4.14 Continuous random variables

Checklist

What you should know

By the end of this subtopic you should be able to:

- state that discrete random variables are usually obtained from a counting experiment and that continuous random variables arise in experiments that involve measurement
- state that the expected value of a random variable X with a probability distribution $\mathrm{P}(X = x)$ is written as $\mathrm{E}(X)$ or μ
- calculate the mean, standard deviation and variance of both discrete and continuous random variables
- prove that $f(x)$ is a valid probability density function by showing that, within its given domain, $f(x) \geqslant 0$ and the area under its curve is equal to 1
- calculate the mode of a continuous random variable by finding the value of x for which the probability density function is at a maximum
- calculate the median of a continuous random variable by finding the value of m for which $\int_a^m f(x)\,\mathrm{d}x = \frac{1}{2}$ where a is the lower limit of the domain
- calculate the effects of the linear transformations of the random variable X on its expectation and variance.