

Example: Battery Lifetimes

Suppose that the lifetime of a battery (in thousands of hours) is a random variable Y whose pdf is

given by:
$$g(y) = \begin{cases} e^{-y} & y > 0 \\ 0 & y \leq 0 \end{cases}$$

(f) Verify that this is a legitimate pdf. [*Hint*: Notice that this is an improper integral.] Also sketch this pdf.

(g) Determine the cdf of Y . [*Hint*: Remember that the domain of this function is all real numbers.]

(h) Determine the mean and median of Y , and comment on how they compare.

(i) Determine the probability that the battery lasts longer than its mean lifetime.

(j) Determine $SD(Y)$.

(k) Determine the probability that a battery lasts more than one standard deviation longer than the mean lifetime.