1. *Kaff* coffee is sold in packets. A seller measures the masses of the contents of a random sample of 90 packets of *Kaff* coffee from her stock. The results are shown in the table below.

Mass w (g)	Midpoint y (g)	Frequency f
$240 \leq w < 245$	242.5	8
$245 \leq w < 248$	246.5	15
$248 \leq w < 252$	250.0	35
$252 \leq w < 255$	253.5	23
$255 \leq w < 260$	257.5	9

(You may use $\sum fy^2 = 5\ 644\ 171.75$)

A histogram is drawn and the class $245 \leq w < 248$ is represented by a rectangle of width 1.2 cm and height 10 cm.

(a) Calculate the width and the height of the rectangle representing the class $255 \leq w < 260$.

(3)

(b) Use linear interpolation to estimate the median mass of the contents of a packet of *Kaff* coffee to 1 decimal place.

(2)

(c) Estimate the mean and the standard deviation of the mass of the contents of a packet of *Kaff* coffee to 1 decimal place.

(3)

The seller claims that the mean mass of the contents of the packets is more than the stated mass. Given that the stated mass of the contents of a packet of *Kaff* coffee is 250 g and the actual standard deviation of the contents of a packet of *Kaff* coffee is 4 g,

(d) test, using a 5% level of significance, whether or not the seller's claim is justified. State your hypotheses clearly.

(You may assume that the mass of the contents of a packet is normally distributed.)

(5)

(e) Using your answers to parts (b) and (c), comment on the assumption that the mass of the contents of a packet is normally distributed.

(1)

(Total 14 marks)