



**General Certificate Secondary of Education
January 2013**

Applications of Mathematics (Pilot) 9370

Unit 1 Higher Tier 93701H

Mark Scheme

Mark Schemes

Principal Examiners have prepared these mark schemes for practice papers. These mark schemes have not, therefore, been through the normal process of standardising that would take place for live papers.

It is not possible to indicate all the possible approaches to questions that would gain credit in a 'live' examination. The principles we work to are given in the glossary on page 3 of this mark scheme.

- Evidence of any method that would lead to a correct answer, if applied accurately, is generally worthy of credit.
- Accuracy marks are awarded for correct answers following on from a correct method. The correct method may be implied, but in this qualification there is a greater expectation that method will be appropriate and clearly shown.

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Glossary for Mark Schemes

These examinations are marked in such a way as to award positive achievement wherever possible. Thus, for these papers, marks are awarded under various categories.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
M Dep	A method mark dependent on a previous method mark being awarded.
B Dep	A mark that can only be awarded if a previous independent mark has been awarded.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$
[a, b]	Accept values between a and b inclusive.
25.3 ...	Allow answers which begin 25.3 e.g. 25.3, 25.31, 25.378.
Use of brackets	It is not necessary to see the bracketed work to award the marks.

A1 Higher Tier

Q	Answer	Mark	Comments
1(a)	9400	B1	
1(b)	$0.2 \times \text{their } 9400 (= 1880)$	M1	
	$\frac{1700 - \text{their } 1880}{12}$	M1 Dep	
	1260	A1	SC1 for 16843...
2(a)	$4x$ seen	M1	
	$4x + 20$	A1	SC1 for $x^4 + 20$
2(b)	$4x + 20 = 2.5x + 35$	M1	
	$1.5x = 15$	M1 Dep	Combining like terms. Allow one error.
	$x = 10$	A1	
2(b) Alt	One attempt at total cost for any number of slabs for both companies	M1	eg, $6 \times 4 + 20 = 44$ and $6 \times 2.5 + 35 = 50$
	An attempt for between 8 and 12 slabs	M1	eg, following 6 above $8 \times 4 + 20 = 52$ and $8 \times 2.5 + 35 = 55$
	10	A1	SC1 for $5 \times 4 + 20 = 40$ and $2.5 \times 2 + 35 = 40$

Q	Answer	Mark	Comments
3(a)	$280 \div 4$	M1	
	Kiwi = 70	A1	
	Yogurt = 210	A1 ft	ft 280 – their 70. Allow their 70×3 if M1 awarded. SC1 for 35 and 105
3(b)	$\frac{1}{4 + 1 + 3} \times 100$	M1	oe $\frac{70}{280 + 70 + 210} \times 100$ ft their weights
	12.5	A1 ft	ft their weights
3(c)(i)	$72 \times \frac{30}{100} (= 21.6)$	M1	oe
	72 + their 21.6 or 22	M1 Dep	
	93.6	A1	
	94 pence or £0.94	Q1	Strand (i) - Correct money notation ft their 93.6 rounded to nearest integer
3(c)(i) Alt	1.3 seen	M1	
	72×1.3	M1	
	93.6 or 94	A1	
	94 pence or £0.94	Q1	Strand (i) - Correct money notation ft their 93.6 rounded to nearest integer. SC3 for 93p with no working.
3(c)(ii)	$0.4 \times 15 (= 6)$	M1	78 implies this mark
	$\frac{\text{their } 6}{72} \times 100$ or $\frac{78}{72} \times 100$	M1	$\frac{15}{72} \times 100 (= 20.83)$ and $\frac{15+6}{72} \times 100 (= 29.16)$
	8.3	A1	
	Organised response	Q1	Strand (ii) – present a logical mathematical argument with key steps clearly shown. Dep on M2 awarded

Q	Answer	Mark	Comments
4(a)	No response section or No mention of websites or No mention of buying music	B1	oe
4(b)	Suitable question	B1	eg, Where do you buy music?
	Suitable response section	B1	eg, bookshops, websites, don't buy music Must include both shops and websites
4(c)	Reason involving time or location	B1	eg, only Monday, only one morning, only customers asked, only in the shop
4(d)	Complete description including correction of time and location	B2	B1 description correcting one problem Accept an increased sample size as one of time/location.
5(a)	All 4 points plotted accurately	B2	B1 for 2 or 3 $\pm \frac{1}{2}$ square. Ignore extras.
5(b)	Positive	B1	
5(c)	Line of best fit drawn or indication on graph at 15	M1	
	'8.80'	A1 ft	ft their straight, increasing lobf SC1 for 7.80 to 9 if no line or mark on graph.
Alt 5(c)	$\frac{8.00+9.80}{2}$	M1	oe allow 7.20 or 7.60 instead of 8.00
	8.90	A1	8.50 or 8.70
5(d)	Point (8,2) circled or stated	M1	
	Not close to lobf/other data Or other data all increase	A1	

Q	Answer	Mark	Comments
6(a)	2000×0.008	M1	oe $\left(\text{eg } 2000 \times \frac{0.8}{100} \right)$ $2016 \Rightarrow \text{M1}$
	16	A1	
6(b)	$36\,000 \times 0.015$	M1	oe $\left(\text{eg } 36000 \times \frac{1.5}{100} \right)$ $36540 \Rightarrow \text{M1}$
	540	A1	
6(c)	Uses boundaries in flow chart $10\,000 \times 0.012 (= 120)$ and $20\,000 \times 0.015 (= 300)$	M1	
	$225 \div 0.012$	M1	
	18 750	A1	
6(c) Alt	Uses inverse operations from flow chart $225 \div 0.015 (= 15\,000)$ or $225 \div 0.008 (= 28\,125)$ or $225 \div 0.012 (= 18\,750)$	M1	Any one correct division
	$225 \div 0.012 (= 18\,750)$	M1	
	18 750 chosen	A1	

Q	Answer	Mark	Comments
7(a)	Cumulative frequencies attempted	M1	8, 18, 32, 40, may be implied by heights on graph
	Their heights plotted	M1	Must be increasing function
	Plots at correct horizontal position	M1	Must be increasing function
	All correct and joined	A1	
7(b)	Read off from their 20 (= 26)	B1 ft	Allow from 20.5 ft their increasing graph
7(c)	Read off from their 10 (= 21) and their 30 (= 29.5)	M1	ft their increasing graph
	8.5	A1 ft	ft their UQ – their LQ
7(d)	Comparison of box plots: Position of Median, UQ and LQ marked on diagram	B1	ft their (b)
	UQ and LQ marked on diagram	A1 ft	ft their (c)
	(On average Jane) is faster due to lower median	B1 ft	oe ft their box plot
	Jane's times are less consistent due to larger IQR	B1 ft	oe ft their box plot
7(d) Alt	Jane's median = 23	B1	
	Jane's IQR = 13	B1	IQR found from box plot
	(On average) Jane is faster due to lower median	B1 ft	oe ft 7(b) correct comparison of their median values
	Jane's times are less consistent due to larger IQR	B1 ft	oe ft 7(c) and Jane's IQR

Q	Answer	Mark	Comments
8	$6x + 5 = 7x - 3$	M1	oe eg, $6x + 8 = 7x$
	$x = 8$	M1	
	$6 \times 8 + 5$	M1	or $7 \times 8 - 3$
	53	A1	SC3 for 56
8 Alt 1	An attempt at $6x + 5$	M1	
	Their total +3 and check divisible by 7	M1	An 'x', 'No' or further attempt implies check
	Two further attempts	M1	
	53	A1	SC3 for 56
8 Alt 2	Multiples of 6 seen	M1	At least 3
	At least 2 numbers in sequence for $6x + 5$	M1	Any 2 from 11, 17, 23, 29, 35, 41, 47, 53(...)
	At least 2 numbers in sequence for $6x + 5 + 3$	M1	Any 2 from 14, 20, 26, 32, 38, 44, 50, 56(...)
	53	A1	SC3 for 56
8 Alt 3	$5 + 3 (= 8)$	M1	Spare sweets
	8 boys	M1	One spare to each boy
	$6 \times 8 + 5$	M1	
	53	A1	SC3 for 56
9	$\frac{1.171 \times 10^9}{8.3 \times 10^6}$	M1	oe eg $1171000000 \div 8300000$ Implied by 0.14108×10^3
	141.0...	A1	Allow 141.1 ...
	141	B1 ft	

Q	Answer	Mark	Comments
10	2.75 or 2.85	B1	
	$5 \times \text{their } 2.75^2$ or $5 \times \text{their } 2.85^2$	M1	
	37.8(125)	A1	
	40.6(125)	A1	
	Yes, as $37.8125 < 40 < 40.6125$	Q1	Strand (iii) – Organised response leading to a correct conclusion based on lower and upper bounds one of which must be correct. SC1 for $5 \times 2.8^2 = 39.2$ with conclusion
11(a)	Attempt at frequency densities	M1	0.3, 1.8, 1.2, 0.4 at least two with different widths correct
	Heights correct	A1	Within class or on boundaries
	Widths correct	A1	
11(b)	$80 \div 2$ or 40th person or $100 \div 2$ Or 50	M1	Accept 40.5 or 50.5
	Median for stately home = 60	A1	
	Median for castle $50 - 48 (= 2)$	M1	Accept 50.5 used in place of 50
	$\frac{2}{24} \times 20$	M1	Attempt at location of median in 60 to 80 class
	Yes, 1.66(6 ...) over 60 or Yes, 61.6 is 2 more than 60	A1 ft	

Q	Answer	Mark	Comments
12(a)	d = the number of deluxe tables e = the number of economy tables	B1	
12(b)	$400d + 200e \leq 3000$ $(2d + e \leq 15)$	B1	
12(c)	$d + e = 10$ drawn	B1	
	$e = 2$ drawn	B1	
	Drawing line parallel to $80d + 50e = P$, or trialling a point in the required region with integer vales of d and e	M1	Accept any value for P
	Trial of (5, 5)	M1	
	£ 650	A1	