**Comments on**
**Proving Pi is not Equal to Various Fractions**

1. Page 1. Title. The Pi in the title should be $\pi$.

2. I should be listed after the authors as your mentor.

3. Page 1. Once you have that $\pi$ is irrational, you do not need to show that its transcendental to establish its not rational. You should be making the following points

   It is know that $\pi$ is irrational, and hence not any of the three fractions we are considering.

   The proof that $\pi$ is irrational is difficult so we are inspired to see if we could prove $\pi$ is not any of those fractions using elementary means.

   Incidentally, $\pi$ is not just irrational, its actually transcendental.

4. Page 1 and 2- to get $PI(n) < \pi < PC(n)$ you need that the distance from the center to any vertex is exactly 1. (Check that.)

5. The table. $X(n)$ should also be on the table and you should speculate on what $X(n)$ is. This is true for the later tables as well, but I won't mention it again.

6. Page 4. You have *When solving the Basel problem Euler proved that*

   Finding that sum IS the Basel problem.

   Here is what you can say:

   *In 1644 Pietro Mengoli posed the following problem: Find the exact value of* $\sum_{i=1}^{\infty} \frac{1}{i^2}$. *This was was called* The Basel Problem *because Euler and the Bernoulli family worked on it, and they lived in Basel. Finally Euler solved it. Euler solved it in 1735 by showing that*

$$\sum_{i=1}^{\infty} \frac{1}{i^2} = \frac{\pi^2}{6}.$$

7. You should make it clear that

$$\pi = \sqrt{6\sum_{i=1}^{\infty}\frac{1}{i^2}}$$

and hence, for all $n$,

$$\pi > \sqrt{6\sum_{i=1}^{n}\frac{1}{i^2}}$$

and then define $L(n)$.

8. The following is very interesting and may lead to more questions:

   - For the inscribe-circumscribe method
     333/106 needed $n = 249$
     355/113 needed $n = 6224$
   - For the Basel method
     333/106 needed $n = 11475$
     355/113 needed $n = 1337$

   SO using ins-circum method 333/106 is easier than 355/113 but using Basel 355/113 is easier than 333/106.

   You should point this out.

9. At the end of the paper you should have a table of all three fractions and all the methods, and the least $n$ that shows they are not $\pi$.

10. Its interesting that the Nilakantha series has so much smaller values of $n$ then the first two methods. Point that out.