Q	Working	Answer	Mark	Notes
1 (a)	$\frac{12}{3}(=3)$ **or** $\frac{4}{12}(=3)$ **or** $\frac{BC}{4}=\frac{16.5}{12}$ **or** $BC \div 16.5 = 4 \div 12$ **or**$(BC =)$ $16.5 \div \frac{12}{4}$ oe		2	M1 correct scale factor (given as 3 ora fraction or a ratio) **or** correct equation using BC **or** a correct expression for BC (award for SF even if not used)
		5.5		A1
(b)		$3x$	1	B1 allow $3 \times x$ or $x \times 3$ft their "3" in (a)
				Total 3 marks

2	eg $\sin 65$ $\sin 65 = \frac{AB}{8.4}$ **or** $\frac{AB}{\sin 65}=\frac{8.4}{\sin 90}$		3	M1 for setting up a trig equation in AB
	eg $(AB =)$ $8.4\sin 65$ **or** $(AB =)\frac{8.4\sin 65}{\sin 90}$			M1 for a complete method
		7.61		A1 accept 7.61 – 7.613
				Total 3 marks

Q	Working	Answer	Mark	Notes
3 (a)		$\frac{5}{12}$ $\frac{8}{15}$ $\frac{7}{15}$ $\frac{8}{15}$ $\frac{7}{15}$	2	B2 for all correct probabilities $\frac{5}{12}, \frac{8}{15}, \frac{7}{15}, \frac{8}{15}, \frac{7}{15}$ (B1 for $\frac{5}{12}$ or $\frac{8}{15}, \frac{7}{15}, \frac{8}{15}, \frac{7}{15}$ oe eg for $\frac{5}{12}$ accept 0.41(666…) or 0.42, for $\frac{8}{15}$ accept 0.53(333…) or 0.53, for $\frac{7}{15}$ accept 0.46(666…) or 0.47
(b)	$\frac{7}{12} \times \frac{8}{15}$		2	M1 ft their tree diagram
		$\frac{14}{45}$		A1 oe eg $\frac{56}{180}$ or 0.31(111...) or 31(.111…)%
				Total 4 marks

Q	Working	Answer	Mark	Notes
4	eg $\frac{2}{5}\times 150 (=60)$ **or** eg 0.32 × 150 (= 48)		5	M1 for finding the number of small mugs **or** number of medium mugs
	eg 150 – "60" – "48" (= 42)			M1 for finding the number of large mugs
	eg "60" × 8.50 + "48"× 11.20 + "42" × 14.20(= 1644) **or** 510 + 537.6 + 596.4 (= 1644)			M1 for working out the income, Profit = 504 implies M3
	eg $\frac{"1644"-1140}{1140}\times 100$ **or** $\frac{"1644"-1140}{1140}\times 100-100$			M1 (indep) for a complete method to find the percentage profit for **their total income** (must be greater than 1140) An answer of 144 implies M4
		44		A1 44 or better (44.2105…)
				Total 5 marks

<table>
<tr><th>Q</th><th>Working</th><th>Answer</th><th>Mark</th><th colspan="2">Notes</th></tr>
<tr><td rowspan="3">5</td><td>$2\times2\times7$ or $2\times3\times7$ or $3^2\times7$ oe condone 1's in factor tree

or showing at least 5 correct multiples across at least 2 lists (excluding 28, 42, 63)
(28) 56, 84, 112, 140, 168, 196, 224, 252
(42) 84, 126, 168, 210, 252
(63) 126, 189, 252</td><td></td><td>3</td><td>M1</td><td>accept prime factors seen in factor tree or correct position in Venn diagram for at least one of the numbers given.</td></tr>
<tr><td>$2\times2\times7$ and $2\times3\times7$ and $3\times3\times7$
or showing at least 9 correct multiples across all 3 lists (excluding 28, 42, 63)</td><td></td><td></td><td>M1</td><td>accept prime factors seen in factor tree or correct position in Venn diagram for all 3 of the numbers given.</td></tr>
<tr><td></td><td>252</td><td></td><td>A1</td><td>or $2^2\times3^2\times7$ oe Dep on M1</td></tr>
<tr><td rowspan="4">5 alt</td><td rowspan="4"><table><tr><td>7</td><td>28</td><td>42</td><td>63</td></tr><tr><td>2</td><td>4</td><td>6</td><td>9</td></tr><tr><td>3</td><td>2</td><td>3</td><td>9</td></tr><tr><td></td><td>2</td><td>1</td><td>3</td></tr></table>oe
or
<table><tr><td>7</td><td>28</td><td>42</td><td>63</td></tr><tr><td>2</td><td>4</td><td>6</td><td>9</td></tr><tr><td>3</td><td>2</td><td>3</td><td>9</td></tr><tr><td>2</td><td>2</td><td>1</td><td>3</td></tr><tr><td>3</td><td>1</td><td>1</td><td>3</td></tr><tr><td>(1)</td><td>1</td><td>1</td><td>1</td></tr></table></td><td rowspan="4"></td><td rowspan="4">3</td><td>M1</td><td>For one correct row in table eg division by 7 gives 4, 6, 9</td></tr>
<tr><td>M1</td><td>Fully correct table – need only go as far as top table – we want to see prime factors along the side or prime factors along the sides and bottom (condone 1's)</td></tr>
<tr><td>252</td><td>A1</td><td>or $2^3\times3^2\times7$ oe Dep on M1</td></tr>
<tr><td></td><td></td><td>Total 3 marks</td></tr>
</table>

Q	Working	Answer	Mark	Notes
6 (a)		7, 33, 57, 71, 78, 80	1	B1
(b)			2	B2 Fully correct cf graph – points at ends of intervals and joined with curve or line segments. If not B2 then B1(ft from a table with only one arithmetic error) for 5 or 6 of their points at ends of intervals and joined with curve or line segments **OR** for 5 or 6 points plotted correct at ends of intervals not joined **OR** for 5 or 6 points from table plotted consistently within each interval (not at upper ends of intervals) at their correct heights and joined with smooth curve or line segments.
(c)		21 – 24	1	B1ft any value in range or ft their cf curve
(d)			2	M1ft eg reading of 72 – 74 or 6 – 8 could be seen as the numerator of a fraction ft their cf graph
		$\frac{8}{80}$		A1ft oe, ft their cf graph fractional answers must have an integer numerator and denominator
				Total 6 marks

Q	Working	Answer	Mark	Notes
7	28 ÷ 0.35 (= 80) oe eg (28 ÷ 7) × 20 (= 80)		5	M1 indep for calculating total number of sweets
	$1-(0.2+0.35)$ (= 0.45) oe **or** (0.2 + 0.35) × "80" (= 44) or 28 + "16" (= 44)			M1 or for a correct equation for missing values eg $x + 2x + 0.2 + 0.35 = 1$ oe (can be implied by 2 probabilities that total 0.45 in table if not contradicted in working space)
	"0.45" ÷ 3 (= 0.15) oe **or** "0.45" × "80" (= 36) **or** "80" – "44" (= 36)			M1 (or 0.15 or 0.3 seen in table – either order)
	"80" × "0.15" **or** "80" × "0.3" (= 24) **or** "36" ÷ 3 or "36" ÷ $\frac{3}{2}$ (= 24)			M1 A correct calculation for the number of white sweets or the number of pink sweets
		12		A1
7 alt	$1-(0.2+0.35)$ (= 0.45) or 100(%) – 20(%) – 35(%) = 45(%)		5	M1 or for a correct equation for missing values eg $x + 2x + 0.2 + 0.35 = 1$ oe
	"0.45" ÷ 3 (= 0.15) 45(%) ÷ 3 (= 15(%))			M1 (or 0.15 or 0.3 seen in table – either order)
	$\frac{n}{28}=\frac{0.15}{0.35}$ **or** $\left(\frac{n}{15}=\right)\frac{28}{0.35}$ oe or $\frac{n}{28}=\frac{0.3}{0.35}$ **or** $\left(\frac{n}{0.3}\right)=\frac{28}{0.35}$ **or** 35% = 28 so 5% = 4			M1 for using proportion with an expression for n white sweets or finding 5% oe to enable calculation to 15%
	$(n=)\ 28\times\frac{0.15}{0.35}$ **or** $(n=)\ 0.15\times\frac{28}{0.35}$ or 15% = 3 × 4 or $28\times\frac{0.3}{0.35}$ **or** $0.3\times\frac{28}{0.35}$ **or** 30% = 6 × 4 (= 24)			M1 a calculation using proportion that would lead to finding their n or $2n$
		12		A1
				Total 5 marks

Q	Working	Answer	Mark	Notes
8	196 ÷ (9 – 5) (= 49) oe		3	M1
	3 × "49"			M1
		147		A1 SCB1 for an answer from 34.5 – 34.6 **or** an answer of 42
				Total 3 marks

9	(a)	–	(5), 8, 8, 20, *x*, (24)	3	B3 for (5), 8, 8, 20, *x*, (24) where *x* = 21 **or** 22 **or** 23 (B2 for (5), 8, 8, 20, *x*, (24) where *x* is blank or **any** value other than 21, 22 or 23) (B1 for a list with a median of 14 **or** a mode of 8 **or** the 3rd and 4th cards having a sum of 28 (ignoring other cards))
	(b)	eg 5 × 21 (= 105) **or** 6 × 23 (= 138)		3	M1
		eg 6 × 23 – 5 × 21			M1
			33		A1
					Total 6 marks

Q	Working	Answer	Mark	Notes
10 (a)	(231 776 – 228 314) ÷ 228 314 **or** 3462 ÷ 228 314 (= 0.01516…) **or** 231 776 ÷ 228 314 (= 1.01516…)		2 M1	
		1.5	A1	for 1.5 or better (1.516…) (be careful: 3462 ÷ 231 776 × 100 = 1.49….)
(b)	231 776 ÷ 1.077 oe		3 M2	If not M2 then M1 for 100 + 7.7 (=107.7) or 1 + 0.077(=1.077) seen but not 1 + 7.7%
		215 000	A1	for 215 000 or better (215 205.19…) (if no marks awarded SCB1 for 212000 or better (211990.71…))
				Total 5 marks

11	$(0\times13)+1\times17+2\times8+3x+4\times11$ or (0 +) 17 + 16 + 3x + 44 (= 77 + 3x)			M1 at least **3** correct products with intention to add. eg award for 77 seen as this is sum of 3 products
	$(13+17+8+x+11)$ oe eg 49 + x **or** $98+2x$			M1 Sum for total frequency or (frequency × 2)
	$\frac{"77+3x"}{"49+x"}=2$ oe e.g. $"77+3x"=2("49+x")$			M1 for use of mean in valid equation (ft their values for sum of products and their total frequency if M2 awarded previously)
		21		A1
				Total 4 marks

Q	Working	Answer	Mark	Notes
12	eg 200 000 × 0.018 (= 3600) **or** 200 000 × 1.018 (= 203 600)		3	M1 for method to find 1.8% or 101.8% of 200 000
	eg 209 754 ÷ "203 600" (= 1.015000…)			M1 for a complete method to find the multiplier for the compound interest for 2nd and 3rd year
		1.5		A1 or better eg 1.500045971…
				Total 3 marks
13	eg $40 = \frac{k}{1.5^2}$ **or** $k = 90$ **or** $\frac{C^2}{1.5^2} = \frac{40}{1000}$ (0.04) **or** $(C^2 =) 1.5^2 \times \frac{40}{1000} (= 0.09)$ **or** $\frac{1.5^2}{C^2} = \frac{1000}{40} (= 25)$ **or** $(C^2 =) 1.5^2 \div \frac{1000}{40} (= 0.09)$		3	M1
	eg $(C =) \sqrt{\frac{"90"}{1000}}$ oe **or** $(C =) \sqrt{1.5^2 \times "0.04"}$ **or** $(C =) \sqrt{1.5^2 \div "25"}$ **or** $(C =) \sqrt{"0.09"}$			M1
		0.3		A1 oe, allow ±0.3 oe or −0.3 oe
				Total 3 marks

Q	Working	Answer	Mark	Notes
14	3.445, 3.455, 1.85, 1.95, 4.5, 5.5		3	B1 any one bound
	$(A =)\ 3.445 - \frac{1.95^2}{4.5}$			M1 $A = LB_w - \frac{(UB_x)^2}{LB_y}$ where $3.445 \leq LB_w < 3.45$, $1.9 < UB_x \leq 1.95$, $4.5 \leq LB_y < 5$
		2.6		A1 oe, (dep on M1), from correct figures (3.445, 1.95, 4.5)
				Total 3 marks

15	eg $\frac{55}{360} \times \pi \times d = 5$ **or** $\frac{55}{360} \times \pi \times 2 \times r = 5$ oe **OR** $\frac{360}{55} \times 5 (= 32.7...)$ oe		4	M1 for a correct equation for the diameter **or** radius **OR** for a method to find the circumference of the circle
	eg $d = \frac{5 \times 360}{55\pi}\ (= 10.4...)$ **or** $r = \frac{5 \times 360}{55 \times 2 \times \pi} (= 5.2...)$ **OR** $d = \frac{"37.2"}{\pi}\ (= 10.4...)$ **or** $r = \frac{"37.2"}{2 \times \pi} (= 5.2...)$			M1 for a method to work out the diameter **or** radius
	(area =) eg $\pi \times \left(\frac{"10.4..."}{2}\right)^2$ **or** $\pi \times "5.2..."^2$			M1
		85.2		A1 allow 84.9 – 85.4
				Total 4 marks

Q	Working	Answer	Mark	Notes
16	$12 \times \tan 5$ (=1.05) **or** $\tan 5 = \frac{'y'}{12}$ **or** $12\tan 5$ **or** $\tan 85 = \frac{12}{'y'}$ **or** $\frac{12}{\tan 85}$ $\frac{y}{\sin 5} = \frac{12}{\sin 85}$ oe **or** (y =) 1.04986… oe		3	M1 oe correct expression using tan or the sine rule or $\sqrt{\left(\frac{12}{\cos 5}\right)^2 - 12^2}$ (= 1.04986…)
	(AB =) 2.6 + "1.05" oe			M1
		3.65		A1 allow awrt 3.65
				Total 3 marks

Q	Working	Answer	Mark	Notes
17	$(2x + 3)(x – 1) < 75$		5	B1 For writing the correct inequality sign with a correct calculation or correct value – this could be initially or saying that $x < 6$ at the end
	$2x^2 + x – 78 < 0$			M1 rearranged to form correct quadratic < 0 (allow = 0 or other incorrect inequality sign) oe
	$(x – 6)(2x + 13)$ (< 0) **or** $x = \frac{-1 \pm \sqrt{(1)^2 - (4 \times 2 \times -78)}}{2 \times 2}$ **or** $2\left(x + \frac{1}{4}\right)^2 - 2\left(\frac{1}{4}\right)^2 - 78 = 0$			M1 first step to find critical values from the correct quadratic
		$x = 6$		A1 $x = 6$ identified as critical value, ignore –6.5 if given
		$1 < x < 6$		A1 correct inequality
				Total 5 marks

Q	Working	Answer	Mark	Notes
18	*DFE* = 42° or *DOG* = 180 – 2 × 42 (= 96) or *EFG* = 90° or *EDG* = 90º or *DEG* = 90 – 42 (= 48)		4	M1 used or seen in diagram (must be clearly labelled if not in diagram)
		48°		A1 award 2 marks for 48 unless from an incorrect method
	angles in same segment **or** angles from same chord **or** angles at the circumference subtended from the same arc of the circle angles in a semicircle are 90° angles in a semicircle are 90° angle subtended by diameter is 90° angle at centre twice angle at circumference oe angles in a triangle add to 180 angles in a triangle add to 180			B2 Dep on a fully correct method to find angle *DFG* for a full set of reasons relevant to their method. B1 dep on M1 for at least one relevant **circle theorem.**
				Total 4 marks

Q	Working	Answer	Mark	Notes
19	at least **two** of 3, 8, 5, 2 seen **or** at least **two** correct frequency densities from 0.6, 0.8, 1, 1.2, 0.4 **or** eg one cm on FD axis = 0.25 **or** eg top of FD axis labelled 2 **or** eg 1 plant = 20 small squares **or** total small squares in at least 2 bars (60, 160, 100, 240, 40) **or** total number of 1 cm squares for at least 2 bars (2.4, 6.4, 4, 9.6, 1.6) oe		4	M1 At least 2 frequencies for other bars **or** scale on FD axis **or** eg 20 small squares represents 1 plant oe
	3 + 8 + 5 + 12 + 2 (= 30) **or** adding the number of small squares in all bars: 60 + 160 + 100 + 240 + 40 (= 600) **or** adding the number of 1 cm squares in all bars: 2.4 + 6.4 + 4 + 9.6 + 1.6 (= 24) oe			M1 add up 5 frequencies (allow one error) or adding the number of small squares in all bars (allow one error) or adding the number of 1 cm squares in all bars (allow one error) oe
	$\frac{0.25\times"12"+"2"}{"30"}$ **or** $\frac{0.25\times"240"+"40"}{"600"}$ **or** $\frac{0.25\times"9.6"+1.6}{"24"}$ **oe**			M1 ft their figures dep on the previous M1
		$\frac{1}{6}$		A1 oe eg $\frac{100}{600}$ allow 0.16(66…) ie 2 dp truncated or rounded or better
				Total 4 marks

Q	Working	Answer	Mark	Notes
20	eg $2^3 : 3^3$ **or** $8 : 27$ **or** $10^3 : 15^3$ oe **or** $\left(\frac{15}{10}\right)^3$ **or** $1.5^3 (=3.375)$ **or** $\left(\frac{3}{2}\right)^3 \left(=\frac{27}{8}\right)$ **or** $\left(\frac{10}{15}\right)^3$ **or** $\left(\frac{2}{3}\right)^3 \left(=\frac{8}{27}\right)$		4	M1 for a correct ratio or scale factor for the volumes
	eg $\frac{1197}{27-8}$ **or** $\frac{1197}{15^3-10^3}$ **or** $\frac{27}{8}V_A - V_A = 1197$ oe **or** $\frac{19}{8}V_A = 1197$ oe			M1 for a correct method to find the value of 1 share of volume **or** for setting up a correct equation using the scale factor for the volumes
	eg $8 \times \frac{1197}{27-8}$ **or** $10^3 \times \frac{1197}{15^3-10^3}$ **or** $\frac{8}{19} \times 1197$ oe			M1 complete correct method to find volume of vase **A**
		504		A1
				Total 4 marks

Q	Working	Answer	Mark	Notes

				Edexcel averages: scores of candidates who achieved grade:								
Qn	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3	U
1	2.50	3	83	2.50	2.97	2.91	2.88	2.73	2.23	1.58	0.82	0.00
2	2.28	3	76	2.28	2.92	2.84	2.81	2.44	1.98	0.94	0.25	0.02
3	3.06	4	77	3.06	3.94	3.76	3.56	3.09	2.39	1.67	0.94	0.00
4	3.61	5	72	3.61	4.71	4.46	4.24	3.77	2.75	1.87	0.96	0.15
5	2.31	3	77	2.31	2.84	2.62	2.51	2.20	1.91	1.76	1.36	0.65
6	4.21	6	70	4.21	5.77	5.36	4.90	3.99	3.36	1.89	0.92	0.00
7	3.37	5	67	3.37	4.69	4.33	3.95	3.41	2.42	1.36	0.48	0.04
8	1.97	3	66	1.97	2.83	2.60	2.22	1.94	1.32	0.81	0.41	0.00
9	3.77	6	63	3.77	5.63	4.91	4.38	3.40	2.51	1.28	0.59	0.00
10	2.97	5	59	2.97	4.64	3.90	3.29	2.54	1.95	0.98	0.29	0.00
11	2.20	4	55	2.20	3.78	3.21	2.49	1.61	0.86	0.43	0.19	0.09
12	1.41	3	47	1.41	2.50	1.84	1.45	0.96	0.72	0.47	0.28	0.07
13	1.46	3	49	1.46	2.81	2.39	1.43	0.72	0.40	0.17	0.13	0.00
14	1.24	3	41	1.24	2.39	1.73	1.31	0.79	0.41	0.13	0.04	0.02
15	1.70	4	43	1.70	3.68	2.78	1.53	0.60	0.27	0.05	0.05	0.00
16	1.21	3	40	1.21	2.51	1.78	1.14	0.70	0.27	0.08	0.00	0.00
17	1.83	5	37	1.83	3.65	2.72	1.82	1.09	0.49	0.12	0.00	0.06
18	1.30	4	33	1.30	2.83	1.71	1.15	0.58	0.41	0.19	0.09	0.02
19	1.32	4	33	1.32	3.07	1.88	1.11	0.49	0.19	0.03	0.00	0.00
20	1.06	4	27	1.06	2.87	1.30	0.58	0.26	0.09	0.05	0.01	0.00
	44.78	**80**	**45**	**44.78**	**71.03**	**59.03**	**48.75**	**37.31**	**26.93**	**15.86**	**7.81**	**1.12**

Suggested grade boundaries

Grade	9	8	7	6	5	4	3
Mark	65	54	43	32	21	12	6