

Quiz #8

1. Determine the convergence or divergence of each of the following series. If you do not justify your answer, you will get zero credit, even if you circle the correct final answer.

In each case, demonstrate that your answer is correct in a step-by-step fashion using *an appropriate convergence test*. Be sure to explicitly state which convergence test you have used and show that it can be used with the series you are working on. Be careful to show all of your work and how the convergence test justifies your answer. As the final part of your answer in each part, CIRCLE either CONVERGES or DIVERGES.

(a) (3 points)
$$\sum_{n=1}^{\infty} \frac{3^n}{(2n)!}$$

JUSTIFICATION:

FINAL ANSWER (CIRCLE ONE):

CONVERGES

DIVERGES

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(b) (3 points)
$$\sum_{n=2}^{\infty} \frac{1}{\ln(n^2)}$$

JUSTIFICATION:

FINAL ANSWER (CIRCLE ONE):

CONVERGES

DIVERGES

2. Suppose that the N^{th} partial sum of the infinite series, $\sum_{k=0}^{\infty} a_k$, is given by the formula:

$$S_N = \frac{16 - \frac{1}{N}}{5 + \frac{1}{N^2}}.$$

- (a) **(2 points)** Does the series $\sum_{k=0}^{\infty} a_k$ converge or not? If so, briefly explain why and calculate the sum of the series. If not, briefly explain why not.

- (b) **(2 points)** Given what you know about S_N , is it possible to calculate the following limit:

$$\lim_{k \rightarrow \infty} a_k \quad ?$$

If so, calculate the limit. If not, briefly explain why not.