# ANS: Intro to LaTeX Tutorial
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Sign - in Plz

*https://github.com/klaw13/ANS-LaTeX-Workshop*

# What is LaTeX?

**Documentation style** that formats your documents and presentations to look pretty

*Fun Fact: This whole presentation was made in LaTeX with beamer documentation*

# Platforms

- Windows, Macs, Linux
  - https://www.latex-project.org/get/

- Free online editors
  - Overleaf: https://www.overleaf.com
  - ShareLaTeX: https://www.sharelatex.com

# Getting Started

- Declare a document class
  - This identifies what type of document you're making (i.e. article, beamer (presentation), etc.
  - i.e. \documentclass{article}

- Declare the packages you will be using
  - LaTeX has packages that are used to help you do different things like embed images, more complex math symbols, and much more!
  - i.e. \usepackage{asmath}, \usepackage{graphicx}, \usepackage{tikz}, \usepackage{listings},

- Begin (and end) your document!
  - \begin{document}
    \end{document}

# Title Page, Table of Contents, and Page Numbering

- This is created before you start your document
- For example:

  \title{INSERT TITLE}
  \date{INSERT DATE}
  \author{YOUR NAME}

  \begin{document}
      \pagenumbering{gobble}
      \maketitle
      \newpage
      \pagenumbering{arabic}
      \tableofcontents               . . .

# Organizing with Sections

- \section{Title}
- \subsection{Title}
- \subsubsection{Title}
- \paragraph{Title}
- \subparagraph{Title}

# Math

- Inline math using $
  - text $ 5 * 12 = 60$ text          $\rightarrow$          text $5 * 12 = 7.2$ text

- Equations
  - You can have your equations number themselves automatically with the following command

    \begin{equation}          $\rightarrow$
        *5 * 12 = 60*
    \end{equation}                          $5 * 12 = 60$          (1)

- Fractions
  - $\frac{x ^ 3}{\sqrt{5}} $          $\rightarrow$          $\frac{x^3}{\sqrt{5}}$

# Math Cont.

- Matrices

  $ \left [ $
  $\begin{matrix}$
    1 & 0 \\
    0 & 1
  $\end{matrix}$
  $\right ] $

  $\rightarrow$

  $$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

- Other useful commands
    - Using $$ *math* $$ will place your math on its own line (no numbering)
    - \begin{equation*} ... \end{equation*} does the same thing as $$
    - \begin{align*} ... \end{align*} is a short-cut to having to do the $$ multiple times but instead of =, you need &=
    - Integral with bounds a to b via \int _{a} ^ {b}

# Figures

- First include the package!
  - \usepackage{graphicx}
- Now the syntax within your paper:
  - \begin{figure}[h!, t, b, p]
    \includegraphics[width=\linewidth, keepaspectratio] {imageName.png}
    \caption {Descriptive caption }
    \label {fig: Figure title }
    \end {figure}
- There are a lot of different ways to format images such as side by side as one figure with two different captions, but this is a good starting point
- List out all of your figures and tables in an appendix!
  \begin{appendix}
  \listoffigures
  \listoftables
  \end{appendix}

# Making A Table

```
\begin{table}[h!]
  \begin{center}
    \caption {some caption}
    \label {tab:table1}
    \begin{tabular} { l | c | r }
      col 1 & col 2 & col 3 \\
      \hline \\
      val 1 & val 2 & val 3 \\
      val 4 & val 5 & val 6 \\
    \end {tabular}
  \end {center}
\end {table}
```

Table: Table Caption

| col 1 | col 2 | col 3 |
|-------|-------|-------|
| val 1 | val 2 | val 3 |
| val 4 | val 5 | val 6 |

# Syntax of Lists

\begin {itemize}
    \item One
    \item Two
    \item Three
\end {itemize}

- One
- Two
- Three

\begin {enumerate} [label=(\roman* **OR** arabic* **OR** alph*)]
    \item One
    \item Two
    \item Three
\end {enumerate}

1. One
2. Two
3. Three

*i*, *1*, *a*

# Other Useful Resources

- The tikz package allows you to draw things in freeform
- You can make a bibliography with BibTex
- You can plot things with pgfplots
- listings package formats your code into your report and will update it as you update your code
- You can draw circuits using the circuitikz package