PY 421 - Introduction to Computational Physics

Homework # 3
Your Name

Answer to problem 2

We use the epsfig command to insert Figure 1 in the text. Change the name of the figure in the epsfig command from sample_fig1.eps to the name of the figure you want to display. Notice the use of label and of ref. Any name can be used as a label, but each label must be associated with a unique name. The center environment is used to place the figure in the center of the page. [h!] is used to force the placement of the figure here. Latex has a mind of its own about figure placement. Other options are [t] for top, [b] for bottom. Try.
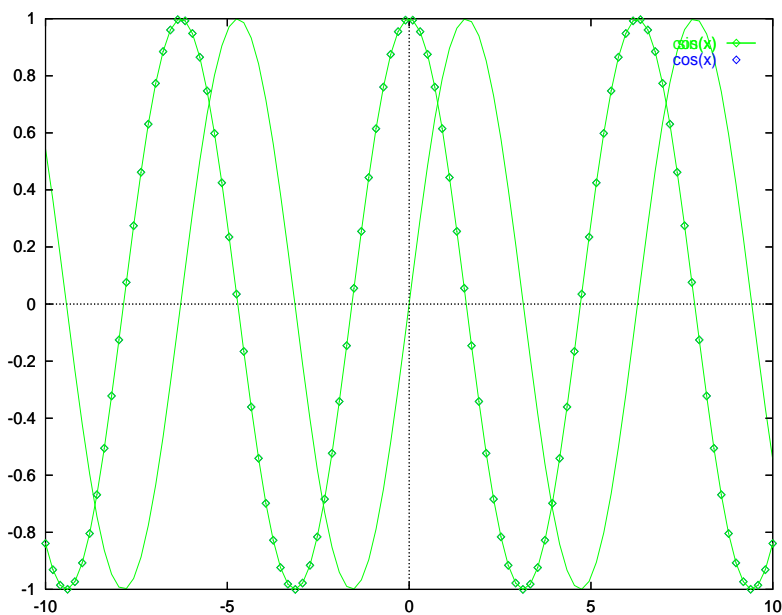

Figure 1: This is the first graph in my report.

Answer to problem 3

Mathematical expressions can be incorporated in the text by enclosing them with \$ signs. Remember to close all \$ with a matching \$. Here are a few mathematical expressions: $a = b+c+\cos(\phi)$, $\alpha = \beta+\gamma+\Phi-\Lambda$ (notice the way Greek letters are entered). $N = m \times l$. $q = \sqrt{f+2c}$. See how to introduce upper and lower indices: $r^2 = x^2 + y^2$, $r = \sqrt{x^2+y^2}$, $a_i^n = 2b_j^\phi$. Notice the use of the brackets for composite indices: $v_i = \sum_j a_{i,j} w_j$, $x = e^{\log(x)}$. In the following, we introduce some extra space: $aa\, a\ a\quad a\qquad a$. The following symbols are useful: $<, \leq, \ll, >, \geq, \gg, \sim, \approx, \infty, \neq$.

Standalone mathematical equations (not in the text) can be typeset by enclosing them in the equation environment:

$$A = \int_0^\infty e^{-x^2} dx \tag{1}$$

Labels are not mandatory, but they allow us to make reference to Eq. 1.

Notice the use of fractions:

$$\rho = \frac{1}{2} \frac{1+x^2}{a+\sqrt{y+3}} \frac{1+\cos^2(x)}{\log(y)+2} \tag{2}$$

(I am not sure that Eq. 2 makes much sense.) Notice also how to make parenthesis bigger

$$f(x) = (\sin(x)) \left[\frac{e^x+1}{e^{-x}+1}\right] \left(\frac{\int_0^x \frac{\sin(x')}{x'} dx'}{x^2+1}\right) \tag{3}$$

Multiline equations can be composed with the eqnarray environment:

$$a = x+y+z \tag{4}$$
$$+\rho^2 \tag{5}$$

Notice the use of nonumber

$$a = x+y+z$$
$$+\rho^2 \tag{6}$$

Finally, in a multiline equation, it is possible to align the expressions as follows:

$$
\begin{aligned}
f_1(x) &= x + \exp[\sin(x)] \tag{7}\\
g_1(x) + f_2(x) &= x^2 - 1 \tag{8}\\
y &= \int f_2(x)dx \tag{9}
\end{aligned}
$$

Answer to problem 4
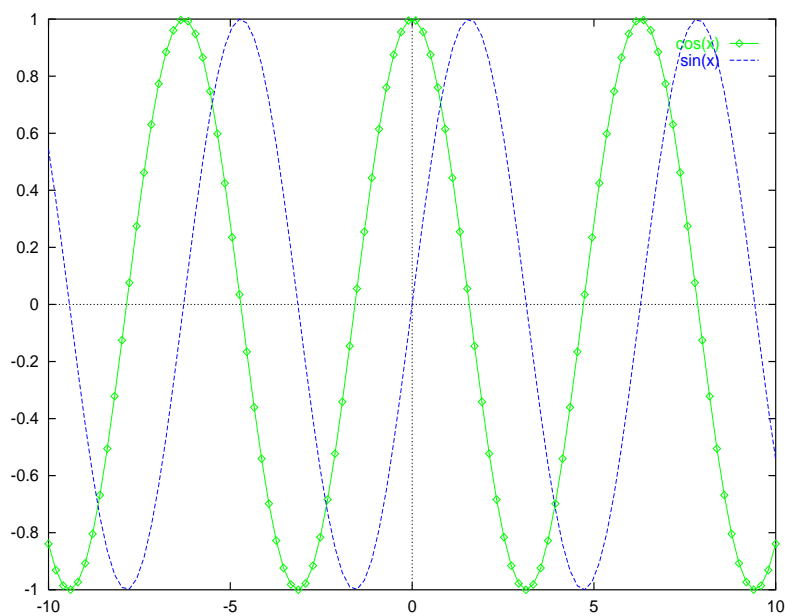
Our final results are reproduced in Fig. 2.

Figure 2: This is the second graph in my report.

Remember to end the document environment.