

Math 342 Tutorial

August 6, 2025

Question 1. Find the rational number, expressed in lowest terms, represented by each of the following simple continued fractions. **(a)** $[10; 3]$, **(b)** $[3; 2, 1]$, **(c)** $[0; 1, 2, 3]$, **(d)** $[2; 1, 2, 1]$, **(e)** $[2; 1, 2, 1, 1, 4]$, **(f)** $[1; 2, 1, 2]$, **(g)** $[1; 2, 1, 2, 1]$, **(h)** $[1; 21, 2, 1, 2]$.

Question 2. Find the simple continued fraction expansion, not terminating with the partial quotient of 1, of each of the following rational numbers. **(a)** $18/13$, **(b)** $32/17$, **(c)** $19/9$, **(d)** $310/99$, **(e)** $-931/1005$, **(f)** $831/8110$.

Question 3. Let f_k denote the k th Fibonacci number. Find the simple continued fraction, terminating with the partial quotient f_{k+1}/f_k , where k is a positive integer.

Question 4. Let $[a_0; a_1, \dots, a_n]$ be the simple continued fraction expansion of r/s , where $(r, s) = 1$ and $r \geq 1$. Show that this continued fraction is symmetric, that is, $a_0 = a_n, a_1 = a_{n-1}, \dots$, if and only if $r \mid (s^2 + 1)$ if n is odd and $r \mid (s^2 - 1)$ if n is even.