Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1 (a)	n^8	B1	cao	
(b)	cd^3	M1	for partial simplification, eg c or d^3	May be seen as simplification in original fraction
		A1	for cd^3	Accept c^1d^3
(c)	$x > \frac{14}{5}$	M1	for $5x > 14$ or $5x = 14$ or critical value, $\frac{14}{5}$ oe	Must see carried out correctly, ie at least $5x > 7 \times 2$ not just intention seen. Allow other signs for this mark.
		A1	$x > \frac{14}{5}$ or $x > 2\frac{4}{5}$ or $x > 2.8$	
2	2 hours 45 minutes	P1	for $30 \div 24$ (= 1.25) or $12 \div 8$ (= 1.5)	May be written in hours and/or minutes
		P1	for finding the sum of their two times eg "1.25" + "1.5" (= 2.75) or 165 (minutes)	or 3 h 15 min or 2 h 75 min
		A1	cao	
3	9.35, 9.45	B1	for 9.35 in the correct position	
		B1	for 9.45 in the correct position	Accept $9.44\dot{9}$ oe or 9.4499…oe

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
3	Shown with reasons	M1	for method to find *ACD* using parallel lines eg *BCA* = 125 **and** *ACD* = 180 – 125 (= 55) **or** *BCF* = 180 – 125 (= 55) = *ACD* **or** *FCD* = 125 **and** *ACD* = 180 – 125 (= 55) **or** *CFG* = 180 – 125 (= 55) = *ACD*	Angles must be clearly labelled on the diagram or otherwise identified. Correct method can be implied from angles on the diagram if no ambiguity or contradiction.
		M1	for method to find *ADC* eg 180 – 110 (= 70) **or** for method to find *CAD* eg 180 – ("70" + "55") (= 55) or 110 – "55" (= 55)	
		A1	for *ACD* = 55 **and** *CAD* = 55	
		C1	for one correct parallel lines reason linked to their method eg Corresponding angles are equal Allied angles / Co-interior angles add up to 180 Alternate angles are equal	Underlined words need to be shown; reasons need to be linked to their method, which can be implied from correctly identified angles (stated or written on the diagram).
		C1	for one other reason stated linked to their method eg Angles on a straight line add up to 180 Angles in a triangle add up to 180 Vertically opposite angles are equal OR Vertically opposite angles are equal The exterior angle of a triangle is equal to the sum of the interior opposite angles. Angles in a quadrilateral add up to 360. Accept "4-sided shape"	
4	17.5	P1	for a first step, eg 5 × 14 (= 70) or 14 ÷ 4 (= 3.5) or 5 ÷ 4 (= 1.25) or 4 ÷ 5 (= 0.8)	Could be done algebraically. 11.2 as answer scores no marks.
		A1	oe	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
19	$\frac{-11x+2}{x^2-4}$	M1	for writing at least one of the 3 terms with a denominator of $(x^2 - 4)$ or $(x - 2)(x + 2)$ eg. $\frac{3x(x-2)}{x^2-4}$ oe or $\frac{(x+2)(2x+1)}{x^2-4}$ oe or $\frac{x^2-4}{x^2-4}$	Students may work with a denominator of $(x - 2)(x + 2)$ for the first 3 marks
		M1	for $\frac{3x(x-2)}{x^2-4} - \frac{(x+2)(2x+1)}{x^2-4} - \frac{x^2-4}{x^2-4}$ oe or for $\frac{x^2-11x-2}{x^2-4}$ (– 1) or for $\frac{[x^2-11x-2]}{x^2-4} - \frac{x^2-4}{x^2-4}$	$[x^2 - 11x - 2]$ denotes their expansion of $3x(x - 2) - (x + 2)(2x + 1)$
		M1	for a numerator of $3x^2 - 6x - 2x^2 - 5x - 2 - x^2 + 4$	May be simplified
		A1	for $\frac{-11x+2}{x^2-4}$	Accept $a = -11$ and $b = 2$
20	44 384	P1	for process to find a, eg. $29\,600 = 24\,000a + 800$ or $(a =)\ 1.2$ oe	
		P1	for $(P_{2020} =)$ "1.2" × 29 600 + 800 (= 36 320)	
		P1	for $(P_{2021} =)$ "1.2" × "36 320" + 800	
		A1	cao	

Paper 1MA1_3F				
Question		**Working**	**Answer**	**Notes**
5	(a)	160 tiles 18 packs	18	M1 a full method to find the area of the trapezium M1 a full method to calculate both areas in consistent units M1 for the area of the trapezium ÷ area of a tile (with consistent units) M1 (dep on previous M) for complete method to find the number of packs required A1
	(b)	176 tiles 20 packs	Supported statement	P1 finding the number of packs for 10% more tiles or 10% of their number of packs, ft from (a) C1 Statement, eg. increase in packs is 2 more which is more than 10%
6			$(x-1)(x+4)$	M1 $(x \pm 1)(x \pm 4)$ A1 $(x-1)(x+4)$ oe
7			A and D	C1 in any order
8	(a)		2500	P1 for use of 1.03 P1 for a full method equivalent to $\div 1.03^2$ A1 2500
	(b)		Saver account with support	P1 process to find a comparable total interest figure or to compare investment for a given amount A1 for conclusion with supporting statement or figures seen eg 21.6(65..)>21
9		1.5×1.7−1.7 Or 0.5 × 1.7 = (0.85)	0.664(09..)	P1 for finding the difference in height by ratio or multiplier P1 for use of tan ratio P1 (dep) for "0.85" ÷ tan 52 oe A1 0.664 to 0.6641

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
19	1610	B1	for 5.875×10^8 or 5.885×10^8 or 3.55×10^5 or 3.65×10^5 or the digits 5875 or 5885 or 355 or 365	Accept $5.884\dot{9}$ for 5.885 Accept $3.64\dot{9}$ for 3.65
		M1	for method to find lower bound, $\frac{[LB]}{[UB]}$ eg $(5.875 \times 10^8) \div (3.65 \times 10^5)$ oe	$5.875 \times 10^8 \leq [LB] < 5.88 \times 10^8$ $3.6 \times 10^5 < [UB] \leq 3.65 \times 10^5$
		A1	for answer in range 1609 – 1610 from correct working	If an answer is shown in the range in working and then incorrectly rounded award full marks
20 (a)	3.5	P1	for process to find the common difference between the first and second and the common difference between the third and second term eg $(3x + 1) - (x + 2)$ (= $2x - 1$) **and** $(x + 2) - (x - 4)$ (= 6) **or** for process to write a correct equation in x, eg $(3x + 1) - (x + 2) = (x + 2) - (x - 4)$ or $2x - 1 = 6$ oe	
		A1	for 3.5 oe eg $\frac{7}{2}$	
(b)	-0.5, 8	P1	for process to write a correct equation in terms of the common ratio and y eg $r(y - 4) = y + 2$ or $r(y + 2) = 3y + 1$	r can be any letter apart from y
		P1	for process to write a correct equation in y eg $\frac{3y + 1}{y + 2} = \frac{y + 2}{y - 4}$ oe	
		P1	for process to write a correct equation without fractions eg $(3y + 1)(y - 4) = (y + 2)(y + 2)$ oe	
		P1	for process of writing a correct simplified equation eg $2y^2 - 15y - 8 (= 0)$	The quadratic does not have to equal 0, ie accept $2y^2 - 15y = 8$
		A1	cao	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
13	435	M1	for start to method of finding the number of pairs, eg 30×29 (= 870) oe or $\frac{30 \times 29}{2}$ or clear intention to sum the integers from 1 to 29 eg $29 + 28 + \ldots + 2 + 1$	M1 for $\frac{1}{30} \times \frac{1}{29}$
		A1	cao	
14	4400	P1	for start to processes needed to find the investment, eg 2937.14 + 1000 (= 3937.14) **OR** starts to work with algebra, eg $P \times 1.035 - 750$	
		P1	for process to find amount of money at the beginning of 2023 after the first withdrawal, eg "3937.14" ÷ 1.035 (= 3804) or [value] ÷ 1.035 **OR** writes down complete equation, eg $(P \times 1.035 - 750) \times 1.035 - 1000 = 2937.14$	[value] can be 2937.14 or 2937.14 + 750 or 2937.14 + 1750
		P1	for complete process, eg ("3804" + 750) ÷ 1.035 **OR** for a start to the process to solve the equation to find $1.035P - 750$ eg $P \times 1.035 - 750 = \frac{2937.14 + 1000}{1.035}$ or $1.035P - 750 = 3804$ **or** for a start to the process to solve the complete equation eg $1.035^2P - 776.25 = 2937.14 + 1000$ or $1.035^2P - 1000 = 2937.14 + 776.25$ or $1.035^2P = 2937.14 + 776.25 + 1000$	
		A1	cao	A correct answer with no supportive working gets 0 marks

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
9	10.125	P1	for process to find volume of at least one of the cube or the pyramid, eg $6 \times 6 \times 6$ (= 216) oe or $k \times 8 \times 8 \times h$ $(=\frac{64}{3}h)$ oe	Check diagram for working Throughout $0 < k \leq 1$
		P1	for process to form an equation, eg $6 \times 6 \times 6 = k \times 8 \times 8 \times h$ or "216" $= \frac{64}{3}h$ **or** for process to find h eg "216" $\div 8^2 \div k$	
		A1	for 10.125 oe mixed number	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
12	Shown	M1	for a method to find the product of two linear expressions (3 out of 4 terms correct or 4 correct terms ignoring signs) eg $x^2 + 3x - x - 3$ or $x^2 + 3x - 5x - 15$ or $x^2 - 5x - x + 5$	Note that (eg) $2x - 3$ in expansion of $(x - 1)(x + 3)$ is to be regarded as 3 correct terms.
		M1	for a complete method to obtain all terms, half of which are correct (ft their first product) eg $x^3 - 5x^2 - 10x + 2x^2 - 3x + 15$	First product must be quadratic with at least 3 terms but need not be simplified or may be simplified incorrectly
		A1	for $x^3 - 3x^2 - 13x + 15$ shown, accept $x^3 + -3x^2 + -13x + 15$	
13	Proof	M1	for giving a general term for a consecutive triangular number eg $\frac{(n+1)(n+2)}{2}$ or $\frac{(n-1)n}{2}$	
		M1	for $\frac{n(n+1)}{2} + \frac{(n+1)(n+2)}{2}$ or $\frac{(n-1)n}{2} + \frac{n(n+1)}{2}$ oe	
		C1	for completing the proof to show a square number, eg $(n + 1)^2$ or n^2	
14	19.9	P1	for substituting into the cosine rule to find OB, eg $(OB^2) = 9^2 + 6^2 - 2 \times 9 \times 6 \times \cos 35$	
		P1	for using correct order of operations eg $81 + 36 - 88.46...$ (= 28.5...)	May be implied by $OB = 5.34...$ Values may be rounded or truncated.
		P1	for process to find the area of the sector, eg $\frac{80}{360} \times \pi \times$ "$5.34...^2$"	
		A1	for answer in the range 19.8 to 20	If a correct answer within the range is shown in working but incorrectly rounded award full marks.

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
5 (a)	63	B1	for 63, accept $3 \times 3 \times 7$ or $3^2 \times 7$	
(b)	15 876	M1	for at least two of 2^2, 3^4, 7^2 **or** shows at least 3 multiples of 2268, eg 2268, 4536, 6804 and at least 3 multiples of 441, eg 441, 882, 1323	(A =) $2^2 \times 3^4 \times 7$ scores 0 marks
		A1	for 15 876 or $2^2 \times 3^4 \times 7^2$ oe	
6	65	P1	for a correct process to find the number of seconds, eg 67 205 600 ÷ 11.9 (= 5 647 529.4...) **or** for a correct process to convert between seconds and days, eg 24 × 60 × 60 (= 86 400) oe, may be seen in stages or 11.9 × 60 × 60 × 24 (= 1 028 160)	Note that this mark may be awarded at any stage in the working.
		P1	for a complete process, eg "5 647 529.4..." ÷ "86 400" or 67 205 600 ÷ "1 028 160"	
		A1	accept answers in the range 65 to 65.4 or 66	If a correct answer within the range is shown in working but incorrectly rounded award full marks.
7 (a)	(1, –3)	B1	cao	
(b)	−0.7 or 2.7	B1	for an answer in the range –0.8 to –0.6 or 2.6 to 2.8	
8	648	M1	for substitution into density formula eg 9×72 or $9 = \frac{m}{72}$	
		A1	cao	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
3	Shown with reasons	M1	for method to find *ACD* using parallel lines eg *BCA* = 125 **and** *ACD* = 180 – 125 (= 55) **or** *BCF* = 180 – 125 (= 55) = *ACD* **or** *FCD* = 125 **and** *ACD* = 180 – 125 (= 55) **or** *CFG* = 180 – 125 (= 55) = *ACD*	Angles must be clearly labelled on the diagram or otherwise identified. Correct method can be implied from angles on the diagram if no ambiguity or contradiction.
		M1	for method to find *ADC* eg 180 – 110 (= 70) **or** for method to find *CAD* eg 180 – ("70" + "55") (= 55) or 110 – "55" (= 55)	
		A1	for *ACD* = 55 **and** *CAD* = 55	
		C1	for one correct parallel lines reason linked to their method eg Corresponding angles are equal Allied angles / Co-interior angles add up to 180 Alternate angles are equal	Underlined words need to be shown; reasons need to be linked to their method, which can be implied from correctly identified angles (stated or written on the diagram).
		C1	for one other reason stated linked to their method eg Angles on a straight line add up to 180 Angles in a triangle add up to 180 Vertically opposite angles are equal OR Vertically opposite angles are equal The exterior angle of a triangle is equal to the sum of the interior opposite angles. Angles in a quadrilateral add up to 360. Accept "4-sided shape"	
4	17.5	P1	for a first step, eg 5 × 14 (= 70) or 14 ÷ 4 (= 3.5) or 5 ÷ 4 (= 1.25) or 4 ÷ 5 (= 0.8)	Could be done algebraically. 11.2 as answer scores no marks.
		A1	oe	

Paper 1MA1: 3H				
Question	**Working**	**Answer**	**Mark**	**Notes**
10		6 (%)	P1 P1 A1	for y^5 oe or 8029.35 ÷ 6000 for a process to find $1+x$ e.g. $\sqrt[5]{(8029.35 \div 6000)}$ or 1.06 or 1.0599.. 5.99 to 6
11		No (supported)	P1 C1	Process to find number of rose trees e.g. 215 ÷17 (=12.647...) or show number of choices with 12 and 13 eg 17 × 12 = 204 and 17 × 13 = 221 No with interpretation that 12.6.. is not a whole number or a whole number of plants must be bought or number of plants would have to be between 12 and 13 which is not possible
12		3 : 4 : 11	P1 P1 A1	Makes a start e.g. by using multipliers e.g. 1 + 5 = 6 and 7 + 11 = 18 and 6 × 3 = 18 or $AB:BD$ = 3:15 or x=3y (appropriate x and y shown) or $\frac{1}{6}=\frac{3}{18}$ Complete process to find ratios e.g. (7 + 11) ÷ (1 + 5) = 3 and 1 × "3" : 7 − ("3" × 1) : 11 oe
13		$y \geq -2, y \geq x$ and $y \leq 0.5x + 1$	M1 M1 M1 A1	$y = -2$ indicated; accept any inequality for "=" $y = x$ oe indicated; accept any inequality for "=" $y = 0.5x + 1$ oe indicated; accept any inequality for "=" $y \geq -2, y \geq x$ and $y \leq 0.5x + 1$
14 (a)		$\frac{x+4}{2x+3}$	M1 M1 A1	Factorising the denominator $(2x \pm 3)(x \pm 4)$ or $2\left(x \pm 1\frac{1}{2}\right)(x \pm 4)$ Factorising the numerator $(x-4)(x+4)$ oe
(b)		$v = \frac{15t}{w+30}$	M1 M1 A1	A correct step towards solution e.g. expanding brackets to get $15t - 30v$ or multiply both sides by v For a method to rearrange the formula to isolate terms in v eg $vw + 30v = 15t$ oe

PAPER: 1MA1_3H			
Question		**Modification**	**Mark scheme notes**
9	(b)	Numbers on the table changed to: 50, 150, 300, 350 and 650. Wording changed to: 'On the grid for Question 9, draw a box plot for the information in the table. Draw this below the box plot for the Male students.'	Standard mark scheme Median 300, IQR 200
13		Diagram enlarged. Shading changed to dotty shading.	Standard mark scheme
15		Diagram enlarged. Angle size moved outside of the angle arc and the arc has been made smaller. MLP only: x changed to y.	Standard mark scheme except using y instead of x.
18		Diagram enlarged.	Standard mark scheme
20	(b)	A blank set of x and y axes have been provided.	Standard mark scheme

Paper 1MA1_3F				
Question		**Working**	**Answer**	**Notes**
16			(6, –1)	M1 for a method showing the translation or reflection in the x-axis of a graph or a correct coordinate A1 cao
17		$l = 20x$ $x = 3$	20736	P1 for a first step to solve the problem eg method to find the slant height of the cone or the volume equals $768\pi x^3$ P1 for setting up an equation for the curved surface area in terms of x eg $2160\pi = \pi \times 12x \times 20x$ P1 for complete method to find the value of x P1 for a method to find the volume or value of V A1 cao
18			0.49	P1 for $\sqrt{0.09}$ P1 for (1-"$\sqrt{0.09}$")² A1 cao
19	(a)		4.23×10^{-4}	B1
	(b)		45000	B1
20		$\sqrt{(253.5 \div 6)}$ $6.5^3 \times 2 = 549.25$ $549.25 \div 10 = 54.925$	55	P1 a process to find the scale factor of 6.5 P1 for a full process to find the amount of clay required C1 for stating 55 bags
21	(a)		Rearrangement	M1 for re arranging to $x^3 =$ C1 a clear step to show re arrangement
	(b)	$x_1 = 3.29296875$ $x_2 = 3.276659786$ $x_3 = 3.279420684$	Values	M1 for substitution of 3.2 into the iterative formula A1 for $x_1 = 3.292(96875)$ A1 for $x_2 = 3.276(659786)$ and $x_3 = 3.279(420684)$
	(c)		Statement	C1 Statement eg estimates of a solution to the original equation

Paper 1MA1_3F			
Question	**Working**	**Answer**	**Notes**
10		Region R	M1 for one line correctly drawn M1 for two lines correctly drawn M1 for three lines correctly drawn A1 fully correct region indicated with all lines correct
11		$(x + 1)^2 - 9$	M1 for $(x + 1)^2$ or $m = 1$ A1 cao
12		430	P1 for appropriate use of Pythagoras P1 for setting up an equation equivalent to $x^2 = 15^2 - 5^2 - 7^2$ or better eg $\sqrt{151}$ P1 for finding the volume using their "$\sqrt{15^2 - 5^2 - 7^2}$" A1 430 to 430.1
13		168	M1 product of 14 and 12 A1 cao
14		$\frac{3x + 10}{x + 2}$	B1 for factorising to get $(x + 3)(x + 2)$ M1 for dealing with the division of $(x + 3)$ by $\frac{x^2+5x+6}{x-2}$ M1 for two correct fractions with a common denominator or a correct single fraction prior to subtracting eg $\frac{4(x+2)-(x-2)}{x+2}$ or $\frac{4(x+2)}{(x+2)} - \frac{(x-2)}{(x+2)}$ A1 $\frac{3x+10}{x+2}$
15 (a)		Number of errors	P1 1000 000 ÷ 256 oe A1 3906 or 3907 or 3900 or 3910 or 4000 from correct working
(b)		Decision	C1 Decision and supporting statement Eg no 'model' never zero or yes cannot have a part error Note just yes or no will score zero

Paper 1MA1_3F				
Question		**Working**	**Answer**	**Notes**
1	(a)		(4,10)	B1 cao
	(b)(i)		Line drawn	B1 Straight line drawn passing between (2, 16) and (2, 28) AND (13, 80) and (13, 92)
	(b)(ii)		Positive	C1 positive OR description of dynamic relationship
	(c)		Value between 60 and 70	C1 a correct value given
	(d)		Statement	C1 for referring to the danger of extrapolation outside the given range or for a given point
2			$12.5 \leq L < 13.5$	B1 12.5 B1 13.5 or 13.4$\dot{9}$
3			$y = 2x + 1$	M1 for a method to find the gradient M1 for a method to find the c in $y = mx + c$ A1 $y = 2x + 1$
4	(a)	(720+408+304+252)÷50 1684 ÷ 50	33.68	M1 for finding 4 products *fw* consistently within interval (including end points) M1 (dep on 1st M) for 'Σfw'÷50 A1 (accept 33.7 from correct working)
	(b)		Manager with reasons	M1 for strategy to compare number of small size sold to number ordered C1 clear comparison that small size is not ¾ and so Jenny is not correct or the manager is correct

Paper: 1MA1/3H					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
21	(a)	Proof	C1	for starting the proof, identifying a pair of relevant equal sides or angles with reasons from $AD = BC$ (opposite sides of a parallelogram are equal) angle PAD = angle QCB (opposite angles of a parallelogram are equal) angle ADP = angle CBQ (given or both 90^o)	
			C1	(dep C1) for complete identification of all three equal aspects with reasons	
			C1	(dep C2) for conclusion of congruency proof	Congruency conclusion must include a reference to ASA
	(b)	Explanation	C1	for identifying a pair of equal sides or angles in $APCQ$, with reason, eg $AP = QC$ since triangle ADP is congruent to triangle CBQ	
			C1	(dep C1) for reasoning that $APCQ$ is a parallelogram so opposite sides of a parallelogram are parallel	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
4 (a)	5	M1	"2" ÷ 40 × 100	"2" comes from their reading of the height of the 20 to 24 column
		A1	cao	
(b)	9.5 shown	M1	for frequencies of 11, 8, 13, 6 and 2 (allow one error) **or** for midpoints 2, 7, 12, 17 and 22	May be seen on chart
		M1	for finding at least 4 products *fx* consistently within interval (including end points)	
		M1	for Σ"*fx*" ÷ ("11" + "8" + "13" + "6" + "2") **or** (11×2 + 8×7 + 13×12 + 6×17 + 2×22) ÷ 40 **or** Σ"*fx*" (=380) **and** 9.5 × ("11" + "8" + "13" + "6" + "2") (=380)	Evidence of two different calculations that should lead to 380 are required for this mark
		C1	for correct figures showing the answer or accurate figures to compare from correct working eg 380 from two calculations	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
15	$(-7, -1)$	M1	for a method which shows understanding of the type of transformation eg reflection in the y axis or translation $\begin{pmatrix} 0 \\ -3 \end{pmatrix}$ or "(0 units right and) 3 units down" **or** for x coordinate as -7 **or** y coordinate as -1	"Reflection" or "Translation" alone is insufficient. Note that the -7 or the -1 may appear in the working space, not necessarily in the final answer.
		A1	for $(-7, -1)$	
16	$2n^2 - 3$	M1	begins to work with 2nd differences	6 10 14 18 22 4 4 4 4
		M1	identifies $2n^2$ as part of the expression eg gives the sequence 2, 8, 18, 32, ... or gives a quadratic expression which includes the term $2n^2$	A quadratic expression of the form $2n^2 + bn + c$ can be awarded the first 2 marks
		A1	oe	
17	B, A, D, C	B2	for all correct	
		(B1	for two or three correct)	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
14	$\frac{13}{20}$	P1	for finding the fraction who chose either soup ($\frac{2}{5}$ oe) or chose prawns ($\frac{3}{5}$ oe) **or** for process to share any number in the ratio 2 : 3 eg 100 ÷ (2 + 3) × 2 (=40)	Starting number 100 Soup : Prawn 40:60
		P1	for a process that could lead to the proportion who chose lasagne or curry for either starter, eg sharing 40% (soup) in the ratio 5 : 3 **or** sharing 60% (prawns) in the ratio 1 : 5 **or** $\frac{2}{5} \times \frac{5}{8}$ **or** $\frac{2}{5} \times \frac{3}{8}$ **or** $\frac{3}{5} \times \frac{1}{6}$ **or** $\frac{3}{5} \times \frac{5}{6}$ **or** for continuing the process with their starting number to find the number who chose lasagne or curry for either starter	L:C L:C 25:15 10:50
		P1	for a complete process to find the proportion who chose curry for **both** starters, eg$(\frac{2}{5} \times \frac{3}{8}) + (\frac{3}{5} \times \frac{5}{6})$ **or** to find the number who chose curry for **both** starter for their starting number	15 + 50 =65 and $\frac{15+50}{100}$
		A1	$\frac{13}{20}$ or equivalent fraction	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
23	Proof (supported)	M1	for using the sine rule on triangle *ABD* or on triangle *ADC*, to involve sides *AB*, *BD*, *AC*, or *DC* eg $\frac{AB}{\sin ADB} = \frac{BD}{\sin x}$ oe or $\frac{AC}{\sin ADC} = \frac{DC}{\sin x}$ oe **OR** for an expression for the area of triangle *ABD* or for the area of triangle *ADC* eg $\frac{1}{2} AB\ AD \sin x$ or $\frac{1}{2} AD\ AC \sin x$ or $\frac{1}{2} h\ BD$ or $\frac{1}{2} h\ DC$	Accept extra letters eg *y* shown on diagram for any angle used
		M1	for using the sine rule on both triangle *ABD* and on triangle *ADC*, to involve sides *AB*, *BD*, *AC*, or *DC* eg $\frac{AB}{\sin ADB} = \frac{BD}{\sin x}$ oe and $\frac{AC}{\sin ADC} = \frac{DC}{\sin x}$ oe **OR** for two expressions for the area of either triangle *ABD* or for triangle *ADC* eg $\frac{1}{2} AB\ AD \sin x$ and $\frac{1}{2} h\ BD$ **or** $\frac{1}{2} AD\ AC \sin x$ and $\frac{1}{2} h\ DC$	
		M1	for stating or showing sin *ADB* = sin *ADC*, eg sin y = sin $(180 - y)$ **OR** for using two expressions to form an equation eg $\frac{\frac{1}{2} AB\ AD \sin x}{\frac{1}{2} AD\ AC \sin x} = \frac{\frac{1}{2} h\ BD}{\frac{1}{2} h\ DC}$ oe	
		C1	for a full method to arrive at the given answer	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
2	12.85 or 12.86 or 13.5(0)	P1	for 9 + 2 + 1 (= 12)	Award this mark for sight of 4500, 1000 or 500
		P1	for working out how many lots of 175g are needed eg 6000 ÷ "12"× 2 ÷ 175 (= 5.71...)	Process may lead to 5 or 6 instead of 5.71...
		P1	for a complete process eg "5.71..." × 2.25 (= 12.857...)	"5.71…" (ft) may be rounded or truncated.eg "6"
		A1	for 12.85 or 12.86 or 13.5(0)	
3 (a)	450 000	B1	cao	
(b)	7×10^{-3}	B1	cao	
(c)	4.73×10^{3}	M1	for 4730 oe **or** for 4.73×10^{n} where $n \neq 3$	
		A1	cao	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16 (a)	129 to 160	M1	for a method to find an estimate for the area under the curve eg 0.5 × 30 × 9	Do not accept 30 × 9
		A1	for value in the range 129 to 160 (If M0, SC B1for 126 or 127.5)	Award full marks for any correct method leading to a better estimate.
(b)	underestimate with reason	C1	(dep M1) for "underestimate" and appropriate reason linked to their method, eg area between triangle and curve not included	
(c)	Explanation	C1	for explanation, **Acceptable examples** method gives average acceleration (in first 60 seconds) he has not used/drawn a tangent (at time 60 seconds) he has not worked out the gradient (at time 60 seconds) **Not acceptable examples** he has not used strips he has calculated it accurately rather than using an estimate the estimate of 13 should be about 4.4 the answer should be approximately 0.073	
17	7.645	P1	for process to use area to find at least one frequency, eg for first frequency (7.2 − 6.4) × 10 (= 8) or (7.2 − 6.4) × 5 (= 4) or 4 × 5 × 5 (= 100)	Frequencies could be written on the graph
		P1	for process to find all frequencies, eg 8, 20, 40, 12 or multiples eg 4, 10, 20, 6 or 100, 250, 500, 150	Marks are for correct processes, one or more frequencies may be incorrect
		P1	(dep P2) for process to estimate mean, eg ((6.8 × [8]) + (7.4 × [20]) + (7.8 × [40]) + (8.1 × [12])) ÷ ([8] + [20] + [40] + [12])	
		A1	for 7.645 (accept 7.65)	Award full marks if a correct answer is seen in working and is then incorrectly rounded.