6. [10 points] Consider the function $f(x) = \ln(1+x)$ and its Taylor series about $x = 0$.

    a. [4 points] Determine the first four non-zero terms of the Taylor series for $f(x) = \ln(1+x)$ about $x = 0$. Be sure to show enough work to support your answer.

    b. [4 points] Find the first three non-zero terms of the Taylor series for $g(x) = \ln\left(\frac{1+x}{1-x}\right)$ about $x = 0$. Be sure to show enough work to support your answer. *(Hint: You may find it helpful to utilize properties of logarithms.)*

    c. [2 points] Find the exact value of the sum of the series

$$2\left(\frac{3}{4}\right) + \frac{2}{3}\left(\frac{3}{4}\right)^3 + \frac{2}{5}\left(\frac{3}{4}\right)^5 + \dots \ .$$