

Math 181 Honors Quiz 3 Version A

1. Provided $x \neq 1$, then the sum $x^3 + x^4 + \cdots + x^{12}$ is equal to

(A) $\frac{x^{13} - x^3}{1 - x}$.

(B) $\frac{x^{12} - x^3}{1 - x}$.

(C) $\frac{x^{12} - x^4}{1 - x}$.

(D) none of the above.

2. Prove the harmonic series $\sum_{n=1}^{\infty} \frac{1}{n}$ diverges.

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3. Sum the series $\sum_{n=2}^{\infty} \frac{1}{5^n}$.

4. Prove one of the following theorems:

The Nested Interval Theorem. *If I_1, I_2, I_3, \dots is a sequence of closed intervals that are “nested,” that is, each I_n contains I_{n+1} , then the intervals I_n have at least one point in common.*

Convergence of the Alternating Harmonic Series. *The alternating series $\sum_{n=1}^{\infty} (-1)^{(n+1)} \frac{1}{n}$ converges.*