

Problem 73

$X \sim \text{Exponential} (\mu=1)$

$$f(x) = e^{-x}$$

$$F(x) = P(X \leq x) = 1 - e^{-x}$$

$$Y = 10 \cdot X^{.8}$$

$$\begin{aligned} F(y) &= P(Y \leq y) = P(10 \cdot X^{.8} \leq y) \\ &= P\left(X \leq \frac{1}{10} y^{\frac{5}{4}}\right) = 1 - e^{-\frac{1}{10} y^{\frac{5}{4}}} \end{aligned}$$

$$\begin{aligned} f(y) &= F'(y) \\ &= \frac{1}{8} \left(\frac{y}{10}\right)^{\frac{1}{4}} \cdot e^{-\frac{1}{10} y^{\frac{5}{4}}} \end{aligned}$$

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