

MATH 290 NUMBER THEORY FOR TEACHERS

HOMEWORK 9

DUE: WEDNESDAY, APRIL 9, 2014

1. Find the value of the continued fraction $[\overline{1}, 2]$.
2. Find the value of the continued fraction $[1, \overline{1}, 2]$
3. Find the value of the continued fraction $[2, \overline{1}, 1, \overline{1}, 4]$.
4. Find the value of $\sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{2 + \dots}}}}$
5. Give the continued fraction expansion for $\sqrt{12}$.
6. Approximate $\sqrt{12}$ by the first five convergents of its continued fraction. Use a calculator to check that if p/q is a rational approximation for $\sqrt{12}$ that you get as a convergent of its continued fraction expansion, then $|\sqrt{12} - p/q| < 1/q^2$.
7. Give two solutions to $x^2 - 12y^2 = 1$. You may not use (1,0) as one of your solutions.
8. Give the continued fraction expansion for $\sqrt{17}$.
9. Find a rational approximation for $\sqrt{17}$ that is within one one-millionth (i.e. the error is at most $1/1000000$).
10. Give three solutions to $x^2 - 17y^2 = 1$. You may not use (1,0) as one of your solutions.