

Practice Quiz IA for Math 1502

I Sum this series exactly:

$$\sum_{k=2}^{\infty} \left(\frac{4}{5}\right)^k$$

(II.) Give a careful and precise explanation of the fact that $\sum_{n=1}^{\infty} \frac{1}{n} = \infty$.

For the next three sums, determine whether the sums are finite or infinite.

(III.)

$$\sum_{k=1}^{\infty} \frac{1}{k + 2^k}$$

(IV.)

$$\sum_{k=1}^{\infty} \frac{k!}{(2k)!}$$

(V.)

$$\sum_{k=1}^{\infty} \frac{1}{k^{11/10}}$$

(VI.) Find the third Taylor polynomial $P_3(x)$ and the fourth remainder $R_4(x)$ for $\ln(1+x)$.

(VII.) Use your answer to the previous problem to estimate $\ln 0.7$. Estimate $|R_4(0.7)|$.

(VIII.) Derive the limit

$$\lim_{x \rightarrow 0} \frac{e^x - 1 - x}{x^2}$$

(IX.) Evaluate the limit

$$\lim_{n \rightarrow \infty} n^{1/n} = 1$$