# CSE 311: LaTeX Cheatsheet

## Math

| Source code |
| --- |
| Use single dollar signs to toggle between text mode and inline math mode: `$x + y = z$`.<br><br>Use double dollar signs to switch to display mode:<br>`$$`<br>`x^2 + y^2 = z^2`<br>`$$` |

| Expected output |
| --- |
| Use single dollar signs to toggle between text mode and inline math mode: $x + y = z$.<br><br>Use double dollar signs to switch to display mode:<br>$$x^2 + y^2 = z^2$$ |

## Useful commands (and operators)

### Text styles

| Description | Example | LaTeX Code |
| --- | --- | --- |
| Bold | **Foo** | `\textbf{Foo}` |
| Italics | *Foo* | `\textit{Foo}` |
| Code | `Foo` | `\texttt{Foo}` |
| Blackboard | $\mathbb{N}$ | `$\mathbb{N}$` |
| Script | $\mathcal{R}$ | `$\mathcal{R}$` |

### Logical symbols

| Description | Example | LaTeX Code |
| --- | --- | --- |
| And | $p \wedge q$ | `p \wedge q` |
| Inclusive Or | $p \vee q$ | `p \vee q` |
| Exclusive Or | $p \oplus q$ | `p \oplus q` |
| Not | $\neg p$ | `\neg p` |
| Implication | $a \to b$ | `a \to b` |
| Biconditional | $a \leftrightarrow y$ | `a \leftrightarrow b` |
| Quantifiers | $\forall, \exists$ | `\forall, \exists` |
| Equivalence | $a \equiv b$ | `a \equiv b` |

### Other Math

| Description | Example | LaTeX Code |
| --- | --- | --- |
| Superscript | $a^{b+c}$ | `a^{b + c}` |
| Subscript | $a_{b+c}$ | `a_{b + c}` |
| Fractions | $\frac{a + b}{c + d}$ | `\frac{a + b}{c + d}` |
| Greek | $\delta, \Delta$ | `\delta, \Delta` |
| Large parenthesis | $a\left(\frac{b + c}{d}\right)$ | `a\left(\frac{b + c}{d}\right)` |
| Times | $a \times b, a \cdot b$ | `a \times b, a \cdot b` |
| Comparison | $a \leq b, a \neq b, a \geq b$ | `a \leq b, a \neq b, a \geq b` |
| Comparison 2 | $a < b, a = b, a > b$ | `a < b, a = b, a > b` |
| Common functions | $\cos a, \log b$ | `\cos{a}, \log{b}` |

If you want to draw a particular symbol, but don't know what it's called, use Detexify!

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

# Images and graphics

The simplest way to add graphics is to embed an external image. You can use any kind of image (jpg, png, etc) – the `includegraphics` command will know what to do.

For example, suppose we have images named `foo.png` and `bar.jpg` located within the same folder as your `.tex` file. To embed those images, do:

---
**Example of embedding images**

```
% Make sure to include '\usepackage{graphicx}'
% in your preamble

% Scales image so it's 5cm wide
\includegraphics[width=5cm]{foo}

% Scales image so it's wide as the page
\includegraphics[width=\textwidth]{bar}
```
---

If you'd like to programatically draw graphics, look into using the "Tikz" package along with the various Tikz libraries. Warning: using Tikz can be time-consuming!

# Miscellaneous quirks

---
**Line breaks**

```
Use two slashes \\
to force a newline.

Use a blank line for
paragraph breaks.

\newpage

Use the \texttt{newpage}
command to force a
new page.
```
---

**Escape sequences**

| Character | Literal |
|:---:|:---:|
| \ | \verb!\! |
| $ | \$ |
| # | \# |
| & | \& |
| % | \% |
| _ | \_ |
| ^ | \verb!^! |
| { | \{ |
| } | \} |

---

**Quotes**

Note: the text:

```
Hello "world"!
```

Will compile to:

Hello "world"!

...which looks weird. Do the code below instead:

```
Hello ``world"!
```
---

# Useful environments

## Centering

<table>
<tr><td>

**Source code**

```latex
\begin{center}
    Text you want to center
\end{center}
```

</td><td>

**Expected output**

Text you want to center

</td></tr>
</table>

## Lists

Note: use `enumerate` instead of `itemize` if you want numbered lists.

<table>
<tr><td>

**Source code**

```latex
\begin{itemize}
    \item Foo
    \item Bar
    \item Baz
\end{itemize}
```

</td><td>

**Expected output**

- Foo
- Bar
- Baz

</td></tr>
</table>

## Tables

<table>
<tr><td>

**Source code**

```latex
\begin{tabular}{lc|r}
    Food    & Color  & Rating \\
    \hline
    Onions  & Purple & 2 \\
    Apples  & Red    & 5 \\
    Bananas & Yellow & 4 \\
    Lettuce & Green  & 3 \\
\end{tabular}
```

</td><td>

**Expected output**

| Food | Color | Rating |
|---|---|---|
| Onions | Purple | 2 |
| Apples | Red | 5 |
| Bananas | Yellow | 4 |
| Lettuce | Green | 3 |

</td></tr>
</table>

## Code

<table>
<tr><td>

**Source code**

```latex
% Make sure to include '\usepackage{minted}'
% in your preamble

\begin{minted}{Java}
public class Hello {
    public int foo() {
        return 3;
    }
}
\end{minted}
```

</td><td>

**Expected output**

```java
public class Hello {
    public int foo() {
        return 3;
    }
}
```

</td></tr>
</table>

## Align

**Source code**

```
Useful for long strings of equations!
\begin{align*}
    a &= b   && \text{Text here} \\
      &= c   && \text{More text} \\
      &= d   && x + y
\end{align*}
```

**Expected output**

Useful for long strings of equations!

$$
\begin{aligned}
a &= b && \text{Text here} \\
  &= c && \text{More text} \\
  &= d && x + y
\end{aligned}
$$

## Piecewise functions

**Source code**

```
May be useful later this quarter:
$$
|x| = \begin{cases}
    x     & \text{if $x \geq 0$} \\
    -x    & \text{otherwise}
\end{cases}
$$
```

**Expected output**

May be useful later this quarter:

$$
|x| = \begin{cases}
x & \text{if } x \geq 0 \\
-x & \text{otherwise}
\end{cases}
$$