57. Let X have cumulative distribution function (CDF)

$$F_X(x) = \begin{cases} 1 - e^{-\lambda x}, & x > 0 \\ 0, & x \leq 0 \end{cases} \qquad \lambda > 0.$$

(a) What is the distribution of $Y = F_X(X)$?

(b) Find the inverse of the transformation; that is, find an expression for X in terms of Y.

(c) Suppose you use a computer to generate 100 uniform(0, 1) random variates. Explain how you would use these to have 100 random variates to get 100 variates with the distribution of $F_X(x)$.