8. (15 points) For each of the following statements, circle **T** if the statement is always true, and otherwise circle **F**.

(a) If the power series $\sum_{n=0}^{\infty} C_n x^n$ is known to converge at 1 and to diverge at -2, then we can conclude that the power series diverges at 3.

T **F**

(b) If $p(x)$ denotes a density function defined on the interval $[a, b]$, and $P(x)$ denotes an antiderivative of $p(x)$, then the function $P(x) - P(b) + 1$ is the cumulative distribution function for $p(x)$.

T **F**

(c) If the pair of functions $(x(t), y(t))$ gives a parameterization of the unit circle centered at the origin, then the integral $\int_0^{2\pi} \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}\, dt$ is equal to 2π.

T **F**

(d) If $P_2(x)$ is the second degree Taylor polynomial that approximates a function f about $x = 3$, and if $E_2(x) = f(x) - P_2(x)$, is the error in the approximation of f by P_2, then $E_2(3) = 0$, $E_2'(3) = 0$, and $E_2''(3) = 0$.

T **F**

(e) If r and a are any positive numbers, then $\sum_{n=0}^{\infty} a\, r^n = \frac{a}{1-r}$.

T **F**