

# MAS116/117 Presentation Lecture 5: Common LaTeX Let-Downs and Grammatical Grumbles

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1: Six common LaTeX let-downs

# LaTeX let-downs

1. Maths not in maths-mode.
2. Text in maths-mode.
3. Punctuation in the wrong place.
4. Using too much displayed mathematics.
5. Using bold text.
6. Overful hboxes.

## 1. Maths not in math-mode

When using inline maths, it is easy to forget the single dollars.

Look out for maths symbols not displayed in italics.

### Examples.

This  $x$  is correct, whereas this  $x$  is not. This  $f(x)$  is wrong as well, as is this set  $A$ , which is should be  $\mathcal{A}$ .

## 2. Text in math-mode

The reverse situation is using text in math-mode.

This is easy to spot, as the text becomes italic and spacing isn't correct.

### Examples.

*This text is in math – mode*

*This line is also in math – mode with ~ used for spaces*

The first case here may have happened by accident.

The second is someone fiddling to make things look okay, but looks bad.

## 2. Text in math-mode II

Text is occasionally needed within math-mode.

If it is necessary, use the `\text{...}` command (from `amsmath`).

The `\text` command allows us to write

$$x = u + v \quad \text{and} \quad y = u - v.$$

Notice the spacing between the maths and text. This has been done using the `\quad` command, which creates a large space:

```
\[
  x = u + v
  \quad\text{and}\quad
  y = u - v.
\]
```

### 3. Punctuation in the wrong place

Punctuation needs to be outside of inline mathematics.

**Correct** Therefore  $x=2$ . The result is proved.

**Wrong** Therefore  $x=2.$  The result is proved.

These display as follows.

**Correct** Therefore  $x = 2$ . The result is proved.

**Wrong** Therefore  $x = 2.$  The result is proved.

There are two things wrong here.

- ▶ The spacing is wrong for the end of a sentence.
- ▶ The wrong type of dot is used.

These subtle differences will make your document look worse.

### 3. Punctuation in the wrong place II

Conversely, punctuation needs to be **inside** of displayed mathematics!  
Otherwise it can fall to the next line.

Thus,  
$$\left[ \sin^2 x + \cos^2 x = 1 \right],$$
  
and the result follows.

gives rise to

*Thus,*

$$\sin^2 x + \cos^2 x = 1$$

*, and the result follows.*

This clearly looks poor.



## 4. Using too much displayed mathematics I

Beginners to  $\text{\LaTeX}$  often overuse displayed mathematics.

Displayed mathematics should be used for important steps that you would like to stand out, or for formulas and equations too big to display well in-line.

Too much displayed maths slows the reader down.

Here's an example of something broken up too much by display-math.

## 4. Using too much displayed mathematics II

### Example.

Suppose not, and  $\sqrt{2}$  is rational. Then, by Lemma 1.2,

$$\sqrt{2} = \frac{a}{b},$$

where  $a$  and  $b$  share no common factors. Thus, squaring, we get

$$2b^2 = a^2.$$

It follows that  $a^2$  is even, and hence so is  $a$ . Write

$$a = 2m$$

for some  $m \in \mathbb{Z} \dots$

## 4. Using too much displayed mathematics III

### Example (Re-write).

Suppose not, and  $\sqrt{2}$  is rational. Then, by Lemma 1.2,  $\sqrt{2} = \frac{a}{b}$ , where  $a$  and  $b$  share no common factors. Thus, squaring, we get  $2b^2 = a^2$ . It follows that  $a^2$  is even, and hence so is  $a$ . Write  $a = 2m$  for some  $m \in \mathbb{Z} \dots$

## 5. Using bold text

As explained in an earlier lecture, LaTeX is a mark-up language.

The best approach is to use LaTeX to tell the computer what kind of thing your text is, rather than specifically how to display it.

Bold text is almost never used in sentences, where the `\emph{...}` command (meaning ‘emphasised text’) is used instead.



2: Two grammatical grumbles

## Grammatical grumbles

1. Using too many paragraphs.
2. Not writing in full sentences.

## 1. Using too many paragraphs

Some have a habit of starting each new sentence as a new paragraph. Each new paragraph should represent a change of idea or step forward.

### Example (Bad).

Let  $y = e^x \cos x$ .

Differentiating, we find  $\frac{dy}{dx} = e^x(\cos x - \sin x)$ .

Thus,  $\frac{dy}{dx} = 0$  if and only if  $e^x(\cos x - \sin x) = 0$ .

Since  $e^x > 0$  for all  $x$ , it follows that...

### Example (Better).

Let  $y = e^x \cos x$ . Differentiating, we find  $\frac{dy}{dx} = e^x(\cos x - \sin x)$ . Thus,  $\frac{dy}{dx} = 0$  if and only if  $e^x(\cos x - \sin x) = 0$ . Since  $e^x > 0$  for all  $x$ , it follows that...



## 2. Not writing in full sentences

Mathematicians often try to save time when writing by hand, adding little notes, and these might not be written in full sentences.

When typing mathematics you should write **everything** in full sentences.

### Example (Bad).

If  $y = \sin(x) \cos(x)$  then  $y' = \cos^2(x) - \sin^2(x)$  (product rule). Sub in  $x = \theta/2$ . Then...

### Example (Better).

If  $y = \sin(x) \cos(x)$  then use the product rule to obtain  $y' = \cos^2(x) - \sin^2(x)$ . Substitute in  $x = \theta/2$ . Then...

3: Activity time

### Activity (More proof-reading).

The document on the course website in the Presentation Materials has a number of problems with it.

Find as many ways of improving the document as you can.

4: Next week

## First mini-project to launch next week

Make sure you attend the Week 6 lectures next week, as the first mini-project will be launched then (to be submitted in Week 8).

## 5: Examples of LaTeX errors

Most often, errors are just due to bad  $\text{\LaTeX}$  code.

Error message alerts show up at the bottom of the left-hand pane in TeXworks and just above the output pane in Overleaf.

Unfortunately, LaTeX's error messages aren't always the clearest (though Overleaf, in particular, does a good job of trying to help).

```

1 ! Missing $ inserted.
2 <inserted text>
3
4 l.55 \item Let  $f(x) = a_0 + a_1x + a_2x^2 + a_3x^3$  and  $g(x) = b_0 + b_1x + b_2x^2$ . F...
5
6 I've inserted a begin-math/end-math symbol since I think you
   left one out.

```

This is maths symbols used not in math-mode (in this case, the \_ symbol).



```
1  ! LaTeX Error: \begin{enumerate} on input line 74 ended by \
   end{document}.
2
3  See the LaTeX manual or LaTeX Companion for explanation.
4  Type H <return> for immediate help.
5  ...
```

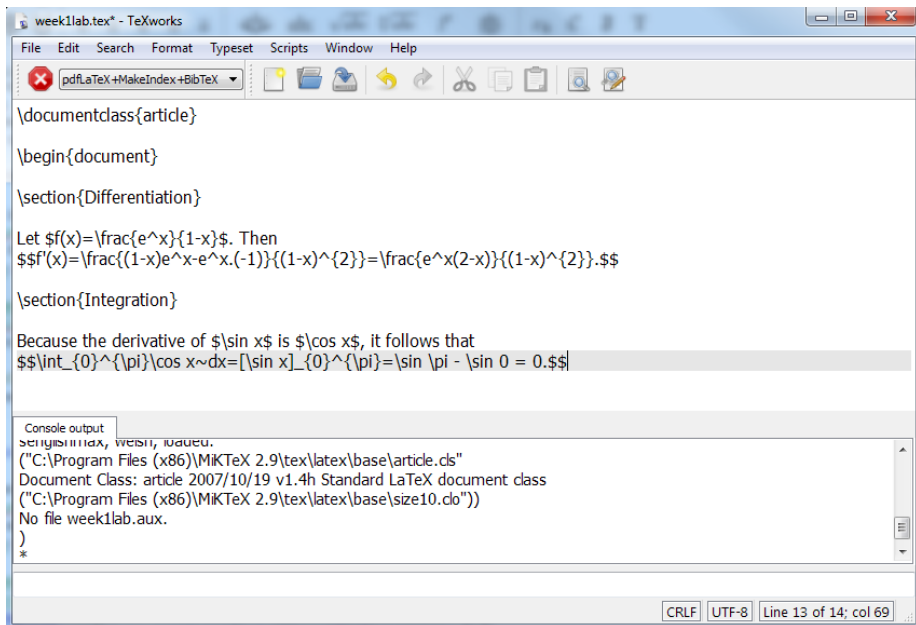
This is a forgotten `\end{enumerate}`.

```
1 Runaway argument?
2 {Maclaurin and Taylor series , drawing attention to the $x-a$
   in the d\ETC.
3 ! File ended while scanning use of \emph .
4 <inserted text>
5           \par
6 <*> ...10*Maclaurin*series/10_maclaurin_series.tex
7
8 I suspect you have forgotten a '}', causing me to read past
   where you wanted me to stop.
```

This is a forgotten }.

```
1  ! LaTeX Error: Environment enumreate undefined.
2
3  See the LaTeX manual or LaTeX Companion for explanation.
4  Type H <return> for immediate help.
5  ...
6
7  l.54 \begin{enumreate}
8
9  Your command was ignored.
```

This is a misspelling of 'enumerate'.



This is a missing `\end{document}`.

Many  $\text{\LaTeX}$  errors will be a variation on one of the above examples.

# About Computer Lab 5

In Computer Lab 5 we'll look at referencing and tables and a few other things.