Question			Answer	Marks	Part marks and guidance	
1	(a)		edges	1	Any clear indication, Eg ringed, others deleted	Condone poor spelling
	(b)		Accept any clear indication	1	Expect arc or mark (eg cross) at CAB	
	(c)		[a] straight line	1	Any clear indication, Eg ringed, others deleted	Condone poor spelling or line
2	(a)		$\frac{3}{7}$ oe	1	Accept equivalent eg $\frac{6}{14}$, $\frac{21}{49}$ or 0.428 to 0.429 or 42.8% to 42.9%	
	(b)		5, 6 and 7 cao	2	**B1** for $\frac{4}{16}$ or $\frac{8}{16}$ seen or At least one from 5, 6 or 7 (condone 4 and/or 8 included)	Allow $\frac{5}{16}$, $\frac{6}{16}$, $\frac{7}{16}$ for **B1**
3	(a)		48	2	**M1** for $6 \times 2 \times 4$	May be in stages
	(b)		8	3	**M2** for $\sqrt{\frac{320}{5}}$ or **M1** for $\frac{320}{5}$ soi 64 or $5k^2 = 320$	
4	(a)	(i)	−12	1		
		(ii)	256	1		
	(b)		10.35 cao	1		
5			−20 2 5	3	**B1** for each If 0 scored **SC1** for $-4 \times$ *their* 5 correct	Middle right box

Question			Answer	Marks	Part marks and guidance	
6	(a)		5 : 2	2	**B1** for 30 [:] 12 oe If 0 scored **SC1** for 5 : 7 or 2 : 5	Condone same units in ratios **B1** for 15 : 6 or 10 : 4 or 2.5 : 1 or 1 : [0].4 may miss ratio signs
	(b)		[0].28	2	**B1** for 250 or [0].7 seen or 2500 and 700 or figs 28 in answer If 0 scored **SC1** for [1:] 3.57[1...]	Condone answer 1 : [0].28 for **B2**
	(c)	(i)	5000	1		
		(ii)	50	2	**M1** for *their* 5000 ÷ 2 ÷ 50 oe	
7	(a)		15 15 90 20 10	4	**B3** for 4 correct or **B2** for 3 correct or **B1** for 2 correct If 0 scored **SC1** for *their* apple = 2 × *their* grapefruit	
	(b)	(i)	80	1		
		(ii)	Orange juice might have run out or 50 is a small sample oe [so may not be representative] These are different men so may make different choices oe Scaling may not produce the exact number	1	Any valid practical reason. Eg running out, (others) being promoted. Any valid statistical reason Eg Choices may be in different proportion [in this group]. Expectation so may be different	Do not accept any suggestion that men may have changed their mind. Mark the best part of the statement and ignore any non-contradictory parts

Question			Answer	Marks	Part marks and guidance	
8	(a)		(Men's average + women's average) ÷ 2 oe	1	Accept half way between the two masses/averages oe or (84 +70) ÷ 2 oe or (84 – 70) ÷2 +70 oe	Allow half way between them or midpoint or added the two and halved May be in stages. Condone missing brackets
	(b)		Correct reason involving distribution of men/women or not all average	1	Saying he is correct scores 0 for reason mark but may score example marks Some may be overweight	Can carry 9 women is not enough May be a combination of both
			Correct example supporting their reason with result ≥ 630	2	8 men [0 women] 7 men 1 woman 6 men and 2 women **M1** for correct calculation supporting their reason wrongly evaluated or correct value ≥ 630 supporting their reason for their example without working or A correct calculation involving a mass and a number of people.	$8 \times 84 = 672$ $7 \times 84 + 1 \times 70 = 658$ $6 \times 84 + 2 \times 70 = 644$ Eg 8 men weigh 672 kg Multiplication or division Eg $84 \times 8 = 672$ or $630 \div 84 = 7.5$ or $630 \div 70 = 9$
9	(a)		(Line 2) [0].25 seen	1		Ignore anything on line 1. Ignore extras in all lines if not wrong or contradictory
			(Line 3) $[\frac{1}{4}] \div 2$ or $\times$ [0].5 oe	1		
			(Line 4) [0].25 + [0].125 = [0].375	1		No FT from **wrong** values above

Question			Answer	Marks	Part marks and guidance	
	(b)		5	**2**	**M1** for 1 ÷ [0].05 [× 200] oe or **B1** for 250 or [0].25 or × 20 or figs 4 or 5 in answer	Condone 250 on answer line
10	**(a)**		7^4	**1**		Condone 7^4= 2401 on answer line
	(b)		× 4 2 × 2 × 2 [=] 2^6	**2**	**B1** for one line correct	
	(c)		1.02×10^3 , 3×10^2 , $8.1 \times 10^{[1]}$, 9.83×10^{-2}	**1**	Accept 1020, 300, 81, [0].0983	Condone error in writing 0.0983 if order correct.
11	**(a)**		4 points plotted and a ruled line joining	**2**	**B1** for 3 points correctly plotted	Line at least between (0, 100) and (150, 25) Use overlay as guide. ½ square accuracy
	(b)	**(i)**	198 to 202	**1**	Do not FT their line	
		(ii)	Battery usage remains the same or Battery can be used right to 0% or Trend or pattern continues	**1**	Accept For every 50 km it uses 25%	
	(c)	**(i)**	$-\frac{1}{2}$ oe or −[0].5	**1**		Ignore units
		(ii)	100	**1**	Accept 0, 100	
	(d)		$-\frac{1}{2}d + 100$	**1**	**FT** *their* **(c)(i)***d* + *their* **(c)(ii)**	Accept any letter for *d* (except *c*)
	(e)	**(i)**	−5	**2**	**FT** *their* **(d)** if linear in *d*. **B1** for correct substitution of 210	Expect $-\frac{1}{2} \times 210 + 100$ Accept any letter for *d* (except *c*)

Question			Answer	Marks	Part marks and guidance	
		(ii)	Impossible [as battery cannot have negative charge] oe	1	**FT** *their* **(i)** only if *their* equation gives negative outcome	
12	(a)		(0, 1)	2	**B1** for (0, ..*g*..) $g \neq 1$ or **M1** for $y = 2x + 1$ or $y - 2 \times 0 = 1$	
	(b)		4	3	**B1** for $c = -2$ or **M1** for $y = 3k - 2$ $k \neq 0$ And **M1** for $10 = 3k - 2$	**B1** soi $3x - 2$ or 3 x number – 2 Allow *x* for *k*
13	(a)		42	2	**M1** for $\frac{1.47 \times 10^7}{3.5 \times 10^5}$ oe If 0 scored **SC1** for figs 42 in answer	Eg. $\frac{14\,700\,000}{350\,000}$
	(b)		$4.2[3\ldots] \times 10^9$	3	**B2** for 4 233 600 000 oe as answer or **M1** for *their* $1.47 \times 10^7 \times 288$ If 0 scored **SC1** for figs 423[...] in answer	Eg. $423.[36] \times 10^7$ *their* 1.47×10^7 converted from info in (a)
	(c)	(i)	6450	3	**B2** for 6447 to 6448 or **M1** for $\frac{1.47 \times 10^7}{(152 \times 15)}$ oe or figs 6447 in answer	May be in stages. NB: $152 \times 15 = 2280$

Question			Answer	Marks	Part marks and guidance	
		(ii)	Each machine makes the same amount of sweets. or There are no breakdowns oe or Machines running at same rate oe or All machines run **for** the same time oe	1		
14	(a)		5.34	4	**B1** for 1.5, 4.5, 7.5, 10.5, 13.5 **M1FT** for 1.5×6 4.5×10 7.5×6 10.5×2 13.5×1 soi 9, 45, 45, 21, 13.5 or 133.5 **M1** for *their* 133.5 ÷ 25	At least 4 midpoints correct FT midpoints or either end of range values consistently used Allow one numerical error Four correct products or 133.5 imply **B1** and **M1**
	(b)		Exact times for each customer are not recorded oe	1		Do not accept, "Because the mid-point is used" or comments on the method used.
15			1500 × 2 ÷ 100 oe 1500 + 30 = 1530 1530 × 1.05 oe leading to 1606.5[0] OR <u>Alternative marking</u> 2% of 1500 = 30 1500 + 30 = 1530 5% of 1530 = 76.5[0] 1530 + 76.5[0] = 1606.5[0]	**M1** **B2** **M1** **B1** **B1** **B1** **B1**	Follow method if **calculations** seen Allow 1500 × [0].02 **B1** for 30 or 1530 (no addition shown) or (1606.50 – 1530)÷1530 × 100 [= 5] or 76.50 ÷ 1530 × 100 [= 5] Follow method if **explanation** seen	**Mark by ONE method only** 1500 × 1.02 = 1530 scores **M1 B2** 30 or 1530 (no working) scores **M0B1** May be seen in stages Non-calculator method must be complete to score **M1** 1% → 1530 ÷ 100 = 15.3 5% → 15.3 × 5 = 76.5 1530 + 76.5 [= 1606.5]

Question			Answer	Marks	Part marks and guidance	
16	(a)	(i)	$\frac{1}{5}$ of Bag A's counters [are red] or The ratio of red to yellow in Bag B is 1:3	1	Accept 1 : 4 = $\frac{1}{5}$ Accept $\frac{1}{4}$ = 1 : 3	Equivalents may be percentages or decimals Eg. Bag A: 20% red, Bag B: 25% red.
		(ii)	Correct answer is any integer multiple of this. Bag A: Red 4, Yellow 16 Bag B: Red 5, Yellow 15	3	**B1** for (Bag A) yellow = 4 × red *and* A total = B total **B1** for (Bag B) yellow = 3 × red If 0 scored **SC2** for correct figures but transposed horizontally	Eg ×2: 8 32; 10 30 — ×3: 12 48; 15 45 ×4: 16 64; 20 60 — ×5: 20 80; 25 75 ×6: 24 96; 30 90 — ×10: 40 160; 50 150
	(b)		20 nfww	3	**B1** for two ratios equivalent to 3:4 **M1** for *their* 15:20 reduced to (15-3):20 <u>Alternative approach</u> **B1** for two fractions equivalent to $\frac{3}{7}$ **M1** for *their* $\frac{15}{35}$ reduced to $\frac{15-3}{32}$	6:8, 9:12, 12:16, 15:20,… *their* 15:20 any ratio **but not** 3:4 using equivalent fractions: Eg $\frac{6}{14}$ *or* $\frac{9}{21}$ *or* $\frac{12}{28}$ *or* $\frac{15}{35}$ *their* $\frac{15}{35}$ any fraction but not $\frac{3}{7}$

Question			Answer	Marks	Part marks and guidance	
17			3 : 8 cao	4	Using fractions **M1** for $\frac{1}{4}$ [+] $\frac{1}{4}$ [+] $\frac{1}{8}$ **M1** for 1 – *their* $\frac{5}{8}$ **B1** for *their* $\frac{3}{8}$: $\frac{8}{8}$ Using Areas **M1** for un-shaded area = 2×2×1÷2 + 1×1÷2 (=2.5) oe **M1** shaded area = *their* 4 – *their* 2.5 **B1** for *their* (1.5 : 4)	May be on diagram Any side length allowed eg 1 → 0.625 (1) 5 → 15.625 (25) 2 → 2.5 (4) 6 → 22.5 (36) 3 → 5.625 (9) 7 → 30.625 (49) 4 → 10 (16) 8 → 40 (64)
18	(a)		Correct ruled line reaching AB and two pairs of correct arcs	2	**B1** for correct ruled line reaching AB without all arcs or correct ruled line with arcs but short	Tolerance ±2°
	(b)	(i)	Correct ruled line reaching AD through E and two pairs of correct arcs	2	**B1** for correct ruled line reaching AD without all arcs or correct ruled line with arcs but short or perpendicular ruled line from BC to another side	Tolerance ±2°
		(ii)	118 to 122	2	**Strict FT** for all marks. Follow through *their* straight line in **(b)(i)** from entrance to another side **B1** for *their* 11.8 to 12.2 [cm]	Use ruler and measure to 2 mm accuracy

Question			Answer	Marks	Part marks and guidance	
19			$a + b = 110$ oe	**1**		
			$4a + 2b = 360$ oe	**1**	Accept $2a + b = 180$	
			$a = 70$	**1**		Ignore units
			$b = 40$	**1**	**FT** from *their a* or *b* seen correctly substituted in one equation If 0 scored **SC1** for any *a* and *b* (not a = 70 and b = 40) as answer that sum to 110	
20			$2a - 1$ [+ $2a$ +] $2a + 1$	**1**		
			$6a = 250$	**1**	Not from $a + 2a + 3a$	
			$250 \div 6 = 41.6$[...] oe or $250 \div 6$ is not an integer	**1**		
			Alternative			
			81 + 82 + 83 = 246	**1**		First two numerical steps may be in reverse order and other sums may be seen (ignore)
			83 + 84 + 85 = 252	**1**		
			82.3[3...] + 83.3[3...] + 84.3[3...] oe and impossible as not integer oe	**1**	If 0 scored **SC1** for one of $2a - 1$ or $2a + 1$ or 41.6[…] or 83.3[…] seen	