

Extra Credit

Name: _____

Prove the following for all $n \in \mathbb{N}$ with $n > 1$

$$\sqrt[n]{1 + \frac{\sqrt[n]{n}}{n}} + \sqrt[n]{1 - \frac{\sqrt[n]{n}}{n}} < 2.$$

I suggest an appropriate technique per your class.

MA 2310. Show $f(n)$ is decreasing in n where

$$f(n) = \sqrt[n]{1 + \frac{\sqrt[n]{n}}{n}} + \sqrt[n]{1 - \frac{\sqrt[n]{n}}{n}}$$

That is take the derivative and show it is negative for $n > e$.

MA 3330. Use LaGrange multipliers.

MA 5320. Prove the Arithmetic mean - Geometric mean inequality and use it.

Any class. Play around with it and teach Professor a new way (my favorite technique).