Math 291: Lecture 3

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Outline

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- Hybrid
  - `$\displaystyle blahhh... $`
    [Size and sub- and superscript locations are as in displayed equations, but it is typeset in-line. See next slide.]

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- Changes to only subscript behavior occur in the commands: $\lim, \liminf, \min, \max$ etc.
  - For example consider: $\min_P L(P, f)$ and $\min_P L(P, f)$

Practice Exercises:

- Type $\lim_{n\to\infty} \frac{n^2}{3n^2-2n+1} = \frac{1}{3}$ in four ways:
  - As an in-line equation (using \$ $\cdots$ \$)
  - As a displayed equation (using \$\$ $\cdots$ \$\$)
  - As a displayed equation with line numbers (using `\begin{equation}`,`\end{equation}`)
  - As an in-line equation using the `\displaystyle` command.

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- The compiler requires a \right for each \left, but does not require the left and right sides to have the same shape.
- If you want to have just a left or just a right, you can use the "empty" grouping symbol of \right. or \left. for the missing side.

Sizing of Grouping Symbols

- Practice:
  - Typeset: $\left)\frac{1}{3},6\right[$
  - Typeset the formula: $\left(1+\frac{1}{n}\right)^{n}\rightarrow e$
  - Typeset the formula: $\left[\frac{1}{x}+3x\right|_{1}^{5}=-\frac{4}{5}+12=\frac{56}{5}$

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- Actual Code:
  - `$$\left)\frac{1}{3},6\right[$$`
  - `$$\left(1+\frac{1}{n}\right)^n 4\rightarrow e$$`
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  - Use the special commands`\imath` and `\jmath` to get the un-dotted versions. (e.g. `\vec{\imath}`)
- Two more related symbols are `\widehat{}` and `\widetilde{}`.
- For example, we used these instead of regular hats and tildes in these expressions: $\widehat{xyz}$ and $\widetilde{3xy}$.

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  - Recall: In LaTeX commands, [] indicates an optional argument, while { } indicates a required argument (empty is usually allowed).

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- Here is the code to do this:

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- Practice: Type (with align or align*, and note the difference)

```
\begin{align}
\sin t  \left( \csc t - \sin t \right)
&= \sin t \left( \frac{1}{\sin t} - \sin t \right) \\
&= 1 - \sin^2 t \\
&= \cos^2 t
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- Your output should look like (using align):

$$\sin t \left(\csc t - \sin t\right) = \sin t \left(\frac{1}{\sin t} - \sin t\right) \tag{1}$$
$$= 1 - \sin^2 t \tag{2}$$
$$= \cos^2 t \tag{3}$$

- & indicates the location in each line that should act as the alignment reference, \\ says when to end a line.

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- Next, try:

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\begin{multline}
382x^{13}+32x^{12}+x^{11}+x^{10}+x^9+x^8+x^7+321x^6\\
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- Try this again using the commands `\begin{equation}`, `\begin{split}`, etc.