4. (18 points) For each of the following statements, circle **T** if the statement is always true, and otherwise circle **F**. *You need not explain your answer.*

(a) If $\lim_{n\to\infty} a_n = 0$, then $\sum_{n=1}^{\infty} a_n$ converges.

T **F**

(b) The Taylor series for $f(x)g(x)$ near $x = 0$ is $f(0)g(0) + f'(0)g'(0)x + \frac{1}{2}f''(0)g''(0)x^2 + \cdots$.

T **F**

(c) If $p(x)$ is the probability density function of some characteristic x distributed throughout a population, then $p(3) = 0.4$ means that 40% of the population has $x < 3$.

T **F**

(d) The infinite series $\sum_{n=2}^{\infty} \frac{1}{n \ln(n)}$ converges.

T **F**

(e) If the Taylor polynomial of degree four of $f(x)$ about $x = 0$ is $2 - 3x + 5x^3 + 7x^4$, then the Taylor polynomial of $g(x) = \frac{f(x^2) - 2}{x}$ of degree five about $x = 0$ is $5x^5 - 3x$.

T **F**

(f) Let $P(x)$ be the cumulative distribution function of the blood cholesterol level of men aged 40 and over in the US population, measured in milligrams (mg) per deciliter (dL). The equality $P(190) = 0.5$ means that the median blood cholesterol level of men in this population is 190 mg/dL.

T **F**