Q	Answer	Mark	Comments
1 (a)	0.4×700 or 280 or $(1 - 0.4) \times 900$ or 0.6×900 or 540 or 30×0.4 or 12 or $30 \times (1 - 0.4)$ or 30×0.6 or 18	M1	oe implied by 820
	$30 \times 0.4 \times 700$ or 8400 or $30 \times (1 - 0.4) \times 900$ or 16200	M1dep	oe implied by 820×30
	24600	A1	

Additional Guidance		
Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		

Q	Answer	Mark	Comments
2	$330 \div (3 + 2)$ or $330 \div 5$ or 66	M1	oe eg $\dfrac{330}{5}$
	their 66×2 or 132	M1dep	oe $\dfrac{2}{5} \times 330$ scores M2
	$294 \div 7$ or 42 or $294 \div 7 \times 3$ or 126	M1	oe eg $\dfrac{294}{7}$ or $\dfrac{3}{7} \times 294$
	132 and 126 and A	A1	

Additional Guidance		
132 and 88.2 and A		M1M1M0A0

Q	Answer	Mark	Comments
	Alternative method 1		
	158 460 ÷ 278 or 570	M1	
	168 720 ÷ their 570	M1dep	
	296	A1	
	Alternative method 2		
	158 460 ÷ 168 720 or 0.939… or 0.94	M1	
	278 ÷ their 0.939…	M1dep	
	296	A1	
	Alternative method 3		
3	168 720 ÷ 158 460 or 1.0647… or 1.065 or 1.06	M1	oe eg $1 + \dfrac{168720 - 158460}{158460}$ or $1 + \dfrac{10260}{158460}$
	278 × their 1.0647…	M1dep	
	296	A1	
	Additional Guidance		
	278 × 1.065 = 296		M1M1A1
	278 × 1.065 = 296.07 with 296 on answer line is evidence of premature rounding in their working		M1M1A0
	168720 ÷ 158460 = 1.06, 278 × 1.06 = 294.68 with answer 294		M1M1A0
	Embedded answer eg 168720 ÷ 296 = 570		M1M1A0

Q	Answer	Mark	Comments
	45×8 or 360	M1	oe number of 2p coins may be embedded
	$45 \times 8 \times 2$ or 360×2 or 720 or $7.2(0)$	M1dep	oe value of 2p coins implied by 1170 or $11.7(0)$
	$17.7(0) -$ their $7.2(0) - 45 \times 0.1(0)$ or $1770 -$ their $720 - 45 \times 10$ or $6(.00)$ or 600	M1dep	oe value of 5p coins implied by $7.2 : 6$ oe ratio not in simplest form or $6 : 7.2$ oe ratio
	$6 : 5$	A1	accept $1.2 : 1$ or $\frac{6}{5} : 1$ or $1\frac{1}{5} : 1$ or $1 : 0.83(\ldots)$ or $1 : \frac{5}{6}$

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Additional Guidance	
Up to M3 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts	
Allow working in pence or pounds throughout	
Must work consistently in pence or pounds for the third mark (or recover)	
Ignore units in the ratio eg 6p : 5p or £1.20 : £1	M3A1
720 may be seen in a ratio with the value of the 10p coins eg $720 : 450$ or $7.2 : 4.5$	M2
600 may be seen in a ratio with the value of the 10p coins eg $600 : 450$ or $6 : 4.5$	M3

For information:

Coin	10p	2p	5p
Number	45	360	120
Value	£4.50	£7.20	£6.00

Q	Answer	Mark	Comments
	Alternative method 1 Works out best estimate of the percentage of employees with hourly rate more than £17		
	32 ÷ 2 or 16	M1	oe implied by 41 or 82
	(15 + 10 + their 16) ÷ 123 or 41 ÷ 123 or $\frac{1}{3}$ or 0.33(...) or (66 + their 16) ÷ 123 or 82 ÷ 123 or $\frac{2}{3}$ or 0.66(...) or 0.67	M1dep	oe eg (123 − 66 − their 16) ÷ 123 or 13(.0...)(%) + [12, 12.2](%) + 8(.1...)(%)
5(a)	33(.3...)(%)	A1	oe eg 0.33(3...) and 0.3 allow 33.2(%) from 13(%) + 12.2(%) + 8(%) SC3 37 (or 36.9) and explains that a minimum of 12 of 32 people earn more than £17
	Alternative method 2 Compares best estimate of the number of employees with hourly rate more than £17 with 30% of number of employees		
	32 ÷ 2 or 16	M1	oe implied by 41 or 82
	0.3 × 123 or 36.9 or 0.7 × 123 or 86.1	M1	oe accept 36 or 37 for 36.9 accept 86 or 87 for 86.1
	41 and 36.9 or 82 and 86.1	A1	accept 36 or 37 for 36.9 accept 86 or 87 for 86.1 SC3 37 (or 36.9) and explains that a minimum of 12 of 32 people earn more than £17

	Alternative method 3		Shows that a value of x gives a percentage $> 30\%$	
	$(15 + 10 + x) \div 123$ where $12 \leqslant x \leqslant 32$	M2	oe eg $(25 + x) \div 123$ must see 15 and 10 **or** 25	
	$(15 + 10 + x) \div 123$ where $12 \leqslant x \leqslant 32$ and evaluates $(15 + 10 + x) \div 123 \times 100$ correctly	A1	evaluations rounded or truncated to nearest integer or better SC3 37 (or 36.9) and explains that a minimum of 12 of 32 people earn more than £17	
	Alternative method 4		Shows a number of employees that gives a percentage $> 30\%$	
	0.3×123 or 36.9	M1	oe accept 36 or 37 for 36.9	
5(a) cont	$15 + 10 + x$ or $25 + x$ where $12 \leqslant x \leqslant 32$	M1dep	must see 15 and 10 **or** 25	
	36.9 and evaluates $15 + 10 + x$ correctly where $12 \leqslant x \leqslant 32$	A1	accept 36 or 37 for 36.9 SC3 37 (or 36.9) and explains that a minimum of 12 of 32 people earn more than £17	
	Additional Guidance			
	Up to M2 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts			
	16 may be seen by the table			
	Alt 1 67% needs further explanation to score A1			
	Ignore irrelevant working in an otherwise fully correct response			
	For the SC3, minimum of 12 may be implied by an explanation that $10 + 15 + x$ is at least 37 or $25 + x$ is at least 37			
	Responses involving interpolation should be escalated			

Q	Answer	Mark	Comments
	Valid reason	B1	eg all employees in the second interval may earn less than £17
	Additional Guidance		
	Fewer than 12 employees could earn more than £17 per hour		B1
	Only 10 might get more than £17 in second class interval (10 could be replaced by any integer from 0 to 11 inclusive)		B1
	More than 12 in group 2 earn less than £17		B0
	Everyone in second group may earn 14 or 15 or 16		B1
	21 people may earn between £14 and £17 (21 could be replaced by any integer from 22 to 32 inclusive)		B1
	More people may earn between £14 and £17		B0
5(b)	People in the 14 to 20 group aren't evenly distributed		B0
	Not everyone in 14 – 20 earns more than £17		B0
	Not many in second group may get more than £17		B0
	Some of second group may get more than £17		B0
	14 to 20 includes people who get less than £17		B0
	2nd group includes some getting less than 17 and some getting more than 17		B0
	We don't know what each person earns		B1
	We don't know how many of 2nd group earn less than £17 per hour		B1
	Under £17 isn't in the data		B1
	Grouped data or it is only an estimate or using midpoints or data is wrong		B0
	Ignore irrelevant working but do not ignore incorrect working		

Q	Answer	Mark	Comments
	12 × 66 or 792 and 17 × 32 or 544 and 30 × 15 or 450 and 70 × 10 or 700	M1	oe implied by 2486 may be seen by the table allow one product or fx value to be incorrect
	(their 792 + their 544 + their 450 + their 700) ÷ 123 or 2486 ÷ 123	M1dep	oe eg $\dfrac{792+544+450+700}{66+32+15+10}$ condone bracket error if working seen eg 792 + 544 + 450 + 700 ÷ 123
	20.2(1…)	A1	allow 20.20 if M2 seen and no errors

5(c)

Additional Guidance	
Four values with three correct from 792, 544, 450, 700 can score up to M2 if they add and divide by 123	
Correct products or values seen but a different method used eg 123 ÷ 4	M0M0
20.2(1…) in working with answer given as the interval $20 \leqslant p < 40$	M2A0
Ignore any references to statement B eg £20.21 which makes B wrong	M2A1
Condone 20.$\dot{2}$, 20.$\dot{2}\dot{1}$ etc for 20.$\dot{2}$11$\dot{3}$8	
Do not allow rounding of any of their 4 values in the second mark eg 792 544 450 700 (800 + 544 + 450 + 700) ÷ 123	M1 M0

Q	Answer	Mark	Comments
	Valid reason referring to the distribution	B1	eg 98 employees earned below £20

Additional Guidance	
Less than a half earned more than £20	B1
Over a half earned between £10 and £14	B1
Lots earned 10 to 14	B0
Only 25 people were over £20	B1
25 people were over £20	B0
Not many earned more than the mean	B0
Most earned less than £20	B1
Some earned less than the mean, some earned more	B0
Mean is not a real amount of money	B0
Median is between £10 and £14	B1
Median is better or mode is better	B0
Modal class is $10 \leqslant p < 14$	B1
The mode is between £10 and £14 (condone mode as modal class)	B1
We don't know what each person earns	B0
Grouped data or it is only an estimate or using midpoints or data is wrong	B0
The range is large	B0
The data has extreme values or outliers or anomalous values	B1
The data is (positively) skewed	B1
The distribution is not symmetrical	B1
The distribution is not evenly spread	B1
Not representative	B0
Lots of low values or high values can make the mean inaccurate	B0
Ignore irrelevant working but do not ignore incorrect working	

(Q column: **5(d)**)

Q	Answer	Mark	Comments
	Alternative method 1		
	$2450 \div (2 + 5)$ or $2450 \div 7$ or 350	M1	oe
	their 350×5 or 1750 or their 350×2 or 700 or their $350 \div 4$ or $87.5(0)$	M1dep	oe $2450 \times \dfrac{5}{7}$ is M2 $2450 \times \dfrac{2}{7}$ is M2 $2450 \div 28$ is M2
6	their $1750 \div 4$ or $(2450 -$ their $700) \div 4$ or their $87.5(0) \times 5$ or $437.5(0)$	M1dep	oe dep on M2 $350 \times \dfrac{5}{4}$ is M3
	$437.5(0)$ and Yes	A1	accept $437.5(0) > 430$
	Alternative method 2		
	$2450 \div 4$ or $612.5(0)$	M1	oe
	their $612.5(0) \div (2 + 5)$ or their $612.5(0) \div 7$ or $87.5(0)$	M1dep	oe $2450 \div 28$ is M2
	their $87.5(0) \times 5$ or their $612.5(0) -$ their $87.5(0) \times 2$ or $437.5(0)$	M1dep	oe dep on M2 $612.5(0) \times \dfrac{5}{7}$ is M3
	$437.5(0)$ and Yes	A1	accept $437.5(0) > 430$

6 cont	**Alternative method 3**		
	430 × 4 or 1720	M1	
	2450 ÷ (2 + 5) or 2450 ÷ 7 or 350	M1	oe
	their 350 × 5 or 1750 or their 350 × 2 or 700	M1dep	oe dep on 2nd M $2450 \times \dfrac{5}{7}$ is M2 $2450 \times \dfrac{2}{7}$ is M2
	1720 and 1750 and Yes	A1	2450 − 1720 = 730 and 700 and Yes
	Alternative method 4		
	430 × 4 or 1720	M1	
	their 1720 ÷ 5 or 344 or their 1720 × 2 or 3440	M1dep	oe
	their 344 × 2 or their 3440 ÷ 5 or 688	M1dep	oe dep on M2 $1720 \times \dfrac{2}{5}$ is M3
	2408 and Yes	A1	
	Additional Guidance		
	Up to M3 may be awarded for correct work, with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	2450 ÷ 7 × 1.25 or 350 × 1.25		M1M1M1
	Yes may be implied eg They receive 7.50 more than 430		M3A1
	Condone £437.50p and Yes		M3A1

Q	Answer	Mark	Comments
	$1.2 \times 20 = 24$ and $40 - 24 = 16$	B1	oe eg $1.2 \times 20 = 24$ and $24 + 16 = 40$ or $40 - 16 = 24$ and $24 \div 20 = 1.2$ or $24 + 16 = 40$ and $24 \div 1.2 = 20$ may be seen as one calculation eg $40 - 1.2 \times 20 = 16$ or $16 + 1.2 \times 20 = 40$ or $40 - 16 = 1.2 \times 20$

	Additional Guidance	
7(a)	$40 - 24 = 16$ and $40 - 16 = 24$ and $24 + 16 = 40$ are equivalent	
	$1.2 \times 20 = 24$ and $24 \div 1.2 = 20$ and $24 \div 20 = 1.2$ are equivalent	
	$40 - 24 = 16$ or $16 + 24 = 40$ or $40 - 16 = 24$	B0
	(20 minutes =) 24 litres leak out $40 - 24 = 16$	B0
	$1.2 \times 20 = 24$ 16 litres left	B0
	Allow unambiguous working in ml and/or seconds	
	For eg $40 - 24 = 16$ condone $24 - 40 = 16$ or $24 - 40 = -16$	
	Condone incorrect use of equals sign eg $1.2 \times 20 = 24 + 16 = 40$ or $1.2 \times 20 = 24 - 40 = 16$	B1
	Correct response with irrelevant work	B1
	16 from two different ways with one way incorrect is choice eg $1.2 \times 20 = 24$ and $40 - 24 = 16$ and $20 \div 1.2 = 16$	B0

Q	Answer	Mark	Comment
	$137\,500 \times 0.08$ or $11\,000$	M1	oe eg $137\,500 \times 1.08 - 137\,500$
	their $11\,000 \div 0.4$ or $27\,500$	M1dep	oe may be seen in stages eg $11\,000 \div 40 = 275$ and 275×100
8	their $27\,500 \times 6$	M1dep	oe eg $137\,500 + 27\,500$
	$165\,000$	A1	SC2 $2\,227\,500$

	Additional Guidance	
	Up to M1 may be awarded for correct work with no answer, or incorrect answer, even if this is seen amongst multiple attempts	
	SC2 is from starting with $137\,500 \times 1.08$	

Q	Answer	Mark	Comments
	Alternative method 1: elimination		
9	at least one correct equation	M1	eg $4x + 3y = 4.7(0)$ or $5x + y = 4.5(0)$ or $15x + 3y = 13.5(0)$ or $9x + 4y = 9.2(0)$ may work in pounds or pence any letters
	correctly multiplies one or two correct equations to equate coefficients of x or y	M1dep	eg $4x + 3y = 4.7(0)$ and $15x + 3y = 13.5(0)$ or $20x + 15y = 23.5(0)$ and $20x + 4y = 18.(00)$
	correctly adds or subtracts correct equations to eliminate one variable	M1dep	eg $11x = 8.8(0)$ or $11y = 5.5(0)$ may be implied by one correct value of x or y with M2 scored
	chocolate bar £0.80 and packet of mints £0.50 or chocolate bar 80p and packet of mints 50p	A1	correct money notation condone £0.80p and £0.50p

	Alternative method 2: substitution		
	$4x + 3y = 4.7(0)$ or $5x + y = 4.5(0)$ or $15x + 3y = 13.5(0)$ or $9x + 4y = 9.2(0)$	M1	oe may work in pounds or pence any letters
	correctly makes x or y the subject of a correct equation	M1dep	eg $x = \dfrac{4.7(0) - 3y}{4}$ or $x = \dfrac{4.5(0) - y}{5}$ or $y = \dfrac{4.7(0) - 4x}{3}$ or $y = 4.5(0) - 5x$
9 **cont**	correctly substitutes to eliminate a variable	M1dep	eg $5\dfrac{(4.7(0) - 3y)}{4} + y = 4.5(0)$ or $4\dfrac{(4.5(0) - y)}{5} + 3y = 4.7(0)$ or $5x + \dfrac{4.7(0) - 4x}{3} = 4.5(0)$ or $4x + 3(4.5(0) - 5x) = 4.7(0)$ may be implied by one correct value of x or y with M2 scored
	chocolate bar £0.80 and packet of mints £0.50 or chocolate bar 80p and packet of mints 50p	A1	correct money notation condone £0.80p and £0.50p
	Additional Guidance		
	Up to M3 may be awarded for correct work with no answer or incorrect answer if this is seen amongst multiple attempts		
	Condone multiple letters in equations eg cb for x		
	Trial and improvement is 0, 3 (incorrect money notation) or 4 (fully correct)		
	Final answer chocolate bar £0.8 and packet of mints £0.5		M3A0
	Final answer chocolate bar 0.80p and packet of mints 0.50p		M3A0

Q	Answer	Mark	Comments
10	**Alternative method 1: population density of Town A**		
	$84\,000 \div (7 \times 2.6)$ or [4615, 4616]	M2	oe M1 $84\,000 \div 7$ or $12\,000$ oe or 7×2.6 or 18.2 oe
	Town B and [4615, 4616]	A1	
	Alternative method 2: comparing one square mile of population		
	$84\,000 \div 7$ or $12\,000$	M1	oe
	4695×2.6 or $12\,207$	M1	oe
	Town B and $12\,000$ and $12\,207$	A1	
	Alternative method 3: comparing seven square miles of population		
	$4695 \times 2.6 \times 7$ or 85449	M2	oe M1 4695×2.6 or $12\,207$ oe or 7×2.6 or 18.2 oe
	Town B and 85449	A1	
	Alternative method 4: comparing areas with equal populations		
	7×2.6 or 18.2	M1	oe
	$84\,000 \div 4695$ or [17.89, 17.9] or 18	M1	oe
	Town B **and** 18.2 **and** [17.89, 17.9] or 18	A1	