

Question	Scheme	Marks	AOs
1(a)	Width = $0.4 \times 5 = 2$ (cm)	B1	3.1a
	Area = 12 cm^2 Frequency = 15 so $1 \text{ cm}^2 = \frac{5}{4}$ packet o.e	M1	1.1b
	Frequency of 9 corresponds to area of 7.2 Height = $7.2 \div 2 = 3.6$ (cm)	A1	1.1b
		(3)	
(b)	$[Q_2 =] (248 +) \frac{22}{35} \times 4$ or (use of $(n+1)$) $(248 +) \frac{22.5}{35} \times 4$	M1	1.1a
	= awrt 250.5 (g) or 250.6	A1	1.1b
		(2)	
(c)	Mean = awrt 250.4 (g)	B1	1.1b
	$[\sigma_x =] \sqrt{\frac{5644171.75}{90} - \left(\frac{22535.5}{90}\right)^2} = \sqrt{15.64...}$	M1	1.1b
	= awrt 4.0 (g)	A1	1.1b
	Accept $\left(s_x = \sqrt{\frac{5644171.75 - 90\left(\frac{22535.5}{90}\right)^2}{89}} = 3.977... \right)$	(3)	
(d)	$H_0 : \mu = 250 \quad H_1 : \mu > 250$	B1	2.5
	$\bar{X} \sim N\left(250, \frac{4^2}{90}\right)$ and $\bar{X} > 250.4$	M1	3.3
	$P(\bar{X} > 250.4) = 0.171...$	A1	3.4
	$0.171 > 0.05$ or $z = 0.9486... < 1.6449$	A1	1.1b
	There is insufficient evidence that the mean weight of coffee is greater than 250 g, or there is no evidence to support the sellers claim.	A1	2.2b
		(5)	
(e)	It is consistent as (the estimate of) the mean is close to (the estimate of) the median which is true for the normal distribution.	B1ft	3.5b
		(1)	
(14 marks)			

Notes:

(a) B1: for correct width

M1: for clear attempt to relate the area to frequency.

May be implied by their height $\times$ their width = 7.2

A1: for height = 3.6 cm

(b) M1: for $\frac{22}{35} \times 4$ or $\frac{22.5}{35} \times 4$

A1: awrt 250.5 or 250.6

(c) B1: awrt 250.4

M1: for a correct expression for σ or s , can fit their mean

A1: awrt 4.0 (allow $s =$ awrt 4.0)

(d) B1: hypotheses stated correctly

M1: for selecting a correct model, (stated or implied)

A1: for use of the correct model to find $p =$ awrt 0.171 (allow $z =$ awrt 0.948)

A1: for a correct calculation, comparison and correct statement

A1: for a correct conclusion in context mentioning mean weight and 250

(e) B1: evaluating the validity of the model used in (d)