

# MAT 25 Homework 5

Hardy Jones  
999397426  
Professor Bae  
Fall 2013

1. 2.2.1

(a)  $\lim_{n \rightarrow \infty} \frac{1}{6n^2+1} = 0$

We need to show

$$\begin{aligned}\frac{1}{6n^2+1} &< \epsilon \\ \frac{1}{\epsilon} &< 6n^2+1 \\ \frac{1}{\epsilon} - 1 &< 6n^2 \\ \frac{1-\epsilon}{\epsilon} &< 6n^2 \\ \frac{1-\epsilon}{6\epsilon} &< n^2 \\ \sqrt{\frac{1-\epsilon}{6\epsilon}} &< n\end{aligned}$$

Let  $\epsilon > 0$ . Choose  $N \in \mathbb{N} | N > \sqrt{\frac{1-\epsilon}{6\epsilon}}$ .

Let  $n \geq N$ . So,  $n \geq N > \sqrt{\frac{1-\epsilon}{6\epsilon}} \implies \frac{1}{6n^2+1} < \epsilon$

Thus  $|a_n - 0| < \epsilon$ .