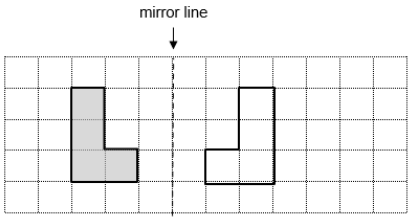
Question			Answer	Marks	Part marks and guidance	
1				2	**B1** for correct orientation but wrong location	Mark intention accepting unruled and shaded squares to indicate image
2	a		−20 0.351 10	1		Allow unambiguous transcription errors e.g. 20 but in correct position
	b		300.96	2	**B1** for 304 and 3.04 clearly identified If 0 scored, **SC1** for answer 297.36 or 270 or 266.4 or 30.96 or 3.6	For B1 may be ordered list or e.g. circled in list –300.96 implies B1
3	a		$(5 – 5) \times 5$	1		Condone extra brackets that do not invalidate answer e.g $((5 – 5) \times 5)$
	b		$20 – 5(1 + 3) = 0$	1		If more than one symbol in a space, mark the worst
4			E F	2	**B1** for each	
5	a		32	1		
	b		10	1		
6	a		2 : 5	2	**M1** for 14 : 35 or 4 : 10 or 1 : 2.5 or 0.4 : 1 If 0 scored, **SC1** for answer 5 : 2	Ignore incorrect cancellation once a correct, partially simplified ratio seen Ratio must have colon **and not** "to" or comma

Question			Answer	Marks	Part marks and guidance	
	b		12.5	**2**	**M1** for any correct ratio not 1 : ... or statement 8 cm = 100 cm oe or (figs 10) ÷ 8 or **B1** for answer 1 : 12.5 If 0 scored, **SC1** for answer [0].125	e.g. 8 : 100, 4 : 50 or 2 : 25 or 0.08 : 1
7			24	**3**	**M1** for $1\frac{1}{4}$ and $\frac{1}{2}$ correct in consistent units **M1** for division in correct order between *their* converted $\frac{1}{2}$ and $1\frac{1}{4}$ OR **M1** for $1\frac{1}{4}$ and $\frac{1}{2}$ correct in consistent units **M1** for three correct consecutive/linked terms	**M0 M1** is possible in either method $1\frac{1}{4}$ or $\frac{5}{4}$ or 1.25 and 30; 75 and 1800; $\frac{1}{48}$ and $\frac{1}{2}$ or (0.021 or 0.0208...) and 0.5 Conversions may be incorrect but clearly represent $1\frac{1}{4}$ and $\frac{1}{2}$ e.g. $\frac{1}{2} \div 1.25$ $1\frac{1}{4}$ or $\frac{5}{4}$ or 1.25 and 30; 75 and 1800; $\frac{1}{48}$ and $\frac{1}{2}$ or (0.021 or 0.0208...) and 0.5 e.g. $\left[1\frac{1}{4}, 1\right]$ $2\frac{1}{2}$, 2 $3\frac{3}{4}$, 3 5, 4 10, 8 20, 16 … or [1m 15s, 1] 2m 30s, 2 3m 45s, 3 …

Question			Answer	Marks	Part marks and guidance	
8	a		16 8 4 1 and or and or and or and 1 2 4 16	2	**M1** for $8 \times 2 = 16$ seen	
	b		3 or 4	2	**B1** for $\left[\frac{1}{5}=\right]0.2$ and $\left[\frac{1}{2}=\right]0.5$ or $\left[\frac{1}{5}=\right]\frac{2}{10}$ and $\left[\frac{1}{2}=\right]\frac{5}{10}$ or 0.3 or 0.4 seen	
9	a		[H B C] [H B L] [H F C] H F L H S C H S L V B C V B L V F C V F L V S C V S L	2	**B1** for at least five new correct combinations	For full marks there must be no repeats or extras but condone the three given combinations included and e.g. VB for Veggie Burger etc
	b		$\frac{\textit{their}\ \text{B}}{\textit{their}\ \text{total}}$ isw	1 FT	Strict FT of *their* table including the three given combinations	FT allow repeats and misplaced letters Accept 3 sf answers if decimal or percentage e.g. 0.333[...] or 33.3[...]% If (a) is not attempted, allow $\frac{4}{12}$ or $\frac{2}{6}$ or $\frac{1}{3}$

Question			Answer	Marks	Part marks and guidance	
10	**a**		B and 1.44 is less than 1.5[0] oe or B and ([0].06 or 6p) cheaper oe or B and 1.44 and 1.5[0] seen in final statement	**3**	**M2** for 1.6[0] × 0.9 oe implied by 1.44 or **M1** for 1.6[0] × 0.1 oe implied by [0].16	Allow B and "It's cheaper oe" if only 1.44 [and 1.50] seen in working space Accept all figures in pence May be 1.6[0] – 1.6[0] × 0.1 oe M0 for 10% of 1.6[0] See Appendix B and 3.75 and 4.32 only scores **0** B and 1.44 and 3.75 scores M2 only
	b		A and 3.75 less than 4.32 oe or A and [0].57 saved oe or A and 3.75 and 4.32 seen in final statement OR A and 1.25 less than 1.44 oe or A and 0.19 oe saved or A and 1.25 and 1.44 seen in final statement	**3**	**Method 1** **M1** for 1.5 × 2.5 oe or 3.75 oe **M1** for *their* 1.44 × 3 or (3 × 1.6) × 0.9 oe or 4.32 oe **Method 2** **M2** for 1.5 × 2.5 ÷ 3 oe or 1.25 or **M1** for 1.5 × 2.5 oe or 3.75	Ignore other figures/statements that don't invalidate answer All values may be seen in (a) oe may be 1.5 + 1.5 + 1.5 ÷ 2 Allow "A because it's cheaper" oe if 3.75 and 4.32 only seen as final costs in working space for (b) Allow "A because it's cheaper" oe if 1.25 and 1.44 only seen as final costs in working space for (b)
11	**a**	**i**	37	**1**		
	a	**ii**	5 cao	**2**	**M1** for either step reversed soi	May be seen on diagram eg + 3, ÷ 4, 20 implies 17 + 3 or 17 + 3 ÷ 4 or answer 17.75

Question			Answer	Marks	Part marks and guidance	
	b		$y = 4x - 3$ final answer	**2**	**M1** for final answer $4x - 3$ or $y = 4x + 3$ or $y = kx - 3$ ($k \neq 0$) or $y = 4x - c$ where c > 0 If 0 scored **SC1** for final answer $x = \frac{y+3}{4}$	Accept throughout y on right e.g. $4x - 3 = y$ Accept throughout $x \times 4$ or $x4$ or $x \times k$ etc but not x^4 $y = 4(x - c)$ $4x - 3y$ scores **0** Do not accept arrows e.g. $4 \rightarrow \times x \rightarrow 3 \rightarrow y$
12	**a**		376	**2**	**M1** for 800 – (48 + 80 + 296) or 80 + 296 or 800 × 0.47 oe	
	b	**i**	4	**2**	**M1** for $\frac{n}{40} = 0.1$ or 40×0.1 oe	Answer $\frac{4}{40}$ implies M1 Do not accept $\rightarrow$ for $\times$ M1 for $\frac{80}{800} = \frac{4}{40}$ or $\frac{800}{40} = 20$ and $\frac{80}{20}$
	b	**ii**	Yes oe and large number of trials oe or No and it is an estimate [of the actual number] oe	**1**		If "Yes" must state or imply large sample. Mention of 800 without saying sample is large is not enough. e.g. Yes, they picked lots of times. **1** Yes, they picked 800 times. **0** If "no" must state or imply estimate e.g. No, the relative frequency is only close to the real value **1** No, it's an estimate of probability **0**

Question			Answer	Marks	Part marks and guidance	
13	**a**		6.3[0] cao	**3**	**M2** for $3.78 \times \frac{5}{3}$ oe or **M1** for $\frac{3.78}{3}$ oe may be implied by 1.26	May be in pence 3.78 × (1.66 or 1.67 or 1.66...) May be in pence e.g. 126
	b		10	**2**	**M1** for $\frac{20}{2}$ oe	
14	**a**		13 and 78	**3**	**B2** for answer 13 or 78 in correct place or **M1** for one correct trial of 2 × 3 × prime or a correct factor tree for a number from 70 to 80 or an integer from 70 to 80 ÷ (2 × 3)	Accept 6 for (2 × 3) throughout e.g. 6 × 13 = 78 for 2 × 3 × 13 = 78 e.g. 2 × 3 × 5 = 30 2 × 3 × 7 = 42 2 × 3 × 11 = 66 May be 2 × 3 × 13 = 78 if answer not 13 and 78 Includes 70 and 80 Includes 70 and 80
	b		49	**2**	**B1** for answer 7	Accept 7^2 for 2 marks
15	**a**		"ten thousand[s]" cao	**2**	**B1** for 10 000 seen or answer 10 thousand or answer 10 times a thousand	Accept reasonable spelling Answer Ten to the power 4 scores 0
	b		$3.5 \times 10^{[1]}$	**2**	**B1** for correct answer but not standard form or [0].35 or [100 =] 10^2	For B1 e.g. 0.35×10^2, 35×10^0 etc

Question			Answer	Marks	Part marks and guidance	
16	a		0.2 or 0.19 to 0.20 cm per minute or cm/min	2 1	**M1** for $\frac{3.8 \text{ to } 4}{20}$ oe If 0 scored, **SC1** for triangle with incorrect values marked and *their* $\frac{\text{rise}}{\text{run}}$ or $\frac{\text{rise}}{\text{run}}$ with answer in range $0.18 \leq g < 0.19$	e.g. $\frac{1.9 \text{ to } 2}{10}$ e.g. $\frac{13}{20}$ with no triangle scores 0 e.g. $\frac{13}{20}$ with 13 and 20 marked on triangle scores SC1 e.g $\frac{2.1}{11.6}$ and answer 0.181... SC1 Mark for units still available even if wrong gradient
	b	i	5 × *their* gradient	M1	**FT** *their g*radient which is a number	<u>Alternative method</u> **M2** for 25 × (0.19 to 0.2) + 9 with answer that rounds to 14 or **M1** for 25 × *their* gradient + 9 with answer that **does not** round to 14
			13 + *their* 1 giving answer that rounds to 14	M1		
	b	ii	Continues to rise at same rate oe or Rises 0.2 cm every minute oe	1	**FT** *their* gradient if figures quoted	Must imply constant increase [in height] or continued pattern If figures used must be correct or from *their* gradient Accept The pattern continues oe The dough rises consistently oe The dough will rise I cm in 5 minutes

Question			Answer	Marks	Part marks and guidance	
17			8 cao with correct working	**4**	**M1** for πr^2 [=] $4\pi r$ or πr^2 [=] $2\pi d$ **M1** for cancellation by π implied or factorising e.g. $\pi r(r-4) = 0$ or $r(r-4) = 0$ **A1** for [radius =] 4 [and 0] Trials using πr^2 and $4\pi r$ or πr^2 and $2\pi d$ or πr^2 and $2\pi r$ *or* πr^2 and πd **M2** for two correct trials with $r \neq 4$ or two correct trials with first $r \neq 4$ and then r = 4 or one correct trial with $r = 4$ or **M1** for one correct trial with $r \neq 4$ **A1** for [radius =] 4 If **0** or **M1** scored, instead award **SC2** for answer 8 cao If **0** scored, instead award **SC1** for answer 4 [and 0]	"Correct working" requires evidence of at least M1M1 FT *their* initial statement if possible Accept $\pi r^2 = 4\pi r$ followed by $r^2 = 4r$ as showing cancelling Dependent on M1M1 Must use same value substituted for *r* in both formulas Answers required Dependent on M2 or M1 with no working or insufficient working with no working or insufficient working

Question			Answer	Marks	Part marks and guidance	
18			[*x*=] 5 and [*y* =] 4 or (5, 4) seen	**B1**		Must be clearly identified/linked to *x* and to *y* May be on graph
			3 × *their x* + [1 ×] *their y*	**M1**		*Their x* and *their y* can be any values linked to *x* and *y* Clear substitution required in 3*x* + *y*
			19	**B1**	**FT** *their* (*x*, *y*)	Must see working for FT
19			Rotation [centre] (0, 2) 180°	**1** **1** **1**		More than 1 transformation scores 0 A vector alone does not imply translation but does with "and then..." Do not accept turn oe for rotation Condone missing brackets; do not accept $\begin{pmatrix}0\\2\end{pmatrix}$ for (0, 2) Allow if accurate point plotted (½ square) and referred to Ignore direction
20			$\begin{pmatrix}7\\3\end{pmatrix}$	**2**	**M1** for $\overrightarrow{PQ}$ + $\overrightarrow{QR}$ or $\begin{pmatrix}3\\2\end{pmatrix}$ + $\begin{pmatrix}4\\1\end{pmatrix}$ or **B1** for answer $\begin{pmatrix}7\\k\end{pmatrix}$ or $\begin{pmatrix}k\\3\end{pmatrix}$	M1 If fraction line in final answer For M1 allow 3 + 4 and 2 + 1

Question			Answer	Marks	Part marks and guidance	
21			−11 15 with correct working	**3**	**M2** for $(x + 11)(x – 15)$ or **M1** for $(x + a)(x + b)$ where either $ab = –165$ or $a + b = ^{-}4$ OR **M2** for 2 correct trials with any number or **M1** for 1 correct trial with any number If **0** scored, **SC1** for –11 and 15 with no working or insufficient working	“correct working” requires **M2** **M2** and **M1** may be implied by grids and other forms such as $x(x – 15) + 11(x – 15)$ Must see substitutions e.g. $5^2 – 4\times5 – 165$ <u>Use of formula</u> **M2** for $\frac{[--]4 \pm \sqrt{([-]4)^2 - 4\times[1]\times-165}}{2\ [\times1]}$ or better e.g. $\frac{4 \pm \sqrt{676}}{2}$ **M1** for formula with at most two errors Do not award if wrong working
22			12	**3**	**B2** for 8 [batches] or **M1** for at least 2 ratios or pairs equivalent to 3:5 or $16 \div (5 – 3)$	e.g. 8×1.5 Allow decimals e.g. 1:1.6 to 1.7 or 0.6:1, 6:10, 9:15, 12:20, 15:25, 18:30, 21:35, 24:40, 27:45, ... Does not need ratio symbol
23	**(a)**		0.3 + 0.75 [= 1.05] is greater than 1	**1**		Condone additional statements that do not contradict See appendix Condone 100% for 1

Question			Answer	Marks	Part marks and guidance	
	(b)		Correct tree diagram	**3**	**B1** for P(draw) = 0.15 **B1** for two correctly placed sets of three branches with win/draw/lose labels **B1** for 0.3, *their* 0.15 and 0.55 correctly placed on all required branches	May be on diagram or in a calculation e.g. 0.3+0.55+0.15 = 1 oe Ignore probabilities. Accept e.g. W/D/L as labels Condone omission of *their* 0.15 on printed branches
	(c)		[0].165 oe	**2**	**M1** for [0].3 × [0].55	oe may be $\frac{33}{200}$ or equivalent fraction or 16.5%
24	**(a)**		Positive	**1**		Ignore comments about strength but not that contradict e.g strong positive decrease
	(b)	**(i)**	Clear indication of the point at (27, 25)	**1**		
		(ii)	Hot day [with] few visitors or Outlier	**1**		See Appendix
	(c)		Ruled line of best fit 52 to 78	**B1** **B1**	 If **B0** scored, **FT** *their* ruled line of best fit with positive gradient	Overlay is a guide only; *their* line must be between or through (15, 40) to (17.5, 40) and (22.5, 80) to (25, 80) If more than one line, mark the worst unless one clearly chosen e.g. vertical line from 21 to the line ½ square tolerance

Question			Answer	Marks	Part marks and guidance	
25	(a)		Method must include dimensions (accept 6^2 for 6 × 6 and 6^3 for 6 × 6 × 6 and 12^2 for 12 × 12) 4 × (6 × 12) + 2 × (12 × 12) or 4 × 2 × (6 × 6) + 2 × 4 × (6 × 6) or 8 × (6 × 6) + 8 × (6 × 6) or 4 × 6 × (6 × 6) – 8 × (6 × 6) or 24 × (6 × 6) – 8 × (6 × 6) or 16 × (6 × 6) [=576]	2	**M1** for full method for surface area 4 × 72 + 2 × 144 or 4 × 2 × 36 + 2 × 4 × 36 or 8 × 36 + 8 × 36 24 × 36 – 8 × 36 oe or 16 × 36	Brackets do not need to be shown **0** for 288 + 288 864 – 288 4 × 6 × 4 × 6 24 × 24

Question			Answer	Marks	Part marks and guidance	
	(b)		12.5 nfww	**4**	**M2** for (2 × 6 × 6) + (4 × 6 × 24) oe or **M1** for calculating the surface area of one or more faces of the cuboid AND **M1** for $\frac{their\ 648}{576}[\times 100]$ oe or $\frac{(their\ 648) - 576}{576}[\times 100]$ oe <u>Alternative method</u> **M2** for 16 and 18 [exposed faces] or **M1** for 16 or 18 [exposed faces] AND **M1** for $\frac{their\ 18}{their\ 16}[\times 100]$ or $\frac{their\ 18 - their\ 16}{their\ 16}[\times 100]$	soi by 72 + 576 or 648 e.g. 6 × 6 soi by 36 6 × 24 soi by 144 *Their* 648 from attempt at surface area involving 6 × (6 or 24) soi by 1.125 or 112.5 soi by 0.125 oe may be $\frac{72}{576}[\times 100]$ soi by 1.125 or 112.5 soi by 0.125

Question			Answer	Marks	Part marks and guidance	
26			57.5	**4**	**M2** for $\frac{7\times 25}{10}$ oe soi by 17.5 or **M1** for 25 ÷ 10 or 10 ÷ 25 or 7 ÷ 10 or 10 ÷ 7 AND **M1** for 15 + 25 + *their* 17.5	Evidence may be seen on diagram Implied by 2.5 or 0.4 or 0.7 or 1.4... *their* 17.5 from *their* valid attempt using scale factors to find *AB*

Appendix for 10a

Working and answer	Mark	Reason
3.75 and 4.32 seen in working Answer: B it is cheaper because 1.44 is cheaper than 1.5	**3**	Answer uses correct figures
1.44 only seen in working Answer: B it costs less	**3**	There can be no other figure to compare with so all marks awarded
1.44, 3.75 and 4.32 seen in working Answer: B He only wants one packet so it is cheaper	**M2**	M2 for 1.44 but no comparison
1.44 and 3.75 seen in working Answer: B even when you buy 2 packets it is cheaper than A	**M2**	M2 for 1.44 but no comparison
Answer: B and 1.44 cheaper than 3.75	**M2**	Answer based on incorrect figures but 1.44 seen
16p found and 3.75 seen Answer: B and 3.59 cheaper	**M1**	16p seen but 3.59 comes from 3.75 – 0.16 so incorrect values. M1 as 16p used
Answer: B and 3.75 lower than 4.32	**0**	Answer based on incorrect values