

Exercises for Math 480 Week #9

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!"