## Problem - Tire endurance

The lifetime of a tire selected at random from a used tire shop is 10,000 X miles, where X is a random variable with the density function
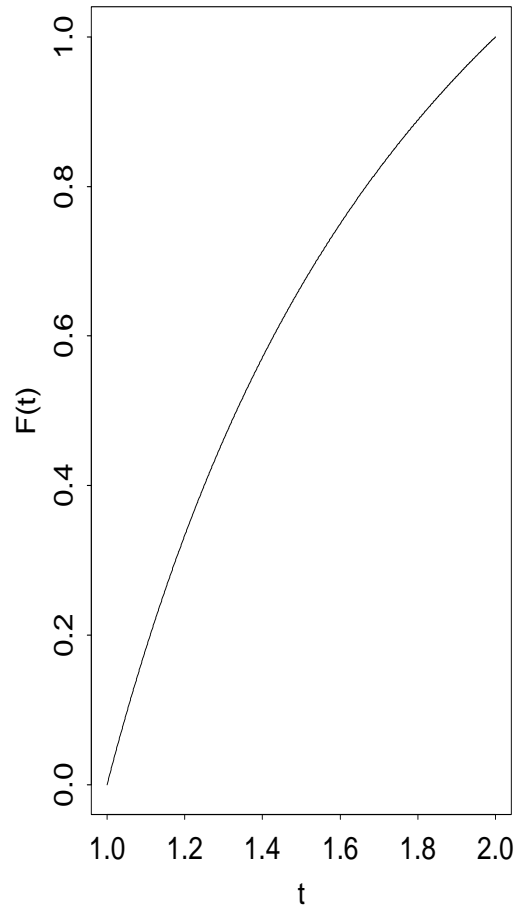
$$f(x) = \begin{cases} 2/x^2, & if \ 1 < x < 2 \\ 0, & elsewhere \end{cases}$$

a) Calculate the distribution function.

b) Calculate the mean/variance.

c) What percentage of the tires in the shop has a lifetime shorter than 15,000 miles.

d) What percentage of those having lifetimes shorter than 15,000 miles last between 10,000 and 12,000 miles?

Density function

f(x)
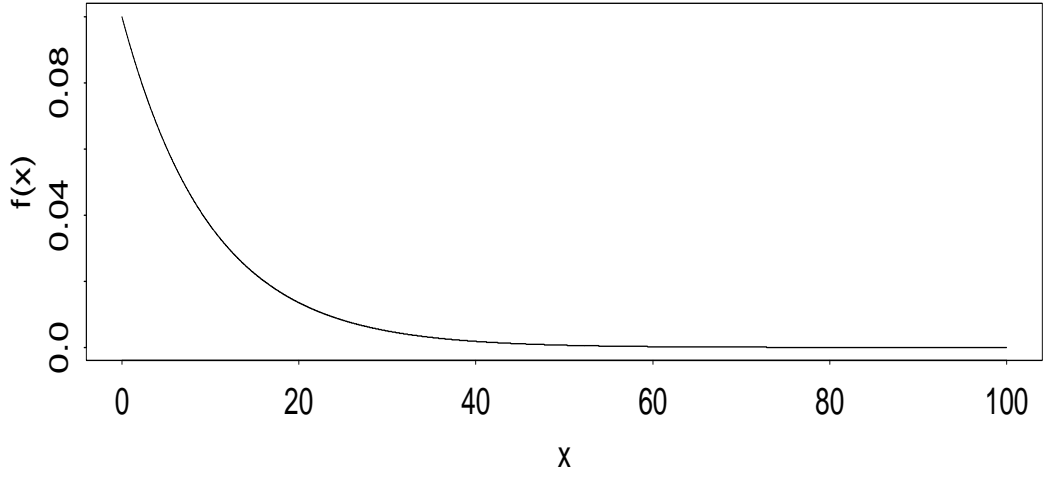
x

Distribution function

F(t)

t
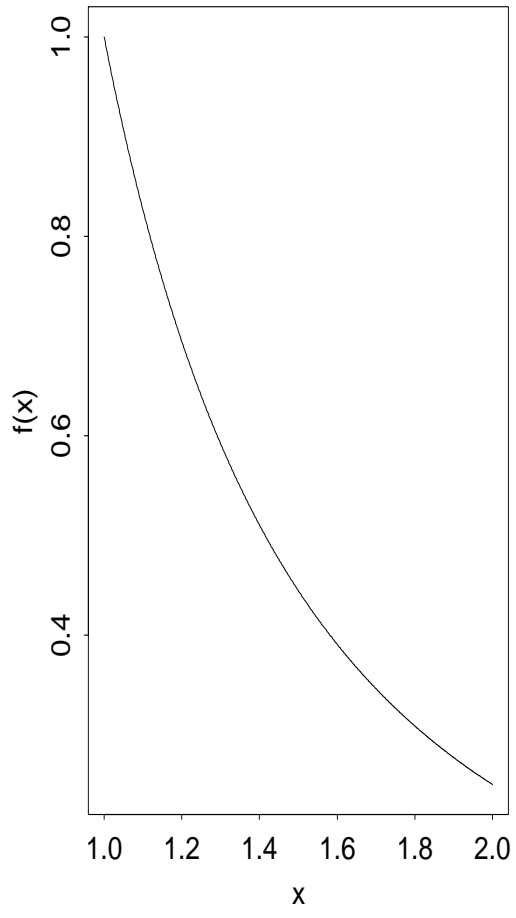
Problem - Car engines

Let X denote the time to failure of an engine in a certain type of car. The density function of X is

$$f(x) = \begin{cases} \lambda e^{-x/10}/10, & if\ 0 \leq x < \infty \\ 0, & elsewhere \end{cases}$$

a) Find λ

b) Find the distribution function.

c) What is the average time to failure for an engine of this type?

d) What is the probability that of 10 such cars, 5 will survive beyond 15 years?

Density function

Distribution function