4. [5 points] The following series **diverges**:

$$\sum_{n=2}^{\infty} \frac{n}{n^2 + \ln(n)}.$$

Use theorems about infinite series to **show** that the series diverges. Give full justification, showing all your work and indicating any theorems or tests that you use.

5. [5 points] Let $\alpha > 0$ be a constant. Compute the first 3 terms of the Taylor series of $f(x) = \dfrac{x}{\sqrt{1+\alpha x}}$ about $x = 0$. Write the appropriate coefficients in the spaces provided.

_____ + _____ x + _____ $x^2 + \cdots$