Lesson 7: Special Size Delimiters

This lesson teaches how to make special sized delimiters in LaTeX. In regular LaTeXthese commands only work properly in *10pt* font but if you use the *amsmath* package then they work properly in any size font.

By now you are all aware of the use of `\left` and `\right`.

```
$$\left[\left(\frac{1}{x}\right) +
\left(\frac{1}{y}\right)\right]
=\left\{\frac{x+y}{xy}\right\}$$
```

produces

$$\left[\left(\frac{1}{x}\right) + \left(\frac{1}{y}\right)\right] = \left\{\frac{x+y}{xy}\right\}$$

But you must remember that the `\left` and `\right` must occur in pairs and cannot be separated across a two lines. Sometimes this causes lots of trouble. For example, to typeset

$$h(x) = \int \left\{ \left(\frac{f(x)+g(x)}{1+f^2(x)} + \frac{1+f(x)g(x)}{\sqrt{1-\sin x}} \right) + \right. \\ \left. + \left(\frac{k(x)+\ell(x)}{1+k^2(x)} + \frac{1+k(x)\ell(x)}{\sqrt{1-\sin x}} \right) \right\} dx$$

I needed to use the special pairs `\left\{` and `\right.` and `\left.` and `\right\}`. Namely,

```
\begin{align*}
      h(x)  = &\int \left\{\left(
                        \frac{ f(x) + g(x) }
                             {1 + f^{2}(x)} +
                        \frac{1 + f(x)g(x)}
                             { \sqrt{1 - \sin x} }
                   \right) +  \right. \\
 & +   \left.       \left(
                        \frac{ k(x) + \ell(x) }
                             {1 + k^{2}(x)} +
                        \frac{1 + k(x)\ell(x)}
                             { \sqrt{1 - \sin x} }
                   \right) \right\}\, dx
\end{align*}
```

The advantage of `\left` and `\right` is that they grow to any size to fit the need. But on some occassion you may want to set your own larger size.

One way to do this is to use the *big* commands:

```
\big, \bigl, \bigm, \bigr,
\Big, \Bigl, \Bigm, \Bigr,
\bigg, \biggl, \biggm, \biggr,
\Bigg, \Biggl, \Biggm, \Biggr,
```

Unlike the `\left` and `\right` family the `\big` family produces the same size delimiters. For example,

```
$($ \ \ $\bigl($  \ \  $\Bigl($ \ \ $\biggl($  \ \ $\Biggl($
```

While I am not positive, I believe that the l, m, r mean left, middle and right. The truth is that I can't tell the difference in using them. My guess is they add a bit of space appropriately.

Here are some examples.

```
$\bigl((x,y),(u,v)\bigr) $
```
$\bigl((x,y),(u,v)\bigr)$

```
$\bigl<\langle x,y\rangle,\langle u,v)\rangle\bigr> $
```
$\bigl<\langle x,y\rangle,\langle u,v)\rangle\bigr>$

```
$F(x)|_a^b\ \ F(x)\bigr|_a^b, \ \ F(x)\Bigr|_a^b $
```
$F(x)|_a^b\ \ F(x)\bigr|_a^b, \ \ F(x)\Bigr|_a^b$

```
$(\frac{a}{b})\ \left(\frac{a}{b}\right)\ \Bigl(\frac{a}{b}\Bigr)$
```

produces $(\frac{a}{b})\ \left(\frac{a}{b}\right)\ \Bigl(\frac{a}{b}\Bigr)$

```
$$\Bigl(\frac{x+y}{x}\bigg/\frac{y}{x+y}\Bigr) $$
```
$$\Bigl(\frac{x+y}{x}\bigg/\frac{y}{x+y}\Bigr)$$

```
$$\left\{\, x \biggm| \int_0^xt^2\, dt \leq 5\right\} $$
```
$$\left\{\, x \biggm| \int_0^xt^2\, dt \leq 5\right\}$$

```
$$\Biggl\|f(x)-\sum_{n=1}^Na_nx^n\Biggr\| $$
```
$$\Biggl\|f(x)-\sum_{n=1}^Na_nx^n\Biggr\|$$

PROBLEM:

Give a one line LaTeXsyntax for $\left.\frac{xy^2}{2}\right|_{y=0}^{y=1} = \frac{x}{2}$