1: Find two rational numbers \( p/q \) satisfying

\[
|\sqrt[3]{3} - (p/q)| < \frac{1}{\sqrt{5}q^2}.
\]

2. Find a number \( C > 0 \) so that

\[
|\sqrt[3]{3} - (p/q)| \geq \frac{C}{q^3}
\]

for any rational number \( p/q \).

3. Using Newton’s method with an initial “guess” of 2, find the next three approximations to \( \sqrt{5} \). Are these convergents to the continued fraction expansion of \( \sqrt{5} \)? If so, which ones (which index \( n \))? 

4. Find the “best” rational approximation to \( \pi \) with denominator less than 100,000. But first, define what you mean by “best!”