1 This is a section

1.1 This is a subsection

1.1.1 This is a subsubsection

I can just start typing along. I could accidentally put too big of a space right here. And I continue and continue. To start a new paragraph all I need to do is skip a line. Note that if I just hit return once, no new paragraph gets started, but if I skip a line,
then I suddenly have a new paragraph.
To do math, I have two basic options:

1. I can write math inside a line by surrounding it with dollar signs. For example, $e^{2\pi i} + 1 = 0$. Note that a and a are significantly different.

2. The other possibility for more extensive math is to display it in a new line. I do this by surrounding the math with double dollar signs:

$$\sum_{k=0}^{n} \binom{n}{k} = 2^n. \tag{1.1}$$

If I continue writing text, it starts a new line.

In the preamble (before begin document), I have some commands that I use often, such as $\mathbb{Z}$ which is the same as $\mathbb{Z}$.

2 Let's start a new section

Piece-wise functions are slightly more complicated:

$$f(x) = \begin{cases} 1, & \text{if } x = 3, \\ 0, & \text{otherwise.} \end{cases} \tag{2.1}$$

The basic pieces are as follows. First, array environment constructs matrices.

5	5	6	7
centered	centered	left aligned	right aligned
1	2	3	4

Next, if we want to puts around an array we use the command

$$\left(\left[\left\{ \begin{array}{cccc} 5 & 5 & 6 & 7 \\ \text{centered} & \text{centered} & \text{left aligned} & \text{right aligned} \\ 1 & 2 & 3 & 4 \end{array} \right\} \right] \right)$$

Another powerful thing about latex is referencing around the document. Say I want to reference an equation, so let's first create a labeled equation. To refer to (2.1) I just use that command.

Theorem 2.1 (Cayley's Theorem)**.** *Every finite group G is isomorphic to a subgroup of S_n for some $n \in \mathbb{Z}_{\geq 1}$.*

To do multiple lines under a sum

$$\sum_{\substack{n \geq 0 \\ n \in S}} n$$