

Homework 1 - due 10:00 AM on Tuesday, August 1

Write up nicely. Make sure to justify your work.

1. Prove there are infinitely many primes using Proof by Contradiction.
2. Prove the statement using the ϵ, δ definition of limit.

$$\lim_{x \rightarrow 4} x^2 = 16$$

3. If $r > 0$ and r is any rational number, prove the statement using the ϵ, M definition of limit.

$$\lim_{x \rightarrow \infty} \frac{1}{x^r} = 0$$

4. Evaluate $\lim_{x \rightarrow \infty} \frac{5x^3 - 17}{11x^3 + 2x^2 - 4x + 1}$.

5. If $[x]$ denotes the greatest integer function, evaluate $\lim_{x \rightarrow \infty} \frac{x}{[x]}$.

Hint: Use the Squeeze Theorem!