

AUC apCalculus BC

Assignment 03

2. On the definition of limits of sequences

PROBLEM 2.1. For each of the following functions limit statements write and prove the limit statement by the rigorous definition of limits:

- (1) $\lim_{n \rightarrow +\infty} \frac{\cos(ne^n)}{n^8 - 3} = 0.$
- (2) $\lim_{n \rightarrow +\infty} \frac{\sin(n^2 + 1)}{n^8 - 3} = 0.$
- (3) $\lim_{n \rightarrow +\infty} \frac{\sin(n)}{n^7 - 1} + \frac{\sin(n^2)}{n^4 + 30} = 0.$

PROBLEM 3.2. For each of the following functions limit statements write and prove the limit statement by the rigorous definition of limits:

- (1) $\lim_{n \rightarrow +\infty} 3n^8 - 2n^7 - n - 20 = +\infty.$
- (2) $\lim_{n \rightarrow +\infty} \frac{\sin(n^3)}{n^4 - n} = 0.$