2011 BC6 Form B

Let $f(x) = \ln(1 + x^3)$.

a. The Maclaurin series for $\ln(1 + x)$ is $x - \dfrac{x^2}{2} + \dfrac{x^3}{3} - \dfrac{x^4}{4} + \cdots + (-1)^{n-1}\dfrac{x^n}{n} + \cdots$.
Use the series to write the first four nonzero terms and the general term of the Maclaurin series for f.

20. What is the sum of the series $1 + \ln 2 + \dfrac{(\ln 2)^2}{2!} + \cdots + \dfrac{(\ln 2)^n}{n!} + \cdots$

A) $\ln 2$ B) $\ln(1 + \ln 2)$ C) 2   D) e^2 E) Diverges

10. What is the value of $\displaystyle\sum_{n=1}^{\infty} \dfrac{2^{n+1}}{3^n}$?

A) 1   B) 2   C) 4   D) 6   E) The series diverges

27. If $\displaystyle\sum_{n=0}^{\infty} a_n x^n$ is a Taylor Series that converges to f(x) for all real x, the $f'(1) =$

(A) 0   (B) a_1 (C) $\displaystyle\sum_{n=0}^{\infty} a_n$ (D) $\displaystyle\sum_{n=0}^{\infty} n a_n$ (E) $\displaystyle\sum_{n=0}^{\infty} n a_n^{n-1}$