Extra Exercises for 2/2/09

The first part of this assignment is to install Pari gp in your computer. The references to pari are to the program gp.exe that will be available when the program is installed.

1. Calculate the continued fraction expansion of $\sqrt{3}$ by filling in the details of the notes for 1/30. Use Pari to find the ratios used by Archimedes in his assertion

$$\frac{265}{153} < \sqrt{3} < \frac{1351}{780}$$

as convergents. Show that if $\frac{265}{153}$ is the nth convergent then the $n+1$ convergent C_{n+1} satisfies $\sqrt{3} < C_{n+1} < \frac{1351}{780}$ and the $n+2$ satisfies $\frac{265}{153} < C_{n+2} < \sqrt{3}$. Can you think of a reason why Archimedes used the choices above?

2. Use Pari to calculate the first 4 convergents of π (Pi in Pari). Use Pari to find the decimal expansions of these convergents (if you enter 22.0/7 you will get the decimal expansion).

3. Calculate by hand the continued fraction decomposition of
a) 2813/113
b) 2701/409.
Show your work and check using Pari gp.