

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  $\lim_{n \rightarrow \infty} a_n = 0$ , then  $\sum_{n=1}^{\infty} a_n$  converges. **T**    **F**

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