

Quiz 6 - Take Home

SHOW ALL WORK!!! Unsupported answers might not receive full credit. CLEARLY label your responses to parts a) and b) and use the back of this paper if necessary.

Problem 1 Determine whether the following series converge or diverge. JUSTIFY your answers!

a) [1 pt] $\sum_{k=0}^{\infty} \frac{3 - 4k^2}{k^2 + 2k - 7}$

$\lim_{k \rightarrow \infty} \frac{k^2(3/k^2 - 4)}{k^2(1 + 2/k - 7/k^2)}$
 $-4/1 \neq 0$

Diverges because the limit does not equal 0.

b) [1 pt] $\sum_{k=0}^{\infty} \frac{3^k + 2^{2k}}{5^k}$ $r = 3/5$

$\sum_{k=0}^{\infty} \left(\frac{3}{5}\right)^k$ $\frac{1}{1 - 3/5}$ converges

$\sum_{k=0}^{\infty} \left(\frac{4}{5}\right)^k$ $\frac{1}{1 - 4/5}$ converges

converges because both common ratios are less than 1.

Problem 2 [2 pts] For a sequence $\{a_n\}_{n \geq 1}$ let $s_n = \sum_{k=1}^n a_k$ denote its sequence of partial sums and let $\{a_n\}_{n \geq 1}$ be a sequence such that $\sum_{k=1}^{\infty} s_k$ converges.

Determine whether there is sufficient information to determine whether $\sum_{k=1}^{\infty} a_k$ converges. If it converges, clearly explain to what value(s) it could converge.

~~If one sum converges then every subsequence will converge to that same limit. If the sum of every value from one to ∞ converges then the sum from one to n will converge as well.~~