9. (2 points each) Circle "TRUE" or "FALSE" for each of the following problems. Circle "TRUE" only if the statement is *always* true. No explanation is necessary.

(a) A quantity x is distributed throughout a population with probability density function $p(x)$. If $p(10) = p(20)$, then none of the population has x values lying between 10 and 20.

TRUE   FALSE

(b) If $\sum a_n$ converges, then $\lim_{n \to \infty} a_n = 0$.

TRUE   FALSE

(c) Let $P(x) = 1 - e^{-0.5x}$ for all $x \geq 0$ and $P(x) = 0$ otherwise. Then $P(x)$ could be a cumulative distribution function for some probability density function $p(x)$.

TRUE   FALSE

(d) $\int_3^x 2t \sin(t^2) dt$ is an antiderivative of $2x \sin(x^2)$.

TRUE   FALSE

(e) $y = \frac{1}{2}(\sin x - \cos x) + 2e^x$ is a solution to the differential equation $\frac{dy}{dx} = \cos x + y$.

TRUE   FALSE