Exercises

1. A continuous random variable T has the following probability density function.

$$f_T(u) = \begin{cases} 0 & (u < 0) \\ 3(1 - u/k) & (0 \le u \le k) \\ 0 & (u > k) \end{cases} .$$

Find

(a) k.
(b) $\mathsf{E}(T)$.
(c) $\mathsf{E}(T^2)$.
(d) $\mathsf{V}(T)$.

2. A continuous random variable X has the following probability density function

$$f_X(u) = \begin{cases} 0 & (u < 0) \\ ku & (0 \le u \le 1) \\ 0 & (u > 1) \end{cases}$$

(a) Find k.
(b) Find the distribution function $F_X(u)$.
(c) Find $\mathsf{E}(X)$.
(d) Find $\mathsf{V}(X)$.
(e) Find $\mathsf{E}(e^X)$.
(f) Find $\mathsf{V}(e^X)$.
(g) Find the distribution function of e^X. (Hint: For what values of X is $e^X < u$?)
(h) Find the probability density function of e^X.
(i) Sketch $f_X(u)$.
(j) Sketch $F_X(u)$.

Answers