Examiner's Report

Q1.
This question was answered well by very many candidates, although it was alarming to see some fundamental errors in the plotting of the additional information in part (a). Many candidates also missed out the plot completely possibly because the lack of an answer line meant they went straight on to (b) without being aware of the demands of (a)
In part (b), candidates needed to relate the amount of sunshine with the number of ice creams sold to be able to score the mark, descriptions such as 'the hotter it is the more ice creams are sold', which was a common answer, gained no credit. An alternative approach saying positive correlation was also acceptable but merely saying the relationship was positive was not enough.
In (c), few candidates showed any working, eg line of best fit, and either scored full marks for an answer within the given range or no marks at all. Those that drew a line of best fit often just joined the last point to the origin and were out of tolerance, but still then didn't use it to find an answer.

Q2.
The vast majority of students worked out the total number of women in part (a). Most went on to complete the two-way table correctly and use it to give the correct answer in part (b). Part (c) was answered less well.
The most common incorrect answers were $\frac{12}{50}$ and $\frac{23}{50}$

Q3.
In part (a), most candidates understood what a stem and leaf diagram entailed. The most common mistakes included omitting a key and providing an unordered diagram. Around a quarter of candidates scored no marks but typically did so by either giving a tally in each row or showing full numbers rather than just the units. Students need to be reminded to count the number of pieces of data in the question and to check they have the same number in the completed diagram.

Following on from part (a), many candidates drew a stem and leaf diagram for the boys in part (b). In these instances the majority did not use their diagram to identify key features of the data such as median and range and therefore failed to make a valid comparison. Candidates who carried out calculations often included the mode and median and were awarded marks for the median. At this level, weaker candidates calculated the range but were unable to interpret it as 'spread' correctly. Candidates who calculated the mean were generally able to give a valid comparison. A significant number scored 0 as a result of only comparing the smallest and tallest boy/girl or by making other unqualified statements having completed no calculations.

In a starred question such as this it is essential that students understand that any comparative statements must involve quotation of statistics, their interpretation and a clear link back to the context of the data, in this case the heights of the boys and the girls.

Q4. No Examiner's Report available for this question

Q5. No Examiner's Report available for this question

Q6.
Many correct and accurate frequency polygons were seen. There were, however, many students who only scored one mark, generally for plotting at the end values of the intervals and joining the points. However many lost a mark for the correct plots at the mid-intervals without joining the points or drawing the correct frequency polygon but also joining the first and last points. Others had little idea what to do which was demonstrated by drawing bar charts or line graphs or by drawing a polygon shape on the grid.

Q7.
This question discriminated well between the more able candidates taking this paper. More than 40% of candidates were able to work out the size of at least one of the missing angles (candidates were given credit for these written clearly on the diagram). About a half of these candidates made further progress and worked out the size of several angles but only the more able candidates were able to get as far as finding the size of angle *x*. Very few candidates gave correct reasons in an acceptable form and so candidates could rarely be awarded all four marks for their response. In particular, candidates did not accurately articulate properties involving angles and parallel lines. Weak candidates often added the sizes of the angles given on the diagram and then found the difference between their answer and 180° or 360°.

Q8. Over one third of students recognised the transformation as an enlargment and gave the correct scale factor but correct identification of the centre of enlargement was very rare indeed. Many students lost marks through giving multiple transformations as answers, mostly in an attempt to give information about the position of the image in the absence of a centre of enlargment. Typically, a translation was described or vector given.

Q9. This question differentiated well. Marks were lost in part (a) since students drew the rectangle inaccurately, or failed to scale up both dimensions. In part (b) it was not uncommon to see incorrect rotations of 180°, about a different point, or rotated with a flip.

Q10. In part (a) too many students failed to understand the term "translate"; this was evidenced by examples of rotations and reflections. Part (b) was answered with greater success. Many noted it was a rotation, and this was usually followed by a description of direction and angle, with only a minority making errors in this statement. Missing out a reference to the centre of rotation was a common error.

Q11. Students who started by putting 15 in the intersection generally went on to answer part (a) quite well and often placed all seven numbers correctly inside the circles. Some students, however, wrote two 15s in the intersection or wrote 15 in more than one region. The outside region, $(A \cup B)'$, proved to be much more problematic. It was very common to see either no numbers at all in this region or duplicates of the numbers that had already been placed inside the circles. Those who did attempt to put the rest of the odd numbers in the outside region sometimes failed to include all eight numbers. It should be emphasised to students that each number in the universal set should appear just once in a Venn diagram. Many students scored the one mark for labelling the circles, usually with A and B but occasionally with "multiples of 3" and "multiples of 5".

In part (b) many students scored one mark for a correct denominator of 15 or, more usually, for a denominator that followed through correctly from their Venn diagram. A correct numerator was seen far less frequently and it was evident that many students confused $A \cup B$ with $A \cap B$. Some incorrect notation for probability, e.g. ratio, was seen.

Q12. Students were most successful in part (a) and almost all were able to measure the distance between the bench and the fountain to gain the mark. Weaker students forgot to multiply their measurement by 2.

In part (b), students usually either gained the full 2 marks or 0, as those that did not understand bearings rarely drew anything on the diagram. There were however, a few that had drawn in the bearing then incorrectly measured the angle leading to an answer in the 70s.

Students attempted part (c) well and often, even if not worthy of any marks, were still using compasses to draw arcs. Many gained full marks or two marks having shaded the wrong region. Only the very weakest students were shading a square or irregular shaped region, though even these regions were shaded in-between the fountain and the bench, indicating some understanding of the problem even if they scored 0 marks.

Q13. Students taking this paper seemed unfamiliar with the techniques needed to solve problems such as this involving similar triangles. It was rare to see an attempt involving the use of scale factors or ratios. Instead, many students mistakenly thought they could apply Pythagoras's theorem to one of the triangles despite there being no indication they were right-angled. A sizeable proportion of students merely subtracted lengths to find AE, for example, $8.1 - 2.6 = 5.5$. 2.6 was quoted as the length of AE by some students and examiners wondered whether they had confused the arrows on sides EA and DB with the notation used for showing lengths are equal. Students may have found it helpful to redraw the diagram as two separate similar triangles.

Q14. About three quarters of students successfully identified a pair of congruent shapes in (a) and about two thirds found a similar shape to that given in (b). The different orientations of the congruent shapes may have caused difficulty as many incorrect answers identified shapes A and C which had the same orientation with just one vertex moved 1 cm. Several gave the pair of similar shapes instead but did not revisit this answer after completing part (b). Shape I, the other isosceles triangle, was the most common incorrect answer in (b) with those students presumably not realising the mathematical meaning of the term "similarity".

Q15. No Examiner's Report available for this question

Q16. Readings taken from the travel graph were usually correct and the majority of candidates gained full marks in parts (a) and (b). The success rate in the completion of the graph using the given information in part (b) was lower. Many correctly identified the 30 minutes when stopped but were often confused in knowing where 'home' was. Some lost marks by drawing lines that were broadly correct but inaccurate. Candidates need to be encouraged to take care with accuracy as some lost marks for drawing too long a horizontal line, with subsequent inaccuracies in the gradient of the return journey home, with the final section of the graph having a positive gradient rather than negative.

Q17. No Examiner's Report available for this question

Q18. In part (a) sight of a complete answer (both 6 and −6) was rare. Some credit was given where an answer was embedded, which was not uncommon. The main mistake occurred when students divided by 2 twice instead of dividing by 2 and then finding the square root.

In part (b) the majority were familiar with what was required but many failed to multiply the $3x$ by $3x$ correctly, often writing this as $6x$, but gained 1 mark if they multiplied their other terms correctly. Using a table format was very popular and generally successful for those students.

In part (c) very few were familiar with the requirements of factorising into two brackets so often tried to "factorise" using only one pair of brackets. Common wrong answers like $x(x + 6) + 9$ were frequently seen.

Q19/20/21. No Examiner's Report available for this question

Q22. Responses to this question started well. Most were able to calculate the profit on either one bottle or 12 bottles. The £0.36 profit was often seen. A significant number of students stopped there, sometimes giving 0.36 as their answer. Many students erroneously took the base for comparison as their selling price, £6 rather than £5.64 cost price. Some appeared to get as far as 1.063 but then rounded to 1.1

Q23. The bill in part (a) was generally well completed - although occasionally the '12' as the number of light bulbs was omitted. A few candidates worked out the total price of the light switches by dividing by 5 instead of multiplying.

Similarly, many candidates got the correct answer to part (b), although there was the odd error of adding £64.83 instead of subtracting it. Some candidates thought they had to find 2.56% interest and then add it on.

Q24. No Examiner's Report available for this question

Q25. The vast majority of students were able to write down the next term in the sequence in part (a) and most could explain how they got their answer.

In part (b), most students gave 43 as the 11th term in the sequence. Incorrect answers were usually due to arithmetic errors.

Although part (c) was answered less well, some very good explanations were seen. Some students stated that it is the 20th term; some said that 79 is in the sequence because 19, 39 and 59 are in the sequence and some continued the sequence up to 79. However, many explanations were insufficient. Some students stated, for example, that 79 is in the sequence because it is an odd number and all the terms in the sequence are odd or wrote "I kept adding 4", without providing any evidence that this did result in 79 being in the sequence.

Q26. There was a poor success rate for part (a). It was clear that some were just entering figures on their calculator without any forethought as to how to get the calculator to process part values. Those who worked out the four values and wrote them out, then moving on to the rest of the process of calculation frequently gained the final correct answer. Some lost marks due to premature rounding of the figures from their calculator.

Good rounding in part (b) frequently led to the mark in this part being awarded. There were errors for some who used the wrong number of decimal places.

Q27. No Examiner's Report available for this question

Mark Scheme

Q1.

Question	Working	Answer	Mark	Notes
(a)		Point at (11.5, 73)	1	B1 Point plotted ± ½ small square
(b)			1	B1 for description of dynamic relationship eg "the more hours of sunshine, the more ice creams sold" or positive correlation [Note: 'sunnier' implies 'more hours of sunshine']
(c)		62 - 70	2	B2 for answer in the range 62-70 OR M1 for a single straight line of best fit with positive gradient, passing between (6.5, 45), (6.5, 59) and (12, 70), (12, 80) or a vertical line drawn from 10 A1 for answer in range 62-70 or ft from single straight "line of best fit" with positive gradient

Q2.

PAPER: 5MB1F_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
(a)		22	1	B1 cao
(b)		23	3	M1 for correct method to find total women who came by bus, e.g. 13 – 6 (=7) M1 for correct method to find women who came by train, e.g. 22 – 7 – 4 (=11) A1 cao OR M1 for correct method to find men who came by car, e.g. 28 – 6 – 12 (= 10) M1 for correct method to find total who came by car, e.g. 10 + 4 (= 14) A1 cao
(c)		$\frac{3}{7}$	2	M1 for $\frac{12}{28}$ oe A1 oe

Q3.

Question	Working	Answer	Mark	Notes
(a)		14 | 8 15 | 2 4 16 | 0 2 4 4 8 17 | 0 3 4 9 14|8 = 148 cm	3	B2 for a fully correct ordered diagram (B1 for correct unordered diagram or ordered with at most two errors) B1 for a correct key eg 14|8 = 148 cm (cm not required)
*(b)	Boy's Median = 170 Girl's Median = 164 Boy's Mean = 170(.38) Girl's Mean= 164 Boy's Range = 27 Girl's Range = 31 15 | 7 9 16 | 2 6 8 9 17 | 0 3 4 6 6 18 | 1 4	Compares: medians/means + Range + Spread	3	A maximum 2B marks from: B1 for a correct mean or median for either the boys or the girls. B1 for a correct range for either the boys or the girls. B1 for a correct stem and leaf diagram drawn for the boys (no need for a key) C1 for any correct comparison, which includes the boys and the girls, of either 2 correct (ft) medians or 2 correct (ft) means or 2 correct(ft) ranges or a correct statement following from comparing the correct stem and leaf diagrams, which includes the boys and the girls.

Q4.

Question	Working	Answer	Mark	Notes
(a)			2	B1 places probs for round, e.g. 4/7 and 3/7 B1 places probs for square, e.g. 3/8, 5/8, 3/8, 5/8
(b)		$\frac{15}{56}$	2	M1 ft for "3/7" × "5/8" A1 15/56 oe

Q5.

Paper 1MA1:3F			
Question	**Working**	**Answer**	**Notes**
(a)	(720+408+304 +252)÷50	33.68	M1 for finding 4 products *fw* consistently within interval (including end points) M1 (dep on 1st M) for 'Σfw'÷50 A1 cao
(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

Q6.

Question	Working	Answer	Mark	Notes
		Polygon drawn	2	B2 for correct frequency polygon (B1 for points plotted at correct midpoints of intervals or joining points at correct heights consistently within intervals including plotting at end values or correct frequency polygon with one point incorrect or correct frequency polygon with first and last points joined directly) NB ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted

Q7.

Question		Working	Answer	Mark	Notes
		Angle *DEC* = 180 – 41 =139 Angles on a straight line sum to 180° Angle *EDC* = 60 – 38 **or** Angle *ABD* = 180 – 120 – 38 (=22) Co-interior/Allied angles of parallel lines sum to 180° **or** Angles in a triangle sum to 180° **and** Alternate angles *x* =)180 – '139' – '22' (=19) Angles in a triangle sum to 180° **OR** Angle *ADC* = 180° – 120° = 60° Co-interior/Allied	*x* = 19° and reasons	4	M1 for *DBC* = 38° **or** *ADC* = 60°(can be implied by *BDC* = 22°) **or** *ABC* = 60° **or** *DCB* = 120° **or** (*ABD* =) 180 – 120 –38 (=22) M1 for (*BDC* =) 60 – 38 (=22) **or** *BDC* = '22' **or** (*DEC* =) 180 – 41 (=139) **or** (*BCE* =) 180 –41 – 38 (=101) M1 (dep on both previous M1) for complete correct method to find *x* **or** (*x* =) 19 C1 for *x* = 19° **AND** Co-interior/allied angles of parallel lines sum to 180° **or** Opposite angles of a parallelogram are equal **or** Alternate angles **AND**

		angles of parallel lines sum to 180° Angle *EDC* = 22° Angle *ECD* = 41° – 22° = 19° Exterior angle of triangle equals sum of the two opposite interior angles **OR** Angle *DBC* = 38° Alternate angles Angle *BCE* = 101° Angle sum of a triangle is 180° Angle *BCD* = 120° Opposite angles of a parallelogram are equal Angle *ECD* = 120° – 101° = 19°			Angles on a straight line sum to 180° **or** Angles in a triangle sum to 180° **or** Exterior angle of triangle equals sum of the two opposite interior angles **or** Angles in a quadrilateral sum to 360°

Q8.

Paper: 5MB3F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
			enlargement scale factor 3 centre *O*	3	B1 for enlargement B1 for scale factor 3 B1 for (centre) *O* oe NB: B0 for any combination of transformations

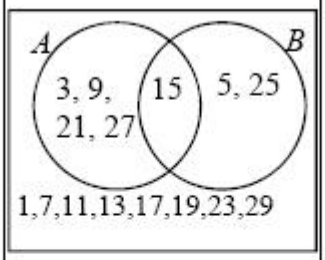
Q9.

5MB3F_01 November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
	(a)		correct enlargement	1	B1 for a 4 by 6 rectangle
	(b)		correct rotation	2	B2 cao (B1 for rotation, direction and angle correct but wrong centre OR rotation, direction and centre correct but wrong angle)

Q10.

PAPER: 5MB3F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
	(a)		Triangle	2	B1 for triangle translated B1 for triangle at (−2,2),(−2,0),(−1,0)
	(b)		Rotation 90° anticlockwise centre (0,0)	3	B1 Rotation B1 90° anticlockwise oe B1 centre (0,0) Note Award no marks if more than one transformation is given

Q11.

Question	Working	Answer	Mark	Notes
(a)		Venn Diagram	B1 M1 M1 C1	for labels on diagram for just 15 in the intersection for just 5 and 25 in only set B or just 3, 9, 21 and 27 in only set A or just 1, 7, 11, 13, 17, 19, 23, 29 in $(A \cup B)'$ for all numbers correctly placed in the Venn Diagram Ignore all entries except the region you are marking for each method mark
(b)		$\frac{7}{15}$	P1 A1	ft for $\frac{"7"}{a}$ where $a \geq$ "7" or $\frac{b}{"15"}$ where $b \leq$ "15" ft $\frac{7}{15}$ oe

Q12.

PAPER: 5MB3F_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
(a)		15.2 – 15.6	1	B1 for 15.2 – 15.6
(b)		107 – 111	2	M1 for correct bearing clearly identified on diagram A1 for 107 – 111
(c)		Region shaded	3	B1 for circle centre f, radius 3.5cm B1 for circle centre b, radius 6cm B1 for correct region shaded

Q13.

Question	Working	Answer	Mark	Notes
(a)		3.9	M1	for a ratio of $\frac{8.1}{5.4}$ (= 1.5) oe or $\frac{5.4}{8.1}$ (= 0.66..) oe or $\frac{2.6}{5.4}$ (= 0.48..) oe or $\frac{5.4}{2.6}$ (= 2.07..) oe
			A1	cao
(b)		2.05	M1	for $\frac{5.4}{8.1} \times 6.15$ (= 4.1) or $\frac{2.7}{8.1} \times 6.15$ oe or ft "scale factor" from (a)
			A1	cao

Q14.

Paper: 5MB3F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
	(a)		A and E	1	B1 cao
	(b)		D	1	B1 cao

Q15.

Question		Working	Answer	Mark	Notes
	(a)	x: 0.5, 1, 2, 3, 4, 5, 6 y: **6**, 3, 1.5, **1**, 0.75, **0.6**, **0.5**	Correct table	2	M1 2 or 3 entries correct A1 all 4 table entries correct
	(b)		Graph	2	M1 (dep on M1) for 6 or 7 points plotted from table A1 correct graph drawn

Q16.

		Working	Answer	Mark	Notes
	(a)		30	1	B1 for 30 minutes oe
	(b)		20	1	B1 cao
	(c)		graph completed	2	B1 for horizontal line from (5, 20) to (5.30, 20) B1 for a single straight line with the correct gradient from '(5.30, 20)' to the time axis

Q17.

Question	Working	Answer	Mark	Notes
(a)		$2a^2 + 14a$	B1	cao
(b)		$7(2b - 1)$	B1	cao
(c)		13	M1 A1	for correct expansion of the bracket, **or** for intention to divide both sides by 9 as the first step cao
(d)		$12y^5$	B1	cao

Q18.

Question	Working	Answer	Mark	Notes
(a)		± 6	M1 A1	for one value (6 or -6) or $\sqrt{36}$ or an embedded answer eg $2 \times 6^2 = 72$ ± 6
(b)	$6x^2 - 4x + 3x - 2$	$6x^2 - x - 2$	M1 A1	for at least 3 terms correct out of a maximum of 4 from expansion, or 4 terms correct ignoring signs. cao
(c)		$(x + 3)^2$	B1	for $(x + 3)^2$ or $(x + 3)(x + 3)$

Q19.

Question	Working	Answer	Mark	Notes
		$x = 3, y = -2$	3	M1 correct process to eliminate one variable (condone one arithmetic error) M1 (dep) for substituting found value in one of the equations or appropriate method after starting again. A1 cao

Q20.

Question	Working	Answer	Mark	Notes
(a)		3.4×10^8	1	B1
(b)		0.0000183	2	M1 for digits 183... seen or converting one number A1 for answer in range 0.0000183 to 0.000018332

Q21.

Question	Working	Answer	Mark	Notes
		207.50	M1	for a first step to solve the problem, e.g. 42.5 ÷17
			M1	for a complete method
			A1	cao

Q22.

Question	Working	Answer	Mark	Notes
	£6 − £5.64 = 36p or 50p – 47p = 3p	6.4	P1	for a strategy to compare the same number of bottles e.g. £5.64 ÷ 12 (= 47 or 0.47) or 12 × 50p (= 6 or 600) or 36 or 0.36 or 3 or 0.03
			P1	for start of process to find percentage profit e.g. $\frac{"36"}{564}$ or $\frac{"3"}{"47"}$ or $\frac{"6"}{5.64}$ or $\frac{50}{"47"}$ oe with consistent units
	6.3829787 …%		A1	for answer in the range 6.3 to 6.4

Q23.

Question	Working	Answer	Mark	Notes
(a)		32, 12, 88.92	3	B1 for 32 B1 for 12 B1 ft "32" for 88.92
(b)		509.98	3	M1 for a correct step 452.25 + 120 (= 572.25) or 452.25 + 2.56 (= 454.81) or 452.25 – 64.83 (= 387.42) or 120 + 2.56 (= 122.56) or 120 – 64.83 (=55.17) or 64.83 – 2.56 (= 62.27) M1 for a complete method A1 cao

Q24.

Paper 1MA1:3F			
Question	**Working**	**Answer**	**Notes**
		8	B1 cao

Q25.

PAPER: 1MA0_2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
(a)(i)		19	2	B1 cao
(ii)		Reason		B1 explanation, e.g. add 4 each time
(b)		43	1	B1 cao
(c)		Yes with reason	1	B1 reason eg 1 less than 80 and 80 is a multiple of 4, or generate series to 79, or 79 is the 20th term, oe

Q26.

Question	Working	Answer	Mark	Notes
(a)		2.7560…	M1	for 1.0654(059…), 0.1402(633…), 7.5957(541…), 2.756 truncated or rounded to no less than 2dp
			A1	for 2.7560(….)
(b)		2.76	B1	for 2.76 ft from (a)

Q27.

Question	Working	Answer	Mark	Notes
		30.7	2	M1 recall of appropriate formula, e.g. $\tan x = \frac{1.9}{3.2}$ A1 answer in range 30.6 to 30.7