Math 181 Honors Quiz 4 Version A

1. State in terms of δ and ϵ what it means for the function $f(x)$ to be continuous at c.

2. Use δ and ϵ to show that $f(x) = x^2$ is continuous at $x = 3$.

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3. A sequence of numbers a_n is called a Cauchy sequence if

(A) given N there is $\epsilon > 0$ such that $n, m > N$ implies $|a_n - a_m| < \epsilon$.

(B) given N there is $\epsilon > 0$ such that $n, m > N$ implies $|a_n - a_m| > \epsilon$.

(C) given $\epsilon > 0$ there is N such that $n, m > N$ implies $|a_n - a_m| < \epsilon$.

(D) given $\epsilon > 0$ there is N such that $n, m > N$ implies $|a_n - a_m| > \epsilon$.

4. Rewrite the sum

$$x + \frac{x^2}{2} + \frac{x^3}{3} + \cdots + \frac{x^{42}}{42}$$

using sum notation.

5. Does the series $\displaystyle\sum_{n=1}^{\infty} \frac{2n}{n+1}$ converge or diverge? Explain your answer.

6. Does the series $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}$ converge or diverge? Explain your answer.