Intro to LaTeX

John Drake

MANSW

April 2024

What's Happening Today

1. Basic LaTeX
2. Using a Template
3. Drawing Diagrams

What is LaTeX?

LaTeX is a system for high-quality technical typesetting. Most mathematicians and many other people use LaTeX to typeset papers, exams, books, and more.

`https://www.bates.edu/mathematics/resources/what-is-latex/`

Example

Example

```
\displaystyle\int_{0}^{4}{\dfrac{x\ dx}{\sqrt{x+4}}}
```

Output

$$\displaystyle\int_{0}^{4}{\dfrac{x\ dx}{\sqrt{x+4}}}$$

Using LaTeX

1. Word
2. Canvas – between \(\)
3. GMail – TeX for GMail extension
4. CodeCogs – `https://editor.codecogs.com/`
5. Overleaf – `https://www.overleaf.com/`

Learning LaTeX

1. Hubert Lam's LaTeXfor Teaching – `https://bit.ly/latexforteaching`
2. MANSW Facebook group
3. Google

Example

Example

```
f(x) = x^2 - 1
```

Output

$$f(x) = x^2 - 1$$

Example

Example

```
\tan{26^{\circ}}
```

Output

$$\tan 26^\circ$$

Example

Example

```
\frac{\pi}{4}\times\dfrac{\pi}{4}
```

Output

$$\frac{\pi}{4}\times\frac{\pi}{4}$$

Example

Example

```
\displaystyle\int_0^2{\sqrt{1 + x^2}\ dx}
```

Output

$$\displaystyle\int_0^2{\sqrt{1 + x^2}\ dx}$$

Practice Time

https://texnique.xyz/

Templates

Templates are LaTeX projects that have code and style-sheets pre-written to do the hard work for you!

`https://mrdrake.com/`

Topic Test Template

```
\documentclass[12pt]{extarticle}      % define font size
\usepackage{topictest}                % use the style file

\title{Topic Test Template}           % internal title
\author{John Drake}                   % author(s)
\date{23 February 2024}               % date of last change

\begin{document}                      % start the document
\thetitle{Arithmetic}                 % make the title

\begin{thequestions}                  % start the questions
    % questions go here
\end{thequestions}                    % end the questions

\end{document}                        % end the document
```

Topic Test Template

```
% question
\question[1] What is $1+2$?
\lines{3}
```

1. What is $1 + 2$? **1**

.....

.....

.....

Topic Test Template

```
% question with parts
\question[] Calculate the following:
\begin{qparts}
    \qpart\mrks{2} $1+2\times3$    % 1 for 1 mark
    \lines{4}
    \qpart\mrks{2} $10\div2^2$
    \lines{4}
\end{qparts}
```

2. Calculate the following:

(a) $1 + 2 \times 3$ **2**

(b) $10 \div 2^2$ **2**

Topic Test Template

```
% new multiple choice question
\question[1] Which of these is $(-3)-(-2)$?
\begin{mchoices}(3)      % in 3 columns
    \choice $-5$         % the choices
    \choice $-1$
    \choice $1$
\end{mchoices}
```

3. Which of these is $(-3) - (-2)$? **1**

A. -5 **B.** -1 **C.** 1

Topic Test Template

```
% question with multiple parts in columns
\question[2] Calculate the following:
\begin{qparts}(2)          % in 2 columns
    \qpart $2\times3$
    \lines{2}
    \qpart $10\div5$
    \lines{2}
\end{qparts}
```

4. Calculate the following: **2**

(a) 2×3

.....

.....

(b) $10 \div 5$

.....

.....

Practice Time

1. Save a copy of the Topic Test Template or Exam Template
2. John will help you start customising it for your purposes

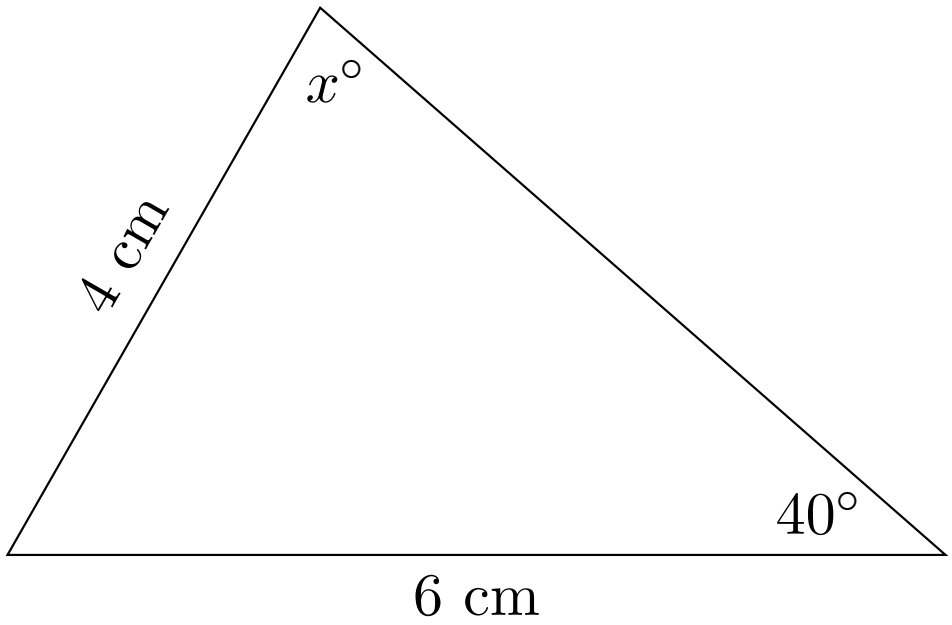
TikZ/PGF

1. PGF/TikZ is a pair of languages for producing vector graphics from a geometric/algebraic description
2. Manual – `https://tikz.dev/`
3. Great short tutoral – `https://cremeronline.com/LaTeX/minimaltikz.pdf`
4. Great visual reference – `https://www.ctan.org/pkg/visualtikz`

TikZ

```
\begin{center}
    \begin{tikzpicture}
        \draw (0,0)--(2,3.5)--(6,0)--cycle;
        \node at (1,2.4)[left,rotate=60] {4 cm};
        \node at (3,0)[below] {6 cm};
        \node at (5.6,0)[above left] {$40^{\circ}$};
        \node at (2.1,3.3)[below] {$x^{\circ}$};
    \end{tikzpicture}
\end{center}
```

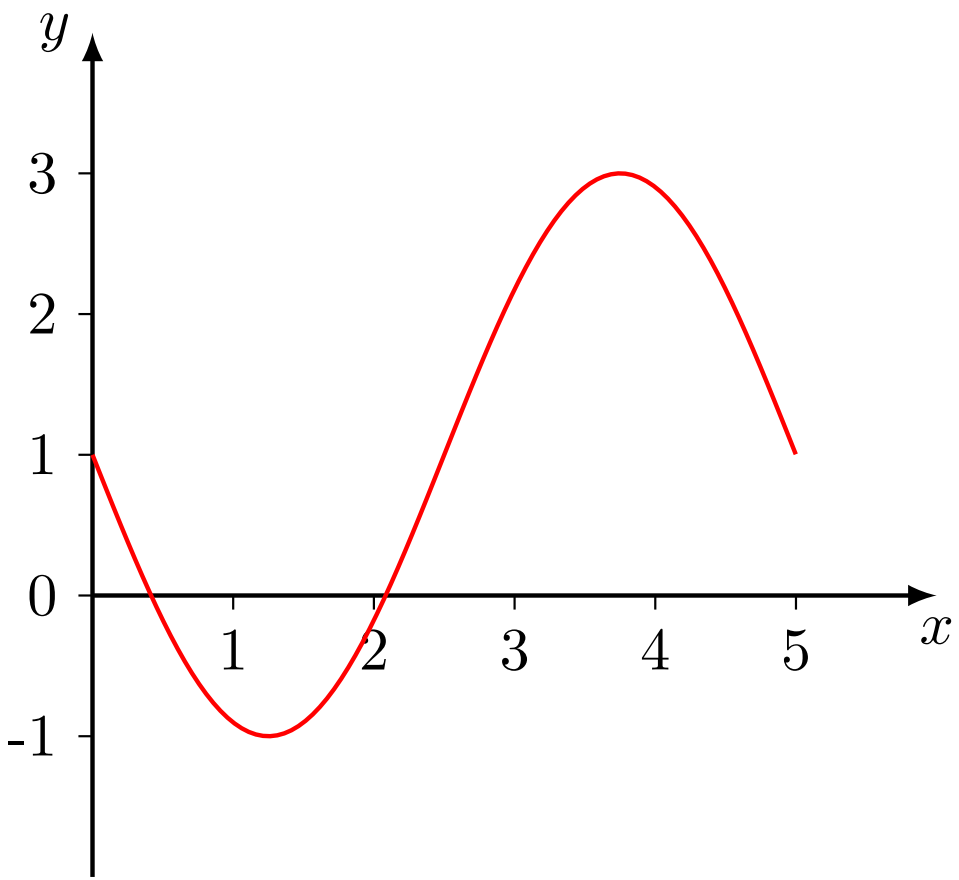
TikZ



TikZ

```
\begin{center}
    \begin{tikzpicture}[domain=0:5, samples=100, scale=0.7]
        \draw[thick,-latex] (0,0) -- (6,0)
            node[below] {$x$};
        \foreach \x in {1,...,5} {\draw (\x,0)--(\x,-0.1)
            node[below] {\x};};
        \draw[thick,-latex] (0,-2) -- (0,4)
            node[left] {$y$};
        \foreach \y in {-1,...,3} {\draw (0,\y)--(-0.1,\y)
            node[left] {\y};};
        \draw[thick,color=red] plot (\x,{-2*sin(72*\x)+1});
    \end{tikzpicture}
\end{center}
```

TikZ



Practice Time

1. You can choose to draw your own diagram
2. Or you can continue working on your assessment
3. John will help you either way!

Wrapping Up

1. You can email John at `jdrake1@parra.catholic.edu.au`
2. Ask for help on the MANSW Facebook Group - there are smarter people than me there!
3. Google is your friend
4. If you practice, you'll find LaTeX is quicker and a lot less frustrating than Word & Google Docs!