbf{x} \$</code>	$\hat{i} + 6\hat{k}$	<code>\$ \hat{i} + 6\hat{k} \$</code>
$\ \vec{x}\ $	<code>\$ \ \vec{x}\  \$</code>	$\nabla \times \mathbf{A}$	<code>\$ \nabla \times \mathbf{A} \$</code>

$$\vec{F}_{\text{tot}}, \vec{F}_{\text{tot}}$$

## Formulas: Calculus

```
\usepackage{commath}

\ddot{\sin}(x)\dot{x}, \dfrac{\partial f(x,y)}{\partial x}, \partial_x f

\int_0^{\infty} e^{-x} \mathrm{d}x = 1
```

$$\frac{d \sin(x)}{dx}, \frac{\partial f(x,y)}{\partial x}, \partial_x f$$

$$\int_0^{\infty} e^{-x} dx = 1$$

\mathbb{b} | \vec{v} | \int | \odot | \neq

## Formulas: Mathematical relations

Formula	Code	Formula	Code
$a \leq b$	$\$ a \leq b \$$	$a \geq b$	$\$ a \geq b \$$
$a < b$	$\$ a < b \$$	$a > b$	$\$ a > b \$$
$a \ll b$	$\$ a \ll b \$$	$a \gg b$	$\$ a \gg b \$$
$a = b$	$\$ a = b \$$	$a \simeq b$	$\$ a \simeq b \$$
$a \neq b$	$\$ a \neq b \$$	$a \approx b$	$\$ a \approx b \$$
$a \sim b$	$\$ a \sim b \$$	$a \stackrel{*}{=} b$	$\$ a \stackrel{*}{=} b \$$

## Formulas: Arrows and operators

```
\DeclareMathOperator{\Image}{Image}
```

```
a \iff b, a\implies b, a\mapsto b  
\lim_{x\rightarrow 0}\frac{\sin(x)}{x} = 1  
\Image(f) = \mathbb{R}_{\geq 0}
```

$$a \iff b, a \implies b, a \mapsto b$$

$$\lim_{x \rightarrow 0} \frac{\sin(x)}{x} = 1$$

$$\text{Image}(f) = \mathbb{R}_{\geq 0}$$

So many! And there are lots more :-)

CTAN symbol list:

[http://mirrors.ctan.org/info/symbols/comprehensive/  
symbols-a4.pdf](http://mirrors.ctan.org/info/symbols/comprehensive/symbols-a4.pdf)

Detexify:

<http://detexify.kirelabs.org/classify.html>

## Equation

The trigonometric identity is  
 $\sin^2(\theta) + \cos^2(\theta) = 1$ .

The trigonometric identity is  
`\begin{equation}  
 \sin^2(\theta) + \cos^2(\theta) = 1.  
\end{equation}`

De trigonometric identity is  $\sin^2(\theta) + \cos^2(\theta) = 1$ .

De trigonometric identity is

$$\sin^2(\theta) + \cos^2(\theta) = 1. \tag{1}$$

# Align

The double-angle formula can now be rewritten as

```
\begin{align}
\cos(2\theta) &= \cos^2(\theta) - \sin^2(\theta) \\
&= 2\cos^2(\theta) - 1.
\end{align}
```

The double-angle formula can now be rewritten as

$$\cos(2\theta) = \cos^2(\theta) - \sin^2(\theta) \quad (1)$$

$$= 2\cos^2(\theta) - 1. \quad (2)$$

# Align

The double-angle formula can now be rewritten as

```
\begin{align}
    \cos(2\theta) &= \cos^2(\theta) - \sin^2(\theta) \\
    &= 2\cos^2(\theta) - 1.
\end{align}
```

The double-angle formula can now be rewritten as

$$\cos(2\theta) = \cos^2(\theta) - \sin^2(\theta) \tag{1}$$

$$= 2\cos^2(\theta) - 1. \tag{2}$$

# Align

The double-angle formula can now be rewritten as

```
\begin{align}
    \cos(2\theta) &= \cos^2(\theta) - \sin^2(\theta) \\
    &\nonumber\\
    &\quad &= 2\cos^2(\theta)-1.
\end{align}
```

The double-angle formula can now be rewritten as

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

## Align

The double-angle formula can now be rewritten as

```
\begin{align*}
    \cos(2\theta) &= \cos^2(\theta) - \sin^2(\theta) \\
    &\equiv 2\cos^2(\theta) - 1.
\end{align*}
```

The double-angle formula can now be rewritten as

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

## Align

The double-angle formula can now be rewritten as

```
\begin{align*}
    \cos(2\theta) &= \cos^2(\theta) - \sin^2(\theta) \\
    &\equiv 2\cos^2(\theta) - 1. \tag{$*$}
\end{align*}
```

The double-angle formula can now be rewritten as

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

# Align

We do this with the double-angle formula

```
\begin{align*}
    \cos(2\theta) &= \cos^2(\theta) - \sin^2(\theta),
\end{align*}
```

which we can rewrite as

```
\begin{align*}
&= \cos^2(\theta) - (1 - \cos^2(\theta)) \\
&= 2\cos^2(\theta) - 1.
\end{align*}
```

We do this with the double-angle formula

$$\cos(2\theta) = \cos^2(\theta) - \sin^2(\theta),$$

which we can rewrite as

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

# Align

We do this with the double-angle formula

```
\begin{align*}
    \cos(2\theta) &= \cos^2(\theta) - \sin^2(\theta),
\intertext{which we can rewrite as}
&= \cos^2(\theta) - (1 - \cos^2(\theta)) \\
&= 2\cos^2(\theta) - 1.
\end{align*}
```

We do this with the double-angle formula

$$\cos(2\theta) = \cos^2(\theta) - \sin^2(\theta),$$

which we can rewrite as

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

## Also in use

```
AA \(\sqrt{2}\)
BB [\sqrt{3}]
CC $$ \sqrt{4} $$
```

$$\begin{array}{c} AA \sqrt{2} BB \\ \\ \sqrt{3} \\ CC \\ \sqrt{4} \end{array}$$

## Left-right

```
\begin{align*}
& f(\sum_{i=1}^n x_i) \\
& f\left(\sum_{i=1}^n x_i\right)
\end{align*}
```

$$f\left(\sum_{i=1}^n x_i\right)$$

## Delimiter point

```
\begin{align*}
    \left. \left. x^2 \right. \right|_{x=0}^{x=2} = 4
\end{align*}
```

$$\left. \left. x^2 \right. \right|_{x=0}^{x=2} = 4,$$

```
\begin{aligned}
R(\theta) &= \begin{pmatrix} \cos(\theta) & -\sin(\theta) \\ \sin(\theta) & \cos(\theta) \end{pmatrix}, \\
|x| &= \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}
\end{aligned}
```

$$R(\theta) = \begin{pmatrix} \cos(\theta) & -\sin(\theta) \\ \sin(\theta) & \cos(\theta) \end{pmatrix}, \quad |x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

# Installation

[vkuhlmann.com/latex/installation](http://vkuhlmann.com/latex/installation)

The screenshot shows a Visual Studio Code interface with a LaTeX extension installed. On the left, the sidebar displays a tree view of a LaTeX project structure. The 'STRUCTURE' section shows a single section named '1 Introductie'. Below it, under 'SNIPPET VIEW', are tabs for 'Symbols' and 'TikZ'. A search bar is present at the bottom of the sidebar. The main editor area contains a LaTeX document named 'scratch1.tex'. The code is as follows:

```
1 \documentclass[a6paper]{article}
2
3 \usepackage[margin=2.5cm]{geometry}
4 \usepackage[dutch]{babel}
5 \usepackage{parskip}
6 \usepackage{amsmath,amssymb}
7 \usepackage{graphicx}
8 \usepackage{hyperref}
9
10 \begin{document}
11 \section{Introductie}
12
13 Hallo!
14 \begin{align*}
15 \quad x = \sqrt{2} + 3
16 \end{align*}
17 \end{document}
```

To the right of the editor, a preview window titled 'scratch1.pdf' shows the rendered document. The first page features a large section header '1 Introductie' and the text 'Hallo!'. Below the text is the mathematical equation  $x = \sqrt{2} + 3$ . The status bar at the bottom of the code editor shows the file path 'master' and other standard status indicators.

On installed versions you might need to compile multiple times.

# The end

# Questions?

Stuck? Mail us at  
[texnicie@a-eskwadraat.nl](mailto:texnicie@a-eskwadraat.nl)

# License

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