

Practice Examples

For this workshop, we'll be using the Overleaf \LaTeX editor:

<https://www.overleaf.com>

1 Text Commands

\LaTeX code:

```
This sentence has \textbf{bolded text}, \emph{italicized text},  
and \underline{underlining}.
```

Output:

This sentence has **bolded text**, *italicized text*, and underlining.

Practice examples:

- This sentence has **bold face text** in it.
- I want to emphasize *this part* of the sentence.
- I underlined the important part of this sentence.

2 Math Mode

L^AT_EX code:

```
\(x + y = z\)
```

Output:

$$x + y = z$$

As a rule, switch to math mode when you come to something that is not a word and stay in math mode until you encounter the next word. For example:

The value of x is -7 .

The value of x is -7 .

Practice examples:

- Let x be a real number such that $x > 3$.
- The value of α is 9.

2.1 Superscripts and Subscripts

L^AT_EX code:

```
\(a^2\)
```

```
\(a_2\)
```

Output:

$$a^2$$

$$a_2$$

Practice examples:

- a_n^2
- $a^2 + b^2 = c^2$
- a^{x+y}

2.2 Roots

L^AT_EX code:

```
\(\sqrt{xy}\)
```

```
\(\sqrt[3]{xy}\)
```

Output:

$$\sqrt{xy}$$

$$\sqrt[3]{xy}$$

Practice examples:

- $\sqrt{x + y}$
- $\sqrt[3]{a + b}$
- $\sqrt[3]{xy} + ab$

2.3 Fractions

Fractions require two inputs, the numerator and the denominator.

L^AT_EX code:

```
\(\frac{9}{5}\)
```

```
\(\frac{x + y}{q + r}\)
```

Output:

$$\frac{9}{5}$$

$$\frac{x + y}{q + r}$$

Practice examples:

- $\frac{10}{17}$
- $c = \frac{x + y}{n + m}$

2.4 Display Mode

Display mode centers the expression and adds space above and below it.

L^AT_EX code:

```
\[z = x + y\]
```

Output:

$$z = x + y$$

Practice example:

The mass-energy equivalence is described by the famous equation

$$e = mc^2.$$

2.5 Aligning Equations

You may wish to align mathematical expressions on the equality sign (=):

$$\begin{aligned} a &= b + c + d \\ b + c + d &= a \end{aligned}$$

Use the “align” environment to align equations vertically. The ampersand (&) determines where the equations align and the double backslash creates a new line.

L^AT_EX code:

```
\begin{align}
  a &= b + c + d \\
  b + c + d &= a
\end{align}
```

Output:

$$\begin{aligned} a &= b + c + d & (1) \\ b + c + d &= a & (2) \end{aligned}$$

Practice example:

$$\begin{aligned} c^2 &= a^2 + a^2 \\ &= 2a^2 \end{aligned}$$

3 Advanced Practice Examples

Quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Derivative using Leibniz notation:

$$\frac{d}{dx}[x^n] = nx^{n-1}.$$

Definite integral:

$$\int_{\alpha}^{\beta} e^x dx = e^{\beta} - e^{\alpha}.$$

Geometric series:

$$\sum_{k=0}^{\infty} ar^k = \frac{a}{1-r}, \text{ for } |r| < 1.$$

Matrix: (*Use the `\begin{vmatrix}` environment*)

$$\begin{vmatrix} 1 & 2 & 3 \\ a & b & c \end{vmatrix}$$

4 Practice and Help

L^AT_EX is a rich and complex program and the possibilities are almost endless. Fortunately, there is an extensive network of skilled users and lots of documentation on the web. If you have a question, an internet search will usually provide an answer.

For tutorials and help, see:

<https://libguides.auburn.edu/LaTeX/Guides>