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GCSE MATHS

Statistics

Edexcel 1MA1 | Subtopic collection Topic 60

Scatter graphs and correlation

Higher tier

Answers and examiner comments

37	2009-2024	Higher
question groups	available papers	tier

Using this booklet

1. Answer numbers match the companion question booklet.
2. Follow the original question number on marking tables.
3. Examiner comments are included where available.

Name _____ **Date** _____

Some entries use full source marking material in an appendix. Any unavailable mark schemes are identified beside the relevant answer.

4	(a)		Correct line	1	B1 For a single line of length in the range 6.8cm to 7.2cm drawn with or without using the given point P
	(b)		Correct point	1	B1 for point Q identified on their line within the range 2.8 cm to 3.2 cm from *P*

11	(a) (b)		Negative 117 – 123	1 2	B1 cao M1 for a line of best fit drawn between (9, 130) & (9, 140) and between (13, 100) & (13,110) inc.. A1 for 117 – 123 inclusive

1380 4H

1380/4H

2	(a)		Info plotted at (6.1, 32)	1	B1 for a correct plot ±2mm
	(b)		positive	1	B1 for positive (correlation)
	(c)		6.6 to 7.6	2	M1 for single straight line segment with positive gradient that could be used as a line of best fit or an indication on the diagram from 40 on the umbrella axis. A1 for an answer in the range 6.6 to 7.6 inclusive.

1380_4H

2	(a)		Point at (11.5, 73)	1	B1 Point plotted $\pm\frac{1}{2}$ 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

5MB1H_01

2	(a)		Positive correlation	1	B1 for positive correlation or as the number of pages increases the time taken increases or the longer the book the more time it takes to read oe
	(b)		7.5	2	M1 for line of best fit drawn between (50, 2) and (50, 4) and (200, 9) and (200, 11) A1 for 6.5 – 8.5

Question	Working	Answer	Mark	Notes
2 (a)	See scatter graph	(12,14) and(17,20) plotted	1	B1 for correct plotting of both points
(b)			1	B1 Positive (accept a correct relationship)
(c)		16 to 18	2	B2 16 – 18 (M1 for a single line segment from m=11 to m = 16 within overlay or a vertical line drawn from m = 15 A1 for an answer in the range 16-18 or ft their line of best fit ± 2mm)

5MB1H_01

Question		Working	Answer	Mark	Notes
11	(a)	Plot (15, 22) and (55, 15)	Points plotted	1	B1 cao ± ½ square
	(b)		Describe relationship	1	B1 If the temperature increases so the time taken decreases oe (accept negative correlation)
	(c)		18 – 20	2	M1 draw LOBF between (20,18) and (20, 22) to (70,3) and (70,8) A1 18 – 20 (if M0 allow B2 for an answer in the range 18–20)
	(d)		Reason	1	B1 reason e.g LOBF would give negative time, you should not use the LOBF beyond your data

5	(a)		Points plotted	1	B1 points plotted (180,72) and (170,65) ±2mm
	(b)		Positive	1	B1 positive (correlation) cao
	(c)		Line of best fit	1	B1straight line passing between (140,40)(140,55) and between (185,60)(185,75) with a positive gradient
	(d)		52-60	1	B1 within the range 52-60 or ft a single straight line segment with positive gradient.

5MB1H_01

Question		Working	Answer	Mark	Notes
7	(a)		negative	1	B1 for negative
	(b)		10.3 – 11.7	2	M1 for a single straight line segment with negative gradient that could be used as a line of best fit or an indication on the diagram from 2.5 on the *x* axis A1 for an answer in the range 10.3 – 11.7 inclusive

Question		Working	Answer	Mark	Notes
3	(a)		(5, 300) plotted	1	B1 for points plotted at (5, 300) allow ± ½ square tolerance
	(b)		The greater the age the less the value	1	B1 for the greater the age the less the value (price, cost etc.) oe Accept negative correlation, but "negative" or "negative relationship" gets B0
	(c)		500 to 800 inc.	2	B2 for an answer in the range 500 to 800 (inc.) OR M1 for a single straight line segment with negative gradient that could be used as a line of best fit A1 ft reading from their line of best fit at Age = 4 [SC: B1 ft reading from their single line of best fit (must be of negative gradient) at Age = 4 if M0 scored]

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*4		2 × 39.50 + 3 × 23.75 = 150.25 150.25 ÷ 3 = 50.08(33..) 150.25 – 50.08(33..) = 100.16(66..) 2 × 40.25 + 3 × 21.85 = 146.05 146.05 ÷ 4 = 36.51(25) 146.05 – 36.51(25) = 109.53(7) $2 \times (1 - \frac{1}{3}) \times 39.50$ $+ 3 \times (1 - \frac{1}{3}) \times 23.75$ $+ 2 \times 0.75 \times 40.25$ $+ 3 \times 0.75 \times 21.85$	Easy ferry	5	M1 for 2×39.50 (=79) or 3×23.75 (= 71.25) or 2×40.25 (= 80.50) or 3×21.85 (= 65.55) M1 for 2×39.50+3×23.75 (=150.25) and 2×40.25+3×21.85 (=146.05) M1 for $(1 - \frac{1}{3})$ × '150.25' oe or (100 – 25)% × '146.05' oe A1 for (£)100.16 to (£)100.17 and (£)109.53 to (£)109.54 C1 for "Easy Ferry is cheaper" oe or ft from their 2 totals provided at least 2 Ms scored and it is clearly stated which total relates to which ferry company OR M1 for $(1 - \frac{1}{3}) \times 39.50$ oe (= 26.33) or $(1 - \frac{1}{3}) \times 23.75$ oe (=15.83) or (100 – 25)% × 40.25 oe (= 30.19) or (100 – 25)% × 21.85 oe (= 16.39) M1 for 2×"26.33" (= 52.66) or 3×"15.83" (= 47.50) or 2×"30.19" (= 60.38) or 3×"16.39 (= 49.17) M1 for 2×"26.33" + 3×"15.83" and 2×"30.19" + 3×"16.39 A1 for (£)100.15 to (£)100.16 and (£)109.55 C1 for "Easy Ferry is cheaper" oe or ft from their 2 totals provided at least 2 Ms scored and it is clearly stated which total relates to which ferry company

5MB1H_01

2	(a) (b)		Positive (correlation) 85	1 2	B1 for positive (correlation) [do not accept a relationship] B2 for an answer in the range 83 to 87 OR M1 for a single straight line segment with positive gradient that could be used as a line of best fit or for an indication on the diagram from 148 on the height axis A1 ft from their line of best fit
3*			9	4	M1 for 7155 – 7095 or 60 seen or 7155×15 (or .15) or 7095×15 (or .15) or 107325 or 106425 or 1073.25 or 1064.25 M1 for '60' ×15 or 7155 ×15 – 7095 × 15 [or .15 instead of 15] A1 for 9 or 9.00 or 900 C1 (ft) for answer with correct units (money notation) identified as the answer.

5	(a)		positive	1	B1 Accept with 'positive' valid extra words eg strong positive
	(b)		46 – 54	2	B2 46 – 54 Or M1 for a single line segment with positive gradient that could be used as a line of best fit or a vertical line from 44 A1 for given answer in the range 46 – 54

5MB1H_01

Question		Working	Answer	Mark	Notes
2	(a)	Plot (2, 250) and (3.1, 190)	Plot points	1	B1 for both points plotted accurately
	(b)		Relationship	1	B1 for "As the distance from the centre increases the monthly rent decreases" or the nearer you are to the centre the more you have to pay oe (accept negative correlation)
	(c)		200 to 260	2	M1 for attempting a correct method, eg a line of best fit **or** any other indication, on a line that could be used as a line of best fit eg line to graph at $x = 2.8$or a mark on the line at 2.8 A1 for value in the range 200 to 260

Question		Working	Answer	Mark	Notes
3	(a)		Points plotted at (1,8200) and (3.5,5000)	1	B1 for points accurately plotted ±1/2 square tolerance
	(b)		‘the older the car the lower the value’ ‘the greater the value the newer the car’	1	B1 for an acceptable relationship eg. ‘the older the car the lower the value’ (accept ‘negative correlation’ but not just ‘negative’)
	(c)		5200 to 6600	2	M1 for a single line segment with negative gradient that could be used as a line of best fit or a vertical line from 2.5 or a point at (2.5,y) where y is from 5200 to 6600 A1 for given answer in the range 5200 − 6600

3	(a)		Point plotted	1	B1 for point plotted
	(b)		Negative	1	B1 for Negative (correlation)
	(c)		Correct line	1	B1 for a straight line that lies between (1, 40) to (1, 48) and (5.5, 6) to (5.5, 14)
	(d)		30 – 34	1	B1 30-34 or ft lobf (dep on single str line segment with a negative gradient)

PAPER: 5MB1H_01

2	(a)		Plot (90,17)	1	B1 cao
	(b)		Positive	1	B1 Positive
	(c)		In range 16 to 20	2	M1 for a single straight line segment with positive gradient that could be used as a line of best fit or a vertical line from 110 or a point plotted at (110, *y*) where *y* is in the range 16 to 20 A1 for an answer in the range 16 to 20 inclusive

5	(a) (b)		Positive correlation 52 – 60	1 2	B1 for positive correlation or the greater the rainfall the more umbrellas sold oe M1 for a single straight line segment with positive gradient that could be used as a line of best fit or an indication on the diagram from 28 on the *x*-axis (point or line) A1 for an answer in the range of 52 – 60
*6		2×462+251 =1175, 0.95×1175 = £1116.25 2×485+218 =1188, 1188 – 75 = £1113.00	Jetstream	5	M1 for identifying correct costs for either Highway Airlines or Jetstream Airlines M1 for attempt to calculate the costs for the family eg 2×"462"+"251" or 2×"485"+"218" M1 for a correct method to work out the discount for one company eg 0.95 × "1175" or 0.05 × "1175" or "1188" – 75 oe A1 for (£)1116.25 and (£)1113.00 C1 (dep on M1) calculations clearly identified with each airline and correct decision from their figures

5MB1H_01

2	(a)		Points plotted	1	B1 for points plotted at (12, 6) and (13, 2)
	(b)		Description	1	B1 for description; accept negative correlation.
	(c)		5 – 7	2	M1 for evidence of use of graph eg a single straight line segment with negative gradient that could be used as a line of best fit **or** an indication on the diagram from 12 on the *y* axis. A1 for 5 – 7

2	(a)		Point plotted	1	B1 for point plotted at (6,35)
	(b)			1	B1 for description of dynamic relationship or negative correlation
	(c)			1	B1 for single straight line of best fit which could be used to take readings
	(d)		21 - 26	1	B1 for answer in the range 21 - 26 or ft from single straight line segment (if previous B0)

2	(a)		Relationship	1	B1 for description of relationship eg "As the length of the pine cone increases the width increases" oe (accept positive correlation)
	(b)		6.1 to 6.4	2	M1 for a single straight line segment with positive gradient that could be used as a line of best fit or a vertical line from 8.4 or a point at (8.4, *y*) where *y* is from 6.1 to 6.4 A1 for given answer in the range 6.1 to 6.4

9		2 cm grid. Crosses changed to filled in circles. Right axis labelled	

6	(a)		Relationship	1	B1 for a description of a dynamic relationship eg “The older the car the lower the price” or “The newer the car the greater the price” oe (accept negative correlation)
	(b)		6400 to 7000	2	M1 for a single straight line segment with negative gradient that could be used as a line of best fit or vert. line from 3.5 or a point plotted at (3.5, *y*), where *y* is in the range 6400 to 7000 A1 for 6400 - 7000

2	(a)		Description	1	B1 description eg Taller trees are older. Accept positive correlation.
	(b)		20	1	B1 19 – 21
	(c)		2	2	M1 for evidence of taking readings at two points from Sandy line, or increase excluding start eg 24÷10, 14÷5 A1 for answer 1.8 to 2.2
	(d)		Comparison	2	B2 for a complete explanation e.g.Trees grow at approximately twice the rate on sandy soil (B1 for a partial explanation e.g. Trees grow faster on sandy soil)

11		A: $y = 2^x$ B: $y = 10 - 2x$ C: $y = 8x - 2x^2$	3	B1cao B1cao B1cao

5MB1H/01 June 2015

2	(a)		Point plotted	1	B1 cao
	(b)		positive	1	B1 cao
	(c)		18 - 22	2	M1 for a single line segment with a positive gradient that could be used as a line of best fit or a vertical line from 10 or a point plotted at (10, *y*) where *y* is in the range 18 - 22 A1 18 - 22
	(d)		45	1	B1 cao

Original question 2

The full source mark scheme begins on page 54. Use the original paper code, tier and question number shown above.

2	(a)		Positive	1	B1 for positive
	(b)		40 - 50	2	M1 for suitable line of best fit drawn or evidence of vertical line at 10 or a point indicated at (10, y) where $40 \leq y \leq 50$ A1 for 40 – 50
	(c)(i) (ii)		Point plotted	2	B1 for point plotted at (6.5, 45) B1 for explanation of outlier eg holiday, party, special event etc

3	(a)		The greater the hand = length the greater the foot length	1	B1 for the greater the hand = length the greater the foot length oe (accept positive correlation)
	(b)		24 – 25	2	M1 for a single straight line segment with positive gradient that could be used as a line of best fit **or** an indication on the diagram from 18.5 on the *x*-axis A1 for answer in range 24 – 25

4	(a)		positive	1	B1 cao
	(b)		17 – 21.5	2	M1 for a single line segment with positive gradient that could be used as a line of best fit or a horizontal line from 21 or a point plotted at (x, 21) where x is in the range 17 – 21.5 A1 for answer in range 17 – 21.5

Paper: 1MA0/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
*5		$x = 30^o$ with complete reasons	4	M1 for a correct first step, eg angle *GED* = 55 or angle *GAD* = 55 or angle *EGA* = 180 – 55 (= 125) A1 for 30 C2 for 30 with full reasons, appropriate to their given method eg alternate angles are equal **and** corresponding angles are equal **and** angles on a straight line add up to 180 eg corresponding angles are equal **and** angles in a triangle add up to 180 **and** alternate angles are equal (C1 (dep on at least M1) for one appropriate reason relating to parallel lines or opposite angles of a parallelogram)

Paper: 1MA1/1H

Question	Working	Answer	Mark	Notes
1 (a)		10,19	B1	cao
(b)		positive	C1	positive (correlation)
(c)		12 to 13	M1	for an appropriate line of best fit drawn, or a point marked at (x, 16.4) or a horizontal line drawn from 16.4 across to (x, 16.4) where x is in the range 12 to 13
			A1	hours given in the range 12 to 13
(d)		explanation	C1	(yes) e.g. as the majority of points for high temperature appear when there are more hours of sunshine (positive correlation)

Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	negative	B1	cao	Ignore any description of a relationship and any reference to strength of correlation
(b)	Explanation	C1	for a correct explanation, eg “not in line with the trend of the other points” “does not fit in with the correlation” “is far away from the other points or line of best fit”	
(c)	Comment	C1	for an explanation eg “point would be outside of the range of the scatter diagram”	

Question	Answer	Mark	Mark scheme	Additional guidance
2	statements	C1	for lobf incorrect **Acceptable examples** lobf lobf does not suit all points/not a lobf lobf wrong since hits *x* axis/is inaccurate/should be amongst the crosses lobf goes through the origin/through one point **Not acceptable examples** no correlation/there is no title	
		C1	for height scale not linear **Acceptable examples** 150 missing Height not linear / Height numbers going up wrong **Not acceptable examples** 150 graph does not start at 140/graph does not start at 0 height should start at 170	

Paper: 1MA1/2H

3	35 to 42	M1 A1	for drawing a suitable line of best fit **or** for a line from $x = 34$ **or** for a point marked on the grid at (34, y), y in the range 33 to 44 answer in the range 35 to 42	Line at $x = 34$ does not have to be full length of grid but should be in or reach the data set. Acceptable values for the data set are $y = 33$ to $y = 44$

Paper: 1MA1/3H

Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	(100,18)	B1	cao	
(b)	12.8 to 14.8	M1	for a method to read off eg line of best fit **or** line up from 370 **or** for a point on the grid at (370, *y*) where *y* lies between 12.8 and 14.8	
		A1	for an answer in the range 12.8 to 14.8	
(c)	Decision and statement	C1	for decision and statement **Acceptable examples** No, as this point can be disregarded from the general trend No, ignore this point No, the correlation is positive No, because even with an outlier you can still have a negative or positive correlation. No, there is still a correlation. No, as you can use the rest of the data to determine a correlation. No, as outlier does not affect the majority No as a line of best fit can still be drawn No, it is an anomaly **Not acceptable examples** Yes, …. Outliers can be ignored [no decision] No, the outlier can be ignored so the correlation is negative No there are other things that can affect the test	

Paper: 1MA1/3H	

Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	(2, 1)	B1	cao	
(b)	Description	C1	correct description, eg as the amount of rainfall decreases the number of hours of sunshine increases	Accept negative correlation Ignore any comment about strength Any numbers used in the description must be within tolerance
(c)	3 to 4	M1	for a suitable line of best fit drawn, **or** for a point marked at (x, 7), **or** a horizontal line drawn from 7 across to (x, 7) where x is in the range 2.5 to 4	
		A1	answer in the range 3 to 4	

Question	Answer	Mark	Mark scheme	Additional guidance
6 (a)	Description	C1	for a valid description of the relationship **Acceptable examples** As age increases, weight increases The older you are the greater the weight Positive correlation **Not acceptable examples** Positive (relationship) age and weight are in proportion strong correlation or correlation is increasing as the babies get older the heavier they get, negative correlation they are directly proportional, weight goes up as age goes up	Accept positive correlation Ignore any comment about strength
(b)	2.5 to 4.5	B2 (B1	for an answer in the range 2.5 to 4.5 for a suitable line of best fit drawn **or** for a point on the grid at (x, 5.8) where x lies between 2.5 and 4.5 **or** a horizontal line drawn from 5.8 across to (x, 5.8) where x is in the range 2.5 to 4.5)	

2	(a)	positive	C1	cao	Ignore any description of a relationship and any reference to strength of correlation
	(b)	lobf drawn	C1	for straight line passing between (140, 20) and (140, 22.5) and between (220, 30) and (220, 32.5)	
	(c)	26.5 – 29.5	C1	for answer in range 26.5 – 29.5 **or** ft single line with positive gradient	

Paper: 1MA1/2H

PMT

edexcel

Mark Scheme (Results)

November 2015

Pearson Edexcel GCSE
In Mathematics B (2MB01)
Higher (Calculator) Unit 1

ALWAYS LEARNING PEARSON

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Note that in some cases a correct answer alone will not score marks unless supported by working; these situations are made clear in the mark scheme. Examiners should be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will award marks for the quality of written communication (QWC).
The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labelling conventions.

ii) *select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate.*
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Partial answers shown (usually indicated in the ms by brackets) can be awarded the method mark associated with it (implied).
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks; transcription errors may also gain some credit. Send any such responses to review for the Team Leader to consider.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect cancelling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

14 The detailed notes in the mark scheme, and in practice/training material for examiners, should be taken as precedents over the above notes.

Guidance on the use of codes within this mark scheme
M1 – method mark for appropriate method in the context of the question A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PMT

5MB1H_01 November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
1.	(a)		0.2	2	M1 for 1 – (0.15 + 0.41 + 0.24) A1 cao
	(b)		12	2	M1 for 50 × 0.24 oe A1 cao
2.	(a)		(146, 41)	1	B1 for point plotted
	(b)		Description	1	B1 for description of dynamic relationship or statement of positive correlation
	(c)		155 – 158	2	M1 for a single straight line segment with positive gradient that could be used as a line of best fit or a horizontal line from 47.5 A1 answer in the range 155 – 158 or ft from line

PMT

<table>
<tr><th colspan="5">5MB1H_01 November 2015</th></tr>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td>3.</td><td></td><td><table><tr><td></td><td>Bus</td><td>Pre</td><td>Ec</td><td>Tot</td></tr><tr><td>M</td><td>(30)</td><td>28</td><td>34</td><td>(92)</td></tr><tr><td>F</td><td>14</td><td>32</td><td>(62)</td><td>108</td></tr><tr><td>Total</td><td>(44)</td><td>(60)</td><td>96</td><td>(200)</td></tr></table>( ) value given</td><td>28</td><td>4</td><td>M1 for total female students 200 – 92 or 108 seen; or for total Economy passengers 200 – 44 – 60 or 96 seen.
M1 for total male passengers in Economy “96”-62 or 34 seen; or for total female Premium “108” – 62 – (44-30) or 32 seen
M1 for 92 – 30 – “34” or for 60 – “32”
A1 cao

OR

Answers may appear in a two-way table with no other method seen
B1 for Female total 108 or Total Economy 96
M1 for “96” – 62 or 34 seen in Male Economy;
or “108” – 62 – (44 –30) or 32 seen in Female Premium
M1 for 92 – 30 – “34” or for 60 – “32”
A1 cao</td></tr>
<tr><td>4.</td><td>(a)</td><td></td><td>Out: 1023/1148
Return: 1737/1918
in Colwyn 5h 49min</td><td>4</td><td>B1 for selecting 1023 train (cheapest out)
B1 for selecting 1737
B1 for 5h 49min (spent in Colwyn)
C1 (dep on at least B1) clearly stating departure and arrival times of both trains used and correct time in Colwyn for their trains</td></tr>
<tr><td></td><td>(b)</td><td></td><td>133.40</td><td>3</td><td>M1 for 30% of any adult fare
M1 for 2 × adult fare + 3 × child fare for at least one of their chosen trains
A1 (accept 133.4)

(SC B2 for £188.60)</td></tr>
</table>

PMT

5MB1H_01 November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
5.			Reasons	2	B1 for one reason eg no quantity (units), no time frame, overlapping intervals, not exhaustive B1 for second (different) reason
6.			$\frac{5x+4}{3}$	2	M1 $x + x + 4 + 3x$ $(= 5x + 4)$ A1 for $(x + x + 4 + 3x) \div 3$ oe
7.		2500 + 2500 × 3.5÷100 = 2500 + 87.50 = 2587.50 2587.50 + 2587.50 × 3.5 ÷ 100 = 2587.50 + 90.5625	2678.06	3	M1 for 2500 × 1.035 or 2500 + 2500 × 0.035 oe or for 2587.5(0) or 87.5(0) or 8750 or 2412.5(0) M1 (dep) for "2587.5" × 1.035 or for "2587.5" + "2587.5" × 0.035 or for "2578.5" + "90.56(25)" or for 2678 or 2678.1(0) or 2678.07 or 2678.06… A1 cao NB: if correct answer seen then ignore any extra years Alternative method: M2 for 2500 × 1.035^n where $n \geq 2$ or for 2678 or 2678.07 or 2678.06… A1 cao

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5MB1H_01 November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
8.	(a)		$10 < n \leq 20$	2	M1 for use of cf to find the 20.5^{th} or 21st value A1 cao
	(b)	$(5 \times 14) + (15 \times 13) + (25 \times 8)$ $+ (35 \times 4) + (45 \times 2)$ $70 + 195 + 200 + 140 + 90$ $695 \div 41$	16.95	4	M1 for $\sum fx$ with consistent values within interval (including end points); accept one error M1 for $\sum fx$ with correct midpoint values M1 (dep M1) for "$\sum fx$" $\div 41$ or "695" $\div 41$ A1 for 16.95(12….)
9.			Box plot	3	M1 for UQ = 1.7 + 2.7 (= 4.4) or 4.4 shown on box plot B1 for box plot with at least 3 pieces of information correctly plotted B1 for fully correct box plot NB: there must be a box
10.	(a)		5, 23, 35, 39, 40	1	B1 for all correct
	(b)		cf graph	2	B1 for 4 or 5 "points" plotted consistently dep on sensible table (condone 1 addition error) B1 correct graph
	(c)		3	2	M1 for evidence of reading off from 187 (eg vertical line) on cf graph or $35 + \frac{2}{5} \times 4$ A1 ft from cf graph

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Question		**Working**	**Answer**	**Mark**	**Notes**
11.			20 shown	5	B1 for 3 combinations (1 + 8, 5 + 4, 7 + 2) spacing amended M1 for partial working $\frac{3}{20}\times 80$ or $\frac{3}{20}\times 3$ oe or 80 × 3 (= 240) M1 for complete working $\frac{3}{20}\times 80\times 3$ oe M1 (income) 80 × 70 (= 5600) or 80 × 0.7 (= 56) C1 for "56 – 36=20" clearly stated
12.	(a)		3	2	M1 for $\frac{50}{600}\times 40$ oe or for 3.33… oe A1 cao
	(b)		75	2	M1 for $\frac{n}{600}\times 40$ or for $\frac{5\times 600}{40}$ where '5' can be 4.5 to 5.5 A1 for 75; accept answers in the range 68 – 82 supported by working.

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5MB1H_01 November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
13.			400 and correct assumption	4	M1 for partial working eg $\frac{60}{12}$ oe or 20% or $\frac{1}{5}$ seen or 80 ÷ 12 (= 6.66..) or $\frac{12}{80}$ oe M1 for complete method eg $\frac{80\times 60}{12}$ or 80 × 5 or 6.66..× 60 or $\frac{12}{60}=\frac{80}{n}$ oe or 80 ÷ 0.2 oe A1 cao C1 for a correct mathematical assumption eg population has not changed overnight or mark which does not wear off or sample is random etc

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5MB1H_01 November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
14.			$\frac{56}{110}$	4	M1 for use of 10 as denominator of second probability M1 for a correct method to find the probability of at least one possible combination, $\frac{4}{11}\times\frac{7}{10}$ or $\frac{7}{11}\times\frac{4}{10}$ M1 for complete and correct method shown, eg $\frac{4}{11}\times\frac{7}{10}+\frac{7}{11}\times\frac{4}{10}$ A1 for $\frac{56}{110}$ oe **Alternative scheme for replacement** M1 for $\frac{4}{11}\times\frac{7}{11}$ or $\frac{7}{11}\times\frac{4}{11}$ M1 for $\frac{4}{11}\times\frac{7}{11}+\frac{7}{11}\times\frac{4}{11}$ OR B2 for $\frac{56}{121}$
15.		Frequency densities of 8 ÷ 10 = 0.8 16 ÷ 10 = 1.6 15 ÷ 5 = 3 12 ÷ 5 = 2.4 6 ÷ 20 = 0.3	Fully labelled histogram	3	B3 for fully correct histogram (B2 for 4 correct blocks) (B1 for 3 correct blocks) (If B0 then SC B1 for correct key eg $1cm^2$=2 birds or frequency ÷ class interval for at least 3 frequencies) NB apply the same mark scheme if a different frequency density is used

Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
Measurements of length: ±5 mm

PAPER: 5MB1H_01			
Question		**Modification**	**Notes**
Q02	(a)	Grid enlarged. Crosses changed to filled in circles. 146 cm changed to 150 cm. 41 kg changed to 40 kg.	
Q04		Crewe to Colwyn – First 2 columns removed. Colwyn to Crewe – First and last columns removed.	
Q06		MLP only: x → f.	
Q09		Weights changed to 1.5 kg, 6.5 kg, 2.5 kg, 1.5 kg, 3.5 kg. Grid enlarged.	
Q10	(b) (c)	Frequencies changed to 5, 15, 10, 5, 5. Grid enlarged. 187 cm changed to 182.5 cm.	
Q15		Frequencies changed to 5, 15, 15, 10, 10. Grid enlarged.	

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Question 3

This question was well answered and almost all students gained both marks. A few students drew a line at $x = 34$ but did not give a final answer or gave an answer outside of the range.

Question 1

Most students found this to be a good start to the paper and scored at least 3 of the 4 marks available. Nearly all students gained some credit for their answers.
For part (a), it was unusual to see an incorrect response but where the answer was wrong it was usually because a student had written (18, 100) instead of (100, 18).

Part (b) of the question was answered less well but nevertheless the majority of students gained the 2 marks available for giving an answer in the range of values accepted. Where this was not the case students usually scored a mark for either drawing a line of best fit or for drawing a vertical line from 370 on the horizontal axis.

In part (c) students could usually make a correct decision, that is “no” and give an acceptable reason. The most common accepted reasons were equivalent to stating that the outlier was an anomaly or that there was positive correlation when the outlier was ignored.

Question 1

This scatter diagram question gives students a familiar starting point. Part (a) required them to identify the outlier on the diagram. The vast majority of students identified the correct point, but some were unable to correctly identify the coordinates, with (1, 2) being a reasonably common incorrect answer. In part (b) we were looking for the relationship between the two variables, and again this was answered well with suitable descriptions relating to one variable increasing as the other decreases. It was common to see a description of correlation, which was acceptable providing the word 'correlation' was used. 'Negative' alone did not gain the mark as the question was not asking them to describe the correlation. Part (c) was the standard question asking students to use the graph to interpolate the rainfall for a given number of hours of sunshine. It was surprising to see so few candidates drawing a line of best fit, although this was not needed to gain full marks. Many were able to get both marks by giving an answer in the range 3-4. Those who did use a line of best fit often gained only 1 or no marks as they were drawing their line too low and gaining an answer outside the given range.

Question 6

In part (a) the majority of students were able to describe the relationship between the age and the weight of the babies. An answer of 'positive correlation' was acceptable but students who gave an answer of 'positive' or 'positive relationship' were not awarded the mark. The most common error was to state that the weight is directly proportional to the age.

Part (b) was also answered very well. A large proportion of students gained both marks for an answer in the range 2.5 to 4.5 with many drawing a line of best fit. Lines of best fit, if drawn, were normally drawn well. Some students used their line of best fit incorrectly, reading from age = 5.8 rather than from weight = 5.8, and some misread the scale on the age axis. These students still gained 1 mark for drawing a line of best fit. Some lines of best fit were drawn that started at (0, 0) and these gained no mark. A significant number of responses did not use a line of best fit to find an estimate and these were variable in their success. Some students with no line of best fit drew a horizontal line from 5.8 and often these lines did not end within the required range of values and scored no marks.

Question 2

This question was answered well by learners. Part (a) simply asked for the type of correlation, in this case 'positive'. Those who added further description, relating to strength for example, were still able to gain the mark. A small number of learners tried to explain the relationship between the variables. Learners should be encouraged to carefully read the demand before answering the question. Part (b) required a line of best fit to be drawn, and whilst many gained the mark, a significant number did not. Many simply joined the bottom left corner of the grid to the top right corner of the grid, which gained no credit. It was also common to see learners drawing a line of best fit that worked for the early points but not for all. Part (c) required use of the line of best fit, and those who had drawn an unsuitable line in part (b) were still able to use that and gain credit in part (c). The only real error seen in this part was from mis-reading the scale, here every 10 small squares represented a change in width of 5m. A common incorrect answer was to write 25.5 instead of 27.5