PHYS 87

Exercises (February 22, 2017):

1. Typeset
$$a^2 = b^2 + c^2$$

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

3. Typeset
$$n_\pm(E,T) = \frac{1}{e^{\frac{E}{k_B T}} \pm 1} = \frac{1}{e^{\hbar\omega/k_B T} \pm 1}$$
Note: This uses the greek letter `\omega` *and the symbol* `\hbar`*.*

4. Typeset
$$F_{\mu\nu} = [D_\mu, D_\nu] = \partial_\mu A_\nu - \partial_\nu A_\mu = \partial_{[\mu} A_{\nu]}$$
Note: This uses the greek letters `\mu` *and* `\nu`*, and the symbol* `\partial`*.*

5. Typeset this (the first is inline, the next two are separate displayed equations):

   "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).

Exercise 1:
```
\item Typeset
\[
a^2=b^2+c^2
\]
\bigskip
```

Exercise 2:
```
\[
F = G_N\frac{m_1m_2}{r^2}
\]
\bigskip
```

Exercise 3:
```
\[
n_{\pm}(E,T)=\frac1{e^{\frac{E}{k_BT}}\pm1}
           =\frac1{e^{{\hbar\omega}/{k_BT}}\pm1}
\]
\bigskip
```

Exercise 4:
```
\[
F_{\mu\nu}  =  [D_\mu  ,   D_\nu]
   =\partial_\mu A_\nu-\partial_\nu A_\mu
 =\partial_{[\mu} A_{\nu]}
\]
```

Exercise 5:
```
‘‘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 (March 1, 2017):

1. Typeset these two expressions as separate *displayed equations*:

$$2\left[3\frac{a}{z}+2\left(\frac{a}{d}+7\right)\right] \qquad x^2\left(\sum_n A_n + 3\left(b+\frac{1}{c}\right)\right)\Bigg]_0$$

2. Typeset this, using the `multline*` environment:

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

3. 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:

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

4. 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 2nd entry of the 1st row of σ^3 is a deliberate typo

5. Typeset this:

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

6. 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	$\frac{1}{2}bh$	$b+h+\sqrt{b^2+h^2}$

Solutions

Exercise 1:
```
\[2\left[3\frac{a}{z}+2\left(\frac{a}{d}+7\right)\right] \]
\[ \left.x^2\left(\sum_nA_n+3\left(b+\frac1c\right)\right)\right]_0\]
```

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

Exercise 4:
```
The Pauli matrices are:
\[\sigma^1=\begin{pmatrix}0&1\\1&0\end{pmatrix},\quad
\sigma^2=\begin{pmatrix}0&-i\\i&0\end{pmatrix}\quad\text{and}\quad
\sigma^3=\begin{pmatrix}1&\\0&-1\end{pmatrix}
\]
```

Exercise 5:
```
\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}
```

Exercise 6:
```
\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 (March 8, 2017):

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

Exercise 1:
```
\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}
```

Exercise 2:
```
\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}
```

Exercise 3:
```
\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}
```

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