Typeset these equations:

$$a^2 = b^2 + c^2$$

$$F = G_N \frac{m_1 m_2}{r^2}$$

$$n_\pm(E,T) = \frac{1}{e^{\frac{E}{k_B T}} \pm 1} = \frac{1}{e^{\hbar\omega/k_B T} \pm 1}$$

$$F_{\mu\nu} = [D_\mu, D_\nu] = \partial_\mu A_\nu - \partial_\nu A_\mu = \partial_{[\mu} A_{\nu]}$$

Solutions:

```
\[
a^2=b^2+c^2
\]
\[
F = G_N\frac{m_1m_2}{r^2}
\]
\[
n_{\pm}(E,T)=\frac1{e^{\frac{E}{k_BT}}\pm1}
           =\frac1{e^{{\hbar\omega}/{k_BT}}\pm1}
\]
\[
F_{\mu\nu}  =  [D_\mu  ,   D_\nu]
   =\partial_\mu A_\nu-\partial_\nu A_\mu
 =\partial_{[\mu} A_{\nu]}
\]
```

Typset: "Taylor expansion $e^x = \sum_{n=0}^{\infty} \frac{1}{n!} x^n$."

$$\int_0^1 \frac{df}{dx} dx = f(1) - f(0)$$

$$e^{\zeta(s)} = \prod_{n=1}^{\infty} e^{1/n^s}$$

(This uses the greek letter zeta)

Solutions:

```
``Taylor expansion $e^x=\sum_{n=0}^\infty \frac1{n!}x^n$.''

\[\int_{0}^1 \frac{df}{dx}dx= f(1)-f(0)\]

\[e^{\zeta(s)}=\prod_{n=1}^\infty e^{1/n^s}\]
```

Exercises (February 3, 2016):

1. Typeset this definition:

$$\int_0^\infty f(x)\,dx \equiv \lim_{t\to\infty}\int_0^t f(x)\,dx$$

2. Typeset this equation:

$$\sqrt[n]{x^{1/n}} = (\sqrt[n]{x})^{\frac{1}{n}} = x^{1/n^2}$$

3. Typeset:

$$|\vec{a}+\vec{b}|^2 = \vec{a}\cdot\vec{a} + 2\vec{a}\cdot\vec{b} + \vec{b}\cdot\vec{b}$$

4. Typeset these two expressions (as separate "displayed equations"):

$$2\left[3\frac{a}{z}+2\left(\frac{a}{d}+7\right)\right]$$

$$x^2\left(\sum_n A_n + 3\left(b+\frac{1}{c}\right)\right)\Bigg]_0$$

5. Typeset this, using `multline*`

$$2\left(1+\frac{1}{2}+\frac{1}{2^2}+\frac{1}{2^3}+\frac{1}{2^4}+\frac{1}{2^5}+\frac{1}{2^6}+\frac{1}{2^7}+\frac{1}{2^8}+\frac{1}{2^9}\right.$$
$$\left.+\frac{1}{2^{10}}+\frac{1}{2^{11}}\right) = \frac{4095}{1024}$$

6. We previously had

```
\[ 2\left[3\frac{a}{z}+
       2\left(\frac{a}{d}+7\right)\right] \]
```

giving

$$2\left[3\frac{a}{z}+2\left(\frac{a}{d}+7\right)\right]$$

Make it look like this:

$$2\!\left[3\frac{a}{z}+2\!\left(\frac{a}{d}+7\right)\right]$$

Exercise 1:

```
\[ \int_0^\infty f(x)\,dx\equiv \lim_{t\to\infty}\int_0^t f(x)\,dx \]
```

Exercise 2:

```
\[ \sqrt[n]{x^{{1/n}}}=(\sqrt[n]{x})^{\frac{1}{n}}=x^{1/n^2}\]
```

Exercise 3:

```
\[ |\vec a +\vec b|^2=\vec a \cdot \vec a+2\vec a \cdot \vec b+\vec b
\cdot \vec b \]
```

Exercise 4:

```
\[2\left[3\frac{a}{z}+2\left(\frac{a}{d}+7\right)\right] \]
\[ \left.x^2\left(\sum_nA_n+3\left(b+\frac1c\right)\right)\right]_0\]
```

Exercise 5:

```
\begin{multline*}
2\left(1+\frac12+\frac1{2^2}+\frac1{2^3}+\frac1{2^4}
       +\frac1{2^5}+\frac1{2^6}+\frac1{2^7}
               +\frac1{2^8}+\frac1{2^9}\right.\\
\left.+\frac1{2^{10}}+\frac1{2^{11}}\right)=\frac{4095}{1024}
\end{multline*}
```

Exercise 5:

```
\[ 2\Bigg[3\frac{a}{z}+
       2\bigg(\frac{a}{d}+7\bigg)\Bigg] \]
```

Exercises:

1.Typeset

$$2\left(1+\frac{1}{2}+\frac{1}{2^2}+\frac{1}{2^3}+\frac{1}{2^4}+\frac{1}{2^5}+\frac{1}{2^6}+\frac{1}{2^7}+\frac{1}{2^8}+\frac{1}{2^9}\right.$$
$$\left.+\frac{1}{2^{10}}+\frac{1}{2^{11}}\right)=\frac{4095}{1024}$$

2. We previously had

```
\[ 2\left[3\frac{a}{z}+
      2\left(\frac{a}{d}+7\right)\right] \]
```

giving

$$2\left[3\frac{a}{z}+2\left(\frac{a}{d}+7\right)\right]$$

Make it look like this:

$$2\Bigg[3\frac{a}{z}+2\bigg(\frac{a}{d}+7\bigg)\Bigg]$$

3. Typeset:

The Pauli matrices are:

$$\sigma^1=\begin{pmatrix}0&1\\1&0\end{pmatrix},\quad \sigma^2=\begin{pmatrix}0&-i\\i&0\end{pmatrix}\quad\text{and}\quad \sigma^3=\begin{pmatrix}1&\\0&-1\end{pmatrix}$$

Note: The blank in the 2^{nd} *entry of the* 1^{st} *row of* σ^3 *is a deliberate typo*

4. Typeset this:

Jersey	First Name	Last Name
10	Cristiano	Ronaldo
11	Didier	Drogba
10	Edson	Arantes do Nascimento (Pele)

5. Typeset this:

Shape	Area	Perimeter
Disk of radius R	πR^2	$2\pi R$
Rectangle of sides L_1 and L_2	L_1L_2	$2(L_1+L_2)$
Square of side $L_1=L_2$		
Right triangle, base b and height h	$\frac{1}{2}bh$	$b+h+\sqrt{b^2+h^2}$

Solutions:

```
\begin{multline*}
2\left(1+\frac12+\frac1{2^2}+\frac1{2^3}+\frac1{2^4}+\frac1{2^5}
+\frac1{2^6}+\frac1{2^7}+\frac1{2^8}+\frac1{2^9}\right.\\
\left.+\frac1{2^{10}}+\frac1{2^{11}}\right)=\frac{4095}{1024}
\end{multline*}

\[ 2\Bigg[3\frac{a}{z}+
       2\bigg(\frac{a}{d}+7\bigg)\Bigg] \]



The Pauli matrices are:
\[\sigma^1=\begin{pmatrix}0&1\\1&0\end{pmatrix},\quad
\sigma^2=\begin{pmatrix}0&-i\\i&0\end{pmatrix}\quad\text{and}\quad
\sigma^3=\begin{pmatrix}1&\\0&-1\end{pmatrix}
\]

\begin{center}
\begin{tabular}{c||l|l}
  Jersey & First Name & Last Name \\
\hline\hline
  10 & Cristiano & Ronaldo \\
\hline
  11 & Didier & Drogba\\
  \hline
10 & Edson & Arantes do Nascimento (Pele)
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{|p{2in}|c|c|}
Shape&Area&Perimeter\\
\hline\hline
Disk of radius $R$ &$\pi R^2$ & $2\pi R$\\
\hline
Rectangle of sides $L_1$ and $L_2$ & $L_1L_2$&$2(L_1+L_2)$\\
\cline{1-1}
Square of side $L_1=L_2$ & & \\
\hline
Right triangle, base $b$ and height $h$ & $\frac12bh$&$b+h+\sqrt{b^2+h^2}$
\end{tabular}
\end{center}
```

Exercises:

1. Typeset this:

Jersey	First Name	Last Name
10	Cristiano	Ronaldo
11	Didier	Drogba
10	Edson	Arantes do Nascimento (Pele)

2. Typeset this:

Shape	Area	Perimeter
Disk of radius R	πR^2	$2\pi R$
Rectangle of sides L_1 and L_2	$L_1 L_2$	$2(L_1 + L_2)$
Square of side $L_1 = L_2$		
Right triangle, base b and height h	$\frac{1}{2}bh$	$b + h + \sqrt{b^2 + h^2}$

3. Homework: Typeset this (note the alignment at equal sign)

a	$x^2 + y = 30$
b	$100 = \sin(\theta) + \cos\varphi$
c	$q \cup p = q \cap p$

4. Find a triton on google images; then resize and crop it to get this:

Solutions:

```
\begin{center}
\begin{tabular}{c||l|l}
  Jersey & First Name & Last Name \\
\hline\hline
  10 & Cristiano & Ronaldo \\
\hline
  11 & Didier & Drogba\\
  \hline
10 & Edson & Arantes do Nascimento (Pele)
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{|p{2in}|c|c|}
Shape&Area&Perimeter\\
\hline\hline
Disk of radius $R$ &$\pi R^2$ & $2\pi R$\\
\hline
Rectangle of sides $L_1$ and $L_2$ & $L_1L_2$&$2(L_1+L_2)$\\
\cline{1-1}
Square of side $L_1=L_2$ & & \\
\hline
Right triangle, base $b$ and height $h$ & $\frac12bh$&$b+h+\sqrt{b^2+h^2}$
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{|l|r@{~$=$~}l|}
\hline
a&$x^2+y$&30\\\hline
b&100&$\sin(\theta)+\cos\varphi$\\\hline
c&$q\cup p$&$q \cap p$\\\hline
\end{tabular}
\end{center}


\includegraphics[width=4cm,trim= 7cm 6cm 8cm 1cm,clip]{gl-5-triton.png}
```