Math 180B - Continued Fractions

1. Find the continued fraction expansion for the following numbers.

   (a) $61/14$

   (b) $\frac{1+\sqrt{5}}{2}$.

   (c) $\sqrt{13}$.

2. Let $c_1, \ldots, c_n$ be integers such that the continued fraction $[c_1; \ldots, c_n]$ exists. Show that we can describe the continued fraction in terms of matrix multiplication

$$\begin{pmatrix} c_1 & 1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} c_2 & 1 \\ 1 & 0 \end{pmatrix} \cdots \begin{pmatrix} c_n & 1 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} A & B \\ C & D \end{pmatrix} \implies [c_1; \ldots, c_n] = \frac{A}{C}.$$