A random sample of 50 values of the continuous random variable X was taken. These values are summarised in the following table.

Interval	$1 \leqslant x < 1.5$	$1.5 \leqslant x < 2$	$2 \leqslant x < 2.5$	$2.5 \leqslant x < 3$	$3 \leqslant x < 3.5$	$3.5 \leqslant x \leqslant 4$
Observed frequency	3	3	8	11	13	12

It is required to test the goodness of fit of the distribution with probability density function f given by

$$\mathrm{f}(x) = \begin{cases} \dfrac{1}{24}\left(\dfrac{4}{x^2} + x^2\right) & 1 \leqslant x \leqslant 4, \\ 0 & \text{otherwise.} \end{cases}$$

The expected frequencies, correct to 4 decimal places, are given in the following table.

Interval	$1 \leqslant x < 1.5$	$1.5 \leqslant x < 2$	$2 \leqslant x < 2.5$	$2.5 \leqslant x < 3$	$3 \leqslant x < 3.5$	$3.5 \leqslant x \leqslant 4$
Expected frequency	4.4271	a	6.1285	8.4549	b	14.9678

(a) Show that $a = 4.6007$ and find the value of b. [3]

(b) Carry out a goodness of fit test, at the 10% significance level, to test whether f is a satisfactory model for the data. [6]