4.12 The length of time to failure (in hundreds of hours) for a transistor is a random variable Y with distribution function given by

$$F(y) = \begin{cases} 0, & y < 0, \\ 1 - e^{-y^2}, & y \geq 0. \end{cases}$$

a Show that $F(y)$ has the properties of a distribution function.

b Find the .30-quantile, $\phi_{.30}$, of Y.

c Find $f(y)$.

d Find the probability that the transistor operates for at least 200 hours.

e Find $P(Y > 100 | Y \leq 200)$.

4.62 If Z is a standard normal random variable, what is

a $P(Z^2 < 1)$?

b $P(Z^2 < 3.84146)$?