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GCSE MATHS

Ratio, proportion and rates of change

Edexcel 1MA1 | Subtopic collection Topic 34

Direct and inverse proportion

Foundation tier

Answers and examiner comments

23	2012-2025	Foundation
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.

Question		Working	Answer	Mark	Notes
16		30 ÷ 12 = 2.5 220 × 2.5 40 × 2.5 150 × 2.5 2 × 2.5	550 100 375 5	3	M2 for any one of 220 + 220 + 110 or 40 + 40 + 20 or 150 + 150 + 75 or 2 + 2 + 1 or 550 or 100 or 375 or 5 A1 for all 4 correct values OR M1 for 30 ÷ 12 oe or sight of 2.5 M1(dep) for 220 × '2.5' or 40 × '2.5' or 150 × '2.5' or 2 × '2.5' oe or 550 or 100 or 375 or 5 A1 for all 4 correct values OR M1 for 220 ÷ 12 or 40 ÷ 12 or 150 ÷ 12 or 2 ÷ 12 or $18\frac{1}{3}$ or $3\frac{1}{3}$ or 12.5 or $\frac{1}{6}$ seen M1(dep) for '$18\frac{1}{3}$' × 30 or '$3\frac{1}{3}$' × 30 or '12.5' × 30 or '$\frac{1}{6}$' × 30 or 550 or 100 or 375 or 5 A1 for all 4 correct values **Continued on next page**

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
					OR M1 for M1 for 220 ÷ 2 or 40 ÷ 2 or 150 ÷ 2 or 2 ÷ 2 or 110 or 20 or 75 or 1 seen M1(dep) for '110' × 5 or '20' × 5 or '75' × 5 or '1' × 5 or 550 or 100 or 375 or 5 seen A1 for all 4 correct values (SC: B2 for 275, 50, 187.5 and 2.5 or B1 for 275 or 50 or 187.5 or 2.5, if M0 scored)
*17		x+2 + 2x+3 + 2x + x + 3 + 2 = 6x + 10 =2(3x + 5) OR Half way round × 2 = (x+2 + 2x+3) × 2 = 3x + 5 Perimeter = 2(3x + 5)	Proof	4	B1 for x + 2 or 2x + 3 seen M1 for perimeter = "x+2" + "2x+3" + 2x + x + 3 + 2 oe A1 for 6x + 10 C1 (dep) for factorising 6x + 10 to give 2(3x + 5) OR B1 for x + 2 or 2x + 3 seen M1 for 2 × ("x+2" + "2x+3") A1 for 6x + 10 C1 (dep) for doubling 3x + 5 to give perimeter = 2(3x + 5)

23	(a)		30	2	M1 for 25 ÷ 10 **or** 2.5 seen **or** 10 ÷ 25 **or** 0.4 seen **or** 12+12+6 oe **or** a complete method eg. 25×12÷10 oe A1 cao
	(b)	1000 ÷ 200 × 12	60	2	M1 for 500 ÷ 50 **or** 1000 ÷ 200 **or** 500 ÷ 10 **or** correct scale factor clearly linked with one ingredient eg 10 with sugar or 5 with butter or flour or 50 with milk **or** an answer of 120 or 600 A1 cao

1MA0_1F

Question		Working	Answer	Mark	Notes
23		180×1.5 40×1.5 110×1.5 30×1.5	Flour = 270 Ginger = 60 Butter = 165 Sugar = 45	3	M1 for ×24÷16 oe or 24/16 or 1.5 seen or 180 + 90 (=270) or 40 + 20 (=60) or 110 + 55 (=165) or 30 + 15 (=45) or sight of any one of the correct answers A2 for all 4 correct answers (A1 for 2 or 3 correct answers)

13	(a)	5 ÷ 2 2.5 × 4 10 × 28	280	3	M2 for 4 × 28 × 5 ÷ 2 oe (M1 for 5 ÷ 2 × 4 (=10) or 4 × 28 (=112) or 4÷2×28 (=56) oe or 560 seen) A1 cao
	(b)	140 ÷ 28 5 × 2	10	2	M1 for 140 ÷ 28 × 2 or 140 ÷ 14 oe A1 cao

5MB2F_01

Original question 14

The full source mark scheme begins on page 37. Use the original paper code, tier and question number shown above.

Original question 22

The full source mark scheme begins on page 57. Use the original paper code, tier and question number shown above.

Question		Working	Answer	Mark	Notes
17		250 ÷ 100 = 2.5 300 ÷ 50 = 6 600 ÷ 120 = 5 60 ÷ 15 = 4	40	3	M1 for 250 ÷ 100 or 300 ÷ 50 or 600 ÷ 120 or 60 ÷ 15 M1 for 250 ÷ 100 **and** 16 × '2.5' or 2.5 oe seen **and** 16 × '2.5' A1 cao **SC** M2 (16+16+16÷2) oe A1 cao **SC** M2 $(250 \div \frac{100}{16})$oe A1 cao

PAPER: 5MB2F_01

Original question 21

The full source mark scheme begins on page 77. Use the original paper code, tier and question number shown above.

20	(a)		360	2	M1 30 ÷ 10 (= 3) or 120 ÷ 10 (=12) or 120 + 120 + 120 oe A1 cao
	(b)		25	2	M1 for $\frac{750}{300}$ (=2.5) oe A1 cao

1MA0 1F November 2015

Question		Working	Answer	Mark	Notes
19			20	3	M1 for 330÷120 (=2.75) or 200÷60 (=3 $^{1}/_{3}$) or 450 ÷180 (=2.5) M1 for 450÷180 (=2.5) AND 8×"2.5"(=20) A1 cao **OR** M1 for 120 ÷ 8 (=15) or 60 ÷ 8 (=7.5) or 180 ÷ 8 (=22.5) M1 for 330 ÷ (120 ÷ 8) (=22) or 200 ÷ (60 ÷ 8) (=26.6...) or 450 ÷ (180 ÷ 8) (=20) A1 cao **OR** M1 for multiples of 120:60:180, eg 240:120:360 M1 for multiples linked to 450 and 8+8+4 or scaling 2.5 oe A1 cao
20*			40°	4	M1 for angle FBC=70 or CFG = *x* or ABF = 110 may be seen in diagram M1 for angle CBF = BFC =70 or 90 – ½ *x* may be seen in diagram A1 for 40 supported by working C1 (dep on M2) for full reasons linked to appropriate working, eg alternate angles are equal; allied angles / co-interior angles add up to 180°; base angles of an isosceles triangle are equal, angles on a straight line add up to 180°, angles in a triangle add up to 180°

Question	Working	Answer	Mark	Notes
12 (a)		50	2	M1 for 1 kg = 1000g or 1 ÷ 20 (=0.05) A1 cao
(b)		70	3	M1 for 5000/20 (=250) or for 250 /100 (= 2.5) or for 5000/2000 (=2.5) M1 for 28 × "2.5" A1 cao Note: calculations may be carried out in kg or in g.

Question	Working	Answer	Mark	Notes
19		180, 210, 375, 3	M1	for $\frac{24}{16}$ **or** 1.5 **or** $\frac{16}{24}$ oe **or** 0.5 of any figure in the recipe calculated **or** amount of any ingredient for 1 flapjack or 3 (tablespoons)
			M1	for method to scale at least one ingredient in grams eg 120 × 1.5 **or** 140 × 1.5 **or** 250 × 1.5
			A1	for all quantities correct

17		90	P1	for a process to find the number of batches for at least 2 ingredients, eg 900 ÷ 225 (= 4) **or** 1000 ÷ 110 (= 9.09..) **or** 1000 ÷ 275 (= 3.6……) **or** 225 ÷ 75 (= 3) **OR** A full method to find the maximum number of biscuits for 1 ingredient eg 900 ÷ 225 × 30 **OR** Amount required for 1 biscuit for at least 2 ingredients eg 225 ÷ 30 (= 7.5) **or** 110 ÷ 30 (= 3.6..) **or** 275 ÷ 30 (= 9.1..) **or** 75 ÷ 30 (= 2.5) **OR** Amount required for 3 batches for at least 2 ingredients eg 225 × 3 (= 675) **or** 110 × 3 (= 330) **or** 275 × 3 (=825) **or** 75 × 3 (= 225)	
			P1	(dep P1) for a complete process to find the maximum number of biscuits after considering at least 3 different ingredients eg “3” × 30	They must use their smallest multiplier after considering at least 3 different ingredients
			A1	(dep P2) cao from fully correct working	90 without working award no marks

Paper: 1MA1/2F

Question	Answer	Mark	Mark scheme	Additional guidance
19	40	P1	for a process to find the maximum number of batches for one ingredient, eg 500 ÷ 175 (= 2.85...) **or** 300 ÷ 75 (= 4) **or** 625 ÷ 250 (= 2.5) **OR** for a process to find the amount of one ingredient for 1 biscuit, eg 175 ÷ 16 (= 10.9375) **or** 75 ÷ 16 (= 4.6875) **or** 250 ÷ 16 (= 15.625) **OR** for multiples of 175 : 75 : 250, eg 175 × 2 (= 350) **and** 75 × 2 (= 150) **and** 250 × 2 (= 500)	Figures may be truncated or rounded
		P1	(dep P1) identifies flour as the limiting factor **OR** for a process to find the maximum number of biscuits for one ingredient, eg butter: "2.85" × 16 **or** 500 ÷ "10.9.." oe (= 45.7...) sugar: "4" × 16 **or** 300 ÷ "4.6.." oe (= 64) flour: "2.5" × 16 **or** 625 ÷ "15.625" oe (= 40)	
		A1	cao SCB2 for answer of 32	

Paper: 1MA1/2F

28	6	M1 M1 A1	for 720 ÷ 40 (= 18) **or** 720 ÷ 30 (= 24) for a complete process eg (720 ÷ 30) – (720 ÷ 40) **or** "18" × 4/3 – "18" **or** "24" – "24" × 3/4 cao	

Paper: 1MA1/2F

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
26 (a)	Yes (supported)	P1	for start of process, eg 5 × 9 (= 45) **or** 10 × 14 (= 140) **or** 5 × 2 (= 10 (kg)) **or** 3 ÷ 2 (= 1.5 (boxes))	Accept values rounded or truncated to 1dp in both (a) and (b). Ignore units
		P1	for process using ratio of areas, eg "140" ÷ "45" (= 3.1...) **or** for using ratio of amount of seed eg "10" ÷ 3 (= 3.3...) **or** for finding coverage for 1 kg of grass seed, eg "45" ÷ 3 (=15 (m^2))	
		P1	for process to find amount of seed needed, eg "140" ÷ "45" × 3 (= 9.3...kg) **or** "140" ÷ "45" × "1.5" (= 4.6...(boxes)) oe **or** "15" × 2 (= 30 (m^2 per box)) **and** "140" ÷ "30" (= 4.6...(boxes)) **or** for process to find area that can be seeded, eg "10" ÷ 3 × "45" (= 150 (m^2)) **or** "140" ÷ "10" (= 14 (m^2)) oe	Accept 9.4 Accept 4.7
		C1	for "Yes" supported by correct figures eg 4.6...(and 5), **or** 9.3...and 10 **or** 150 and 140 (or 140 to 148.5) **or** 15 and 14	
(b)	Yes, (does not have enough) (supported)	C1	for reasoning supported with correct figures, eg does not have enough seed and compares 9 (kg) with 9.3…(kg) or 4.5 (boxes) with 4.6… (boxes) or 135 (m^2) with 140 (m^2) or 14 (m^2) with 15 (m^2) ft from (a)	Values used in (a) do not need repeating in (b) as long as intention is clear

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
17 (a)	42	P1	for a correct start to the process by finding the number of batches for one ingredient, eg 500 ÷ 125 (= 4) **or** 700 ÷ 200 (= 3.5 or 3) **or** 250 ÷ 50 (= 5) **OR** for a correct start to building up number of batches of **all** ingredients, eg. (24 biscuits or 2 batches =) 250 (butter), 400 (flour) and 100 (sugar) **OR** for a start to the process by finding the amount of one ingredient needed to make 1 biscuit, eg 125 ÷ 12 (= $10\frac{5}{12}$) **or** 200 ÷ 12 (= $16\frac{8}{12}$) **or** 50 ÷ 12 (= $4\frac{2}{12}$)	
		P1	for a correct process to find the number of batches for all 3 ingredients, eg 500 ÷ 125 (= 4) **and** 700 ÷ 200 (= 3.5 or 3) **and** 250 ÷ 50 (= 5) **OR** for a build-up process reaching a point where there is not enough of one ingredient, eg. (36 biscuits or 3 batches =) 375 (butter), 600 (flour) and 150 (sugar) **or** (48 biscuits or 4 batches =) 500 (butter), 800 (flour) and 200 (sugar) **OR** for a correct process to find the amount of each ingredient needed to make 1 biscuit, eg 125 ÷ 12 (= $10\frac{5}{12}$) **and** 200 ÷ 12 (= $16\frac{8}{12}$) **and** 50 ÷ 12 (= $4\frac{2}{12}$)	

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
		P1	(dep on P2) for a process to find the number of biscuits, eg "4" × 12 (= 48) **or** "3.5" × 12 (= 42) **or** "3" × 12 (= 36) **or** "5" × 12 (= 60) **OR** (dep on P2) for (700 – 600) ÷ 200 × 12 (= 6) or "3" × 12 (= 36) **OR** (dep on P2) for a process to find the number of biscuits, eg 500 ÷ "$10\frac{5}{12}$" (= 48) **or** 700 ÷ "$16\frac{8}{12}$" (= 42) **or** 250 ÷ "$4\frac{2}{12}$" (= 60)	
		A1	cao	
(b)	Explanation	C1	(dep on P3) for a correct explanation, ft (a) for the critical ingredient identified **Acceptable examples** No, since flour is the critical value No, since flour gives you the least number of batches No since she needs more flour to make more biscuits. **Not acceptable examples** Yes … No (no reason given) No, since we would need more of the other ingredients too	

Paper: 1MA1/1F

18	100	M1 A1	M1 for a correct first step, eg 25÷10 (= 2.5) **or** 40 ÷ 10 (= 4) **or** 20 (scones) = 40 × 2 (= 80g) **or** 5 (scones) = 40 ÷ 2 (= 20g) cao	Multiplier may be seen as evidence of this mark

20	100g butter 25g sugar 1 egg	P1 P1 P1 C1	for process to find the amount needed of one ingredient for 25 scones for process to find the amount needed for at least three ingredients for 25 scones **or** for process to find the correct amount more for at least two of butter, sugar, eggs for complete process to find amount more for each of butter, sugar, eggs for correct amounts more shown for butter, sugar, eggs	amount needed: 200g butter 875 flour 75 sugar 5 eggs Flour can be excluded, but no incorrect information about flour should be given.

16	750	M1 A1	for 250 × (60 ÷ 20) oe or 150 × (60 ÷ 20) oe or 100 × (60 ÷ 20) oe cao	

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
10	Yes **and** 750	P1	for beginning to work with proportion eg 60 ÷ 20 (= 3) **or** 900 – 250 (= 650) **or** 250 ÷ 20 (= 12.5 oe) **or** 900 ÷ 60 (= 15)	Sugar = 600 (g) or Small eggs = 6 (eggs) implies P1
		P1	for a complete process to see if there is enough peanut butter eg "3" × 250 (= 750) **or** 900 ÷ "3" (= 300) **or** "650" – 250 – 250 (= 150) oe **or** "12.5" × 60 (= 750) **or** for a complete process to work out how many cookies he can make eg 900 ÷ "12.5" (= 72) **or** for process to work out how much peanut butter is needed for one cookie and how much peanut butter he can use per cookie eg 250 ÷ 20 (= 12.5 oe) **and** 900 ÷ 60 (= 15)	Sight of 750 gains P2
		C1	Yes **and** accurate figure to compare eg 750 (g needed) **or** 150 (g over) **or** 300 (g per batch available) **or** 72 (cookies can be made) **or** 12.5 (g peanut butter per cookie needed) **and** 15 (g peanut butter per cookie available)	

Question	Answer	Mark	Mark scheme	Additional guidance
17	180, 300, 75	M1	for complete method to find amount needed for 30 biscuits for one ingredient, eg 120 ÷ 20 × 30 (= 180) oe eg 120 + 120 ÷ 2 (= 180) **or** for method to find a scale factor, eg 30 ÷ 20 (= 1.5 oe) **or** for method to find amount needed for 10 biscuits for at least 2 ingredients eg 120 ÷ 2 (= 60) or 200 ÷ 2 (= 100) or 50 ÷ 2 (= 25) **or** for method to find amount needed for 1 biscuit for at least 2 ingredients eg 120 ÷ 20 (= 6) or 200 ÷ 20 (= 10) or 50 ÷ 20 (= 2.5)	
		M1	for complete method to find amount needed for 30 biscuits for at least 2 ingredients, eg at least 2 of 120 ÷ 20 × 30 (= 180) or 200 ÷ 20 × 30 (= 300) or 50 ÷ 20 × 30 (= 75) oe **or** eg at least 2 of 120 × “1.5” (= 180) or 200 × “1.5” (= 300) or 50 × “1.5” (= 75) **or** eg at least 2 of 120 + “60” (= 180) or 200 + “100” (= 300) or 50 + “25” (= 75) **or** eg at least 2 of 30 × “6” (= 180) or 30 × “10” (= 300) or 30 × “2.5” (= 75)	
		A1	for all quantities correct	

Paper: 1MA1/3F

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
17	No, not enough milk (supported)		**Process to find amount needed (starting from recipe quantities)**	
		P1	for a correct process to find amount needed of one ingredient, eg 100 ÷ 10 × 15 oe (= 150) or 200 ÷ 10 × 15 oe (= 300) or 100 ÷ 2 + 100 (= 150) or 200 ÷ 2 + 200 (= 300) or 40 ÷ 2 × 3 oe (= 60) or 2 ÷ 2 × 3 oe (= 3) **or** scale factor of 1.5 seen	
		P1	for a correct process to find amount needed of all the ingredients, eg 100 ÷ 10 × 15 oe (= 150) and 200 ÷ 10 × 15 oe (= 300) and 40 ÷ 10 × 15 oe (= 60) and 2 ÷ 10 × 15 oe (= 3)	
		C1	for statement that there is not enough milk with supporting evidence OR	Must have correct figures for all ingredients, but it is not necessary to comment on the other ingredients. Any comment on the other ingredients must be correct.
			Process to find quantity of pancakes that can be made (working from the quantities of ingredients available)	Award this mark for a complete process to find the amount of ingredients for a quantity of pancakes that uses all of one of the ingredients eg process to find amount of ingredients for 20 pancakes (flour).
		P1	for a correct process to find the number of pancakes that can be made with one ingredient, eg 200 ÷ 100 × 10 oe (= 20) or 250 ÷ 200 × 10 oe (= 12.5) or 70 ÷ 40 × 10 oe (= 17.5) or 5 ÷ 2 × 10 oe (= 25)	
		P1	for a correct process to find the number of pancakes all ingredients could produce eg 200 ÷ 100 × 10 oe (= 20) and 250 ÷ 200 × 10 oe (= 12.5) and 70 ÷ 40 × 10 oe (= 17.5) and 5 ÷ 2 × 10 oe (= 25)	
		C1	for statement that there is not enough milk with supporting evidence	Must have correct figures for all ingredients, but it is not necessary to comment on the other ingredients.

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
				Any comment on the other ingredients must be correct.

PMT

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Mark Scheme (Results)

March 2013

GCSE Mathematics (Linear) 1MA0
Foundation (Calculator) Paper 2F

PMT

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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. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

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. Examiners should also 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 indicate within the table where, and which strands of QWC, are being assessed. 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 labeling 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.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
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.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

PMT

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.

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)

Guidance on the use of codes within this mark scheme
M1 – method mark 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

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		7025	1	B1 cao
	(b)		Nine thousand four hundred (and) fifty	1	B1 for Nine thousand four hundred (and) fifty Accept 'nine thousand' written as '9 thousand', 'four hundred' written as '4 hundred' and 'fifty' written as '5 tens' or any mixture of these. Do not penalise poor spelling.
	(c)		29	1	B1 for 29 or twenty nine or 29.0
	(d)		7000	1	B1 for 7000 or 7 thousand or seven thousand
2	(a)		8, 10	1	B1 cao
	(b)		24	1	B1 cao
	(c)		reason	1	B1 for a valid reason that demonstrates the understanding that the number of triangles is twice the pattern number
3	(a)		240	1	B1 for 240
	(b)		arrow at 125°C	1	B1 for arrow (or line) pointing within a range of 122.5 to 127.5 (ie nearer to 125 than either 120 or 130) Use professional judgement.
	(c)		6.05 (pm)	1	B1 for 6.05 (pm) oe

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
4	(a)		Thursday	1	B1 cao
	(b)		7	1	B1 cao
	*(c)		Nick	3	M1 for the intention to add Dave's 4 times or Nick's 4 times A1 for 58 and 64 C1 (dep on M1 and two totals) for clearly stating Nick as their answer or ft from their two totals OR M1 for the intention to find the difference between the times on each of the 4 days A1 for 6 or −6 C1 (dep on M1 and a net difference) for clearly stating Nick as their answer or ft from their difference [SC: B1 for "Nick spent 6 minutes more than Dave on his phone" if M0 scored.]
5			9 squares shaded	1	B1 for any 9 squares shaded oe
6			66	2	M1 for a correct method to find the number of people on the bus if the 15 get off first. (= 57) A1 cao OR M1 for a correct method to find the number of people on the bus if the 9 get on first. (= 81) A1 cao OR M1 for a correct method to find the net change in the number of people on the bus (= 6 or −6) A1 cao

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
7		20 − 6.65 13.35 ÷ 3	4.45	3	M1 for a correct method to find the amount shared by B, R and T M1 (dep) for a correct method of dividing this amount by 3 A1 cao [SC: B1 for an answer of 17.78 (20 – 6.65 ÷ 3), if M0 scored, with or without working]
8	(a)		3, 6, 9, 3	3	B3 for a table showing all 4 correct frequencies in the correct place. (condone the absence of or any incorrect tallies) [(B2 for 2 or 3 correct tallies or 2 or 3 correct frequencies even in the wrong columns) (B1 for 1 correct tally or 1 correct frequency even in the wrong column)] [SC: B2 for 3/21 and 6/21 and 9/21 and 3/21 shown in the frequency column]
	(b)		3	1	B1 for 3 or ft table in (a)
9			Circle radius 5 cm drawn	1	B1 for a circle of radius 5 cm drawn (condone an alternative centre)

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(i)		5,15 or 5,125 or 15,125 or 30,50 or 30,60 or 30,90 or 30,100 or 50,60 or 50,90 or 50,100 or 60,90 or 60,100 or 90,100	4	B1 for 2 numbers, from the list, whose sum is an even number.
	(ii)		60 or 100		B1 for 60 or 100 or both
	(iii)		5 or 15		B1 for 5 or 15 or both
	(iv)		125		B1 cao
11		9.39 × 10 24.30 × 3 + 9.39 93.90 − 82.29	£11.61	5	M1 for a correct method to find the most expensive way to buy the 10 cartridges (= 93.90) M1 for a correct method to find the least expensive way to buy the 10 cartridges (= 82.29) M1 (dep on M1 scored) for a correct method to find the difference between their least and their most expensive way, provided that both totals are for the cost of exactly 10 cartridges A1 for 11.61 B1 (indep) for correct units

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
12	(a)(i)		B and D	2	B1 cao
	(ii)		G and E		B1 for G and E (allow B and D if not in (i))
	(b)	3 + 3 + 3 + 2 + 2 +1 + 1 + 1	16	1	B1 cao
13	(a)		6am	1	B1 for 6am (accept −4) Do not accept 6 alone.
	(b)		3	1	B1 for 3 (allow − 3)
	(c)	−1−5	−6	2	M1 for −1 − 5 or intention to subtract 5 from -1 (may be shown on a diagram) A1 cao

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*14			Yes + supporting work	4	M1 for adding the weights of all the ingredients (= 96) M1 (dep) for '96' × 8 A1 cao for 768 C1 (dep on M2), ft for a correct conclusion (yes or no) from a comparison of 750 (pots) with their '768' pots; units must be quoted [SC: B1 for 768 seen without working if M0M0 scored] **OR** M1 for adding the weights of all the ingredients (= 96) M1 for 750 ÷ 8 A1 cao for 93.75 C1(dep on M2), ft for a correct conclusion (yes or no) from a comparison of their weight of ingredients in one tank full '93.75' kg with '96' kg; units must be quoted [SC: B1 for 93.75 seen without working if M0M0 scored]] **OR** M1 for adding the weights of all the ingredients (= 96) M1 (dep) for 750 ÷ '96' A1 cao for 7.8125 C1(dep on M2), ft for a correct conclusion (yes or no) from a comparison of their number of pots, '7.8125' pots with 8 (pots); units must be quoted [SC: B1 for 7.8125 seen without working if M0M0 scored]]
15			85 29 54 **168** **93** 31 47 171 13 5 **9** **27** 191 **65** **110** 366	3	B3 for fully correct table (B2 for 3 or 4 or 5 correct entries, B1 for 1 or 2 correct entries)

PMT

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
16	(a)(i)		5	3	B1 cao
	(ii)		8		B1 cao
	(iii)		5		B1 cao
	(b)		correct sketch	2	B2 for fully correct sketch [B1 for a square (or rectangle) drawn with 2 or 3 connecting triangles on the outside of the square]
17	(a)(i)		12.978(61279…)	2	B1 for 12.978(…..)
	(ii)		13		B1 for 13 or ft from a(i) [Note: An answer of 13.0 gets B0]
	(b)		100000	1	B1 cao
18	(a)	$2 \times 8 = 16$ $16 + 7$	23	2	M1 for correct substitution of 8 into the expression $2f$ A1 cao
	(b)	$3 \times -2 + 5 \times 4$	14	2	M1 for correct substitution into the formula A1 cao

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
19	(a)		$\frac{40}{360}$	1	B1 for $\frac{40}{360}$ oe (ignore any incorrect simplification) Accept 0.11…. if no fraction shown
	(b)		4	3	M1 for a correct method to find the angle of the 'weeding' sector If measured, accept an angle between 138 and 142 inc. M1 (dep) for a correct method to find the number of degrees per hour (= 20) or the number of hours ($\frac{1}{20}$ (3 mins) per degree A1 cao for 4
20	(a)		2.5	2	M1 for 10 (cm) or "10" ÷ 4 A1 for 2.45 – 2.55
	(b)		A marked on diagram	2	M1 for a point marked (or line drawn) on a bearing of 038° from either point B or point W, OR for a point marked (or arc drawn) 6 cm from B A1 for the position of Avebury marked (accept without label if not ambiguous)

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
21	(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
22	(a)		$x = 3$ drawn	1	B1 for $x = 3$ drawn [Note: each line drawn must be a single line segment satisfying $x = 3$]
	(b)		$y = x$ drawn	1	B1 for $y = x$ drawn [Note: each line drawn must be a single line segment satisfying $y = x$]
	(c)	Gradient = $\frac{3-0}{0--2}$	1.5	2	M1 for a method to find the gradient of the given line A1 for 1.5 oe
23	(a)		n^8	1	B1 for n^8 (accept n^{5+3})
	(b)		n^5	1	B1 for n^5 (accept n^{7-2})

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
24	(a)	15 ÷ 6	2.5	2	M1 for 15 ÷ 6 oe A1 for 2.5 or $2\frac{1}{2}$
	*(b)		Yes + evidence	2	M1 for a correct method to change 15 miles into kilometres C1(dep on M1) for 24 km **and** statement with correct conclusion [SC: B1 for "Yes" oe and 24 km shown if M0 scored] **OR** M1 for a correct method to change 20 kilometres into miles C1(dep on M1) for 12.5 miles **and** statement with correct conclusion [SC: B1 for "Yes" oe and 12.5 miles shown if M0 scored]

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
25			414.96	5	M1 for a correct method to work out the amount of oil required to fill the tank M1 for a correct method to find the cost of oil required before the discount M1 for a correct method of finding 5% of their calculated cost M1 (dep on previous M1) for a correct method to find the discounted cost A1 for correct answer of 414.96 or 41496p **OR** M1 for a correct method of finding 5% of the cost of 1 litre of oil M1 (dep on previous M1) for a correct method to find the discounted cost of 1 litre of oil M1 for a correct method to work out the amount of oil required to fill the tank M1 for a correct method to find the discounted cost of the oil required A1 for correct answer of 414.96 or 41496p **OR** M1 for a correct method to work out the amount of oil required to fill the tank M1 for a correct method of finding 5% of their calculated amount of oil M1 (dep on previous M1) for a correct method to find the reduced amount of oil M1 for a correct method to find the cost of the reduced amount of oil A1 for correct answer of 414.96 or 41496p

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
26	(a)	$1 - 0.2 - 0.1$ $0.7 \div 2$	0.35	3	M1 for correctly using total probability 1 or 100% if percentages used M1 (dep) for complete correct method to complete the solution A1 for 0.35 or 35% or $\frac{35}{100}$ oe
	(b)	0.1×200	20	2	M1 for 0.1×200 A1 cao [SC: B1 for an answer of $\frac{20}{200}$ if M0 scored]
27	(a)		$3x + 12$	1	B1 for $3x + 12$ or $12 + 3x$
	(b)		$x^3 + 2x$	2	M1 for the intention to multiply both terms in the bracket by x A1 for $x^3 + 2x$ OR B2 for $x^3 + 2x$ [B1 for x^3 or $2x$ seen]
	(c)		$x(x - 6)$	1	B1 for $x(x - 6)$ or $(x - 6)x$

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
28			1180	3	M1 for a correct method to find the area of the cross section M1 (dep) for a complete correct method for the volume of the prism A1 cao OR M1 for a correct method to find the volume of one cuboid M1 (dep) for a complete correct method for the volume of the prism A1 cao

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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. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

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. Examiners should also 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 indicate within the table where, and which strands of QWC, are being assessed. 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 labeling 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.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
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 canceling 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.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

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.

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)

Guidance on the use of codes within this mark scheme
M1 – method mark 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

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PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		2085	1	B1 for 2085 or 2,085
	(b)		five thousand, one hundred and eight	1	B1 for five thousand, one hundred (and) eight
	(c)		9 tenths		B1 for 9 tenths oe, eg $\frac{9}{10}$ or $\frac{90}{100}$
	(d)		160	1	B1 cao
2			inches grams litres	3	B1 for inch(es) or ins B1 for gram(s) or g B1 for litre(s) or *l* or millilitre(s) or m*l* (accept centilitres or cc or c*l* or cm^3)
3	(a)(i)		right angle marked	1	B1 for a clear intention to mark bottom left hand angle with R (accept r)or right-angle marked
	(ii)		acute	1	B1 for acute
	(iii)		reflex	1	B1 for reflex
	(b)		perpendicular line from *T* to *AB*	1	B1 for perpendicular line from *T* to *AB* (within guidelines of overlay)
4	(a)		5*m*	1	B1 for 5*m* or 5×*m* or *m*×5 or *m*5
	(b)		9*p*	1	B1 for 9*p* or *p*9
	(c)		4*tw*	1	B1 for 4*tw* or 4*wt* or *tw*4 or *wt*4 (condone 4×*tw* and 4×*wt*)

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
5			$\frac{40}{200}$	3	**(uses frequencies)** M1 for 40 or 200 or any correct day total M1 for $\frac{40}{T}$, $T > 40$ or $\frac{n}{200}$, $n < 200$ A1 for $\frac{40}{200}$ oe accept 20% OR **(uses boxes)** M1 for 2 or 10 M1 for $\frac{2}{T}$, $T > 2$ or $\frac{n}{10}$, $n < 10$ A1 for $\frac{2}{10}$ oe accept 20% OR **(uses rectangles)** M1 for 8 or 40 M1 for $\frac{8}{T}$, $T > 8$ or $\frac{n}{40}$, $n < 40$ A1 for $\frac{8}{40}$ oe accept 20% [SC B2 for 40 out of 200 oe]
6	(a)		circle drawn, centre *O* radius *OP*	1	B1 for circle drawn radius *OP* within guidelines of overlay
	(b)		chord drawn	1	B1 for any line drawn joining two points on circumference of circle (accept diameter) [NB shaded segment scores B0]

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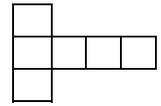
PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
7			110	2	M1 for 30 + 70 + 20 (=120) or 50 + 40 + 20 (=110) or 50 + 10 + 60 (=120) A1 cao
8	(a)	4 × 3	12	1	B1 cao
	(b)		5	2	M1 for 4 × 2 – 3 A1 cao
9			5%	2	**(uses percentages)** M1 for 30 – 25 (= 5) or 25 – 30 (= −5) A1 for 5% oe OR **(uses decimals)** M1 for or 0.3 – 0.25 or 0.25 – 0.3 (= −0.05) A1 for 0.05 OR **(uses fractions)** M1 for $\frac{30}{100} - \frac{1}{4}$ or $\frac{1}{4} - \frac{30}{100}$ $(=-\frac{5}{100})$ A1 for $\frac{5}{100}$ oe OR **(uses trial value, eg 60)** M1 for 0.3×60 – 0.25×60 (=3) or 0.25×60 – 0.3×60 (= −3) A1 for $\frac{3}{60}$ oe
*10			diagram or chart	4	B1 for a key or suitable labels to identify Kitty and George B1 for diagram(s) or chart(s) set up for comparison, showing data for at least 3 months, eg dual bar chart, line graph etc B1 for correct heights for Kitty **or** George, dependent on a linear scale C1 for a fully correct diagram or chart to include 4 months labelled and eg 'cars' or 'frequency' axis correctly scaled and labelled

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
11	(a)		12	1	B1 cao
	(b)		14	1	B1 cao
	(c)		16	1	B1 cao
12	(i)	2 2 3 3 3 4 4 5 5 6 ▲	3.5	6	M1 for ordering the data condone one extra or one omission A1 for 3.5 or $3\frac{1}{2}$
	(ii)		4		M1 for 6 – 2 or 2 – 6 A1 cao
	(iii)		3.7		M1 for (2+2+3+3+3+4+4+5+5+6) ÷ 10 condone missing brackets or 37÷10 A1 for 3.7 or $3\frac{7}{10}$ [SC B1 for 31.6 or 33.4]
13			60	3	M1 for 9 × 14 + 6 (=132) M1 (dep) for full method to convert '132' from lbs to kg using the graph **or** for '132'÷2.2 (=60) A1 for 59 – 62 OR M1 for reading off 14 lbs (= 6.2–6.5) and 6 lbs (=2.4–2.9) M1 (dep) for 9 × '6.4' + '2.75' A1 for 59 – 62 [SC B2 for 66]

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*14			Correct statement	4	M1 for 6.50 × 8 + 12 or 6.50 × 7 + 15 M1 for 6.50 × 8 + 12 and 6.50 × 7 + 15 A1 for 64 and 60.5(0) C1 (dep on first M1) for correct statement ft their figures OR M1 for 6.50 × (8−7) or 15−12 M1 for 6.50 × (8−7) and 15−12 A1 for 6.5(0) and 3 C1 (dep on first M1) for correct statement ft their figures [SC If no working shown B1 for 64 and 60.5(0) **or** B1 for 6.5(0) and 3]
15			coin / tally / freq £1 / lll / 3 50p / / (0) 20p / ~~llll~~1 / 6 10p / lll / 3 5p / ll / 2 2p / / (0) 1p / ll / 2	2	B2 for all frequencies correct condone missing 0s (B1 for at least 3 correct non zero frequencies or at least 3 correct non zero tallies or at least 2 correct non zero tallies with their frequencies correct)

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
16	(a)		8	1	B1 cao
	(b)			2	M1 for 5 or 6 squares drawn and joined A1 for a correct net [NB missing internal lines may be implied by grid]
	(c)		54	2	M1 for 3 × 3 × 6 oe A1 cao
17	(a)		720	2	M1 for 6 × 120 or 600 × 120 ÷ 100 oe A1 for 720 oe (accept 720.0)
	(b)		£10 or €12	3	M1 for 540÷1.2 (=450) oe, eg 4×100+50 (=450) M1(dep) for 460 – '450' (=10) A1 for £10 oe (accept £10.0) OR M1 for 460×1.2 (=552) oe, eg 4×120+60+12 (=552) M1 (dep) for '552' – 540 (=12) A1 for €12 oe (accept €12.0)
18			11	3	M1 for $52 \times \frac{3}{4}$ (=39) oe or $\frac{120}{360} \times 150$ (=50) oe M1 for $52 \times \frac{3}{4}$ (=39) oe and $\frac{120}{360} \times 150$ (=50) oe A1 cao

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PAPER: 1MA0_2F					
Question		Working	Answer	Mark	Notes
19	(a)		40	3	M1 for 120 × 100 (=12 000) or 20 × 15 (=300) M1 (dep) for '12 000' ÷ '300' A1 cao OR M1 for 120 ÷ 15 (= 8) or 100 ÷ 20 (= 5) M1 (dep) for '8' × '5' A1 cao OR M1 for 120 ÷ 20 (=6) or 100 ÷ 15 (=6.66…) M1 (dep) for '6'×'6.66…' (=40) or '6'×'6' (=36) or '6'×'7' (=42) A1 cao
	(b)		10.40	2	M1 for $\frac{20}{100} \times 52$ oe A1 for 10.4(0) [SC B1 for 62.4(0) or 41.6(0)]

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*20		**(Method 1)** Angle *ACB* = 180 – 135 (= 45) (sum of angles on a straight line = 180) Angle *ABC* = 180 – 70 – 45 (=65) (sum of angles in a triangle = 180 (*x* =) 180 – 65 (=115) (sum of angles on a straight line = 180) OR **(Method 2)** Angle *ACB* = 180 – 135 (= 45) (sum of angles on a straight line = 180) (*x* =) 70 + 45 (=115) (exterior angle = sum of interior opposite angles) OR **(Method 3)** Angle DAB = 180 – 70 = 110 (sum of angles on a straight line = 180) (*x* =) 360 – 135 – 110 (sum of exterior angles of a polygon = 360)	*x* = 115	5	M1 for correct method to find angle *DAB* or angle *ACB* or angle *ABC* (may be implied by correct angle marked in diagram) M1 for complete correct method to find *x* A1 for *x* = 115 C2 (dep on M1) for fully correct reasons for chosen method no extras (C1 (dep on M1) for one correct reason for chosen method) [NB *x* = 115 must be stated explicitly, 115 only scores A0]

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PAPER: 1MA0_2F					
Question		Working	Answer	Mark	Notes
21	(a)		2.70	3	M1 for 2 × 1.40 + 2.10 + 2.40 (= 7.30) M1 (dep) for 10 – '7.30' or 2.7(0) A1 for 2.70 in correct money notation OR M1 for subtracting at least 2 different correct costs from (£)10 M1 for 10 – 1.40 – 1.40 – 2.10 – 2.40 A1 for 2.70 in correct money notation [SC B1 for 4.10 in correct money notation]
	(b)		2.21	3	M1 for 2.60×0.15 (= 0.39) or 260×0.15 (=39p) M1 (dep) for 2.60 – '0.39' or 260–39 (=221p) A1 cao OR M1 for 1 – 0.15 (=0.85) or 100 – 15 (=85) M1 (dep) for 2.60 × 0.85 oe A1 cao

PMT

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*22			Not enough mincemeat since 600<700 OR Only able to make 38 mince pies since insufficient mincemeat	4	M1 for 45 ÷ 18 (= 2.5) M1 for 2.5 used as factor or divisor A1 for 562.5 and 875 and 250 and 700 and 2.5 (accept 2 or 3) OR for availables as 400 and 400 and 200 and 240 and 2.4 (accept 2 or 3) C1 ft (dep on at least M1) for identifying and stating which ingredient is insufficient for the recipe (with some supportive evidence) OR M1 for a correct method to determine the number of pies one ingredient could produce M1 for a correct method to determine the number of pies **all** ingredient could produce A1 for 80 and 51 and 90 and 38 and 108 C1 ft (dep on at least M1) for identifying and stating which ingredient is insufficient for the recipe (with some supportive evidence)
23	(a)		Response boxes overlap and are not exhaustive	2	B2 for **TWO** aspects from: No time frame given Non-exhaustive responses Response boxes over-lapping (B1 for ONE correct aspect)
	(b)		How many magazines do you buy each month? 0-4 5-8 over 8	2	B1 for a question with a time frame B1 for at least 3 correctly labelled response boxes (non-overlapping, need not be exhaustive) **or** for a set of response boxes that are exhaustive (could be overlapping) [NB do not allow inequalities in response boxes]
	(c)		One reason	1	B1 for one reason eg all the same age, may all be males, may all like same types of magazines, sample too small, biased

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
24		x | $x^3 + 2x$ 4 | 72 4.1 | 77.(121) 4.2 | 82.(488) 4.3 | 88.(107) 4.4 | 93.(984) 4.5 | 100.(125) 4.6 | 106.(536) 4.7 | 113.(223) 4.8 | 120.(192) 4.9 | 127.(449) 5 | 135 4.65 | 109.8(44625) 4.66 | 110.5(14696) 4.67 | 111.1(87563) 4.68 | 111.8(63232) 4.69 | 112.5(41709)	4.7	4	B2 for a trial $4.6 \leq x \leq 4.7$ evaluated correctly (B1 for a trial evaluated correctly for $4 \leq x \leq 5$) B1 for a different trial evaluated correctly for $4.65 \leq x < 4.7$ B1 (dep on at least one previous B1) for 4.7 [Note: Trials should be evaluated to at least accuracy shown in table, truncated or rounded] [NB No working scores 0 marks]

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
25			28% or $\frac{14}{50}$	4	M1 for 100 − 30 (=70) or $1-\frac{3}{10}(=\frac{7}{10})$ M1 for '+70' ÷ (3 + 2) (=14) or '$\frac{7}{10}$' ÷ (3 + 2)(= $\frac{7}{50}$) M1 for '14' × 2 or $\frac{7}{50}\times 2$ A1 for 28% or $\frac{14}{50}$ oe OR M1 for a correct method to find (100−30)% of any actual sum of money, eg 0.7×500 M1 for '350' ÷ (3 + 2) (=70) M1 for '70' × 2 (=140) A1 for 28% or $\frac{14}{50}$ oe OR M1 for starting with a two numbers in ratio 3:2, eg 21 and 14 M1 for equating sum of their numbers to 100 – 30 (=70), eg '21' + '14' (=35) M1 for scaling sum of their numbers to 100%, eg '35'÷70×100 (=50) A1 for 28% or $\frac{14}{50}$ oe [SC award B3 for oe answers expressed in an incorrect form eg $\frac{2.8}{10}$]
26		$3x - 6 = x + 7$ $2x = 13$	6.5	3	M1 for $3\times x - 3\times 2$ (=$3x$ – 6) or $\frac{x}{3}+\frac{7}{3}$ seen M1 for correct method to isolate the terms in x or the number terms on opposite sides of an equation A1 for 6.5 oe
27			3.52	3	M1 for $1.35^2 + 3.25^2$ M1 (dep) for $\sqrt{(1.35^2 + 3.25^2)}$ (=$\sqrt{12.385}$) A1 for answer in the range 3.51 to 3.52

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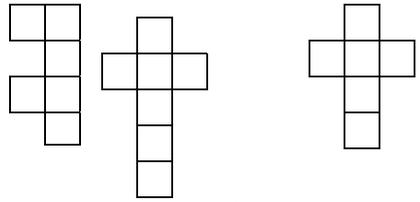
Modifications to the mark scheme for Modified Large Print (MLP) papers.

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: 1MA0_2F			
Question		**Modification**	**Notes**
2		MLP: candidates told that there are three spaces to fill. Braille: table shows: (i) centimetres (ii) ounces (iii) pints and candidates have been asked to write down what is missing.	Standard mark scheme Standard mark scheme
3	(a)	size of diagram is ×1.5	Standard mark scheme
	(b)	Line AB is 10 cm and T is 5 cm away from the line.	Standard mark scheme
6	(a)	OP = 5 cm and is a horizontal line.	B1 for circle drawn radius 4.5 to 5.5 cm
	(b)	circle size is increased by 1.5	Standard mark scheme
8	(a)	a is changed to e and b to f.	Standard mark scheme
10		1.5 cm grid.	B1 for intention to draw correct heights for Kitty **or** George, dependent on a linear scale

PMT

PAPER: 1MA0_2F			
Question		**Modification**	**Notes**
13		*x*-axis:1.5 cm for $\frac{1}{2}$ *y*-axis: 1.5 cm for 2 Leeway will be needed in marking answers.	Standard mark scheme
16	(a)	Models as well as diagrams provided.	Standard mark scheme
	(b)	Question changed, now reads: Look at the diagrams for Question 16(b). Which diagram, Shape 1, Shape 2 or Shape 3 is the net of a cube?'  Shape 1 shape2 shape3	B2 for diagram 3
	(c)	models as well as diagrams provided.	Standard mark scheme
20		Wording added: 'Angle FCA = 135^0 Angle CAB = 70^0	Standard mark scheme
26		MLP only: *x* is changed to *y*.	Standard mark scheme
27		Braille only. Wording added: '*XY* = 1.35 metres. *YZ* = 3.25 metres.'	Standard mark scheme

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Mark Scheme (Results)

November 2014

Pearson Edexcel GCSE
In Mathematics A (1MA0)
Foundation (Non-Calculator) Paper 1F

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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.

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.

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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

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		Lhotse	1	B1 cao
	(b)		8200	1	B1 cao
	(c)		Seven thousand four hundred and twenty-eight	1	B1 for any unambiguous answer
	(d)		8051	1	B1 cao
2	(a)		4,8,3,3,2	2	M1 for at least 2 tallies or 2 frequencies correct A1 for 5 correct frequencies
	(b)		correct graph	3	M1 for bar chart or other suitable chart with at least 2 correct frequencies drawn for their scale (ft from (a)) M1 for all bars labelled and vertical axis correctly scaled A1 for accurately representing their data, with all labels, ft from (a)
3	(a)		56 000	1	B1 cao
	(b)		276	1	B1 cao
	(c)		6	1	B1 cao
	(d)		29	1	B1 cao
	(e)		13	1	B1 cao

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
4			3	3	M1 for attempt to find number of bags needed eg 254 ÷ 20 oe (= 12.7) **or**12 **or** 13 M1 (dep) for "254 ÷ 20" ÷ 5 oe (= 2.4) A1 cao **OR** M1 for 5 × 20 (=100) M1 (dep) for intention to find how many "100" in 254 (= 2.54) A1 cao
5	(a)		B or C	1	B1 for B **or** C **or** B and C
	(b)		G, E	2	B1 for G; B1 for E
	(c)		Hexagon	1	B1 cao
	(d)		Parallelogram	1	B1 cao
6	(a)		$3m$	1	B1 cao
	(b)		$7e$	1	B1 cao
	(c)		$15g$	1	B1 cao
7	(a)		31	2	M1 for 3 × 5 + 2 × 8 **or** 15 and 16 A1 cao
	(b)		$6x + 8y$	2	M1 for $6x$ **or** $8y$ A1 for $6x + 8y$ oe as final answer

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*8		Tables-R-Us 120 + (120 + 2 × 40) = 320 Fred's Furniture 120 + (32 × 6) = 312 Tables 'n Chairs 120 + (3 × 70) = 330	Fred's Furniture with working	4	M1 for correct method to find total cost of chairs (and table) for at least one shop M1 for correct method to find total cost of chairs (and table) for at least two shops A1 for 3 comparable totals (eg. chairs £200, £192, £210 **or** table and chairs £320, £312, £330) C1 (dep on M1) ft for correct statement with shop name from comparable figures
9			48	2	M1 for method to find 15% of 320 A1 cao
10	(a)		5	1	B1 cao
	(b)		evens	1	B1 cao
	(c)		$\frac{2}{6}$ oe	2	M1 for $\frac{a}{6}$ where $a < 6$ **or** $\frac{2}{b}$ where $b > 2$ A1 for $\frac{2}{6}$ oe
11	*(a)		No with working	2	M1 for 19.5 + 22.8 (= 42.3) **or** 40 − 19.5 − 22.8 (= −2.3) **or** 22 + 19 (= 41) C1 for statement with No and 42.3 **or** ±2.3 **or** 41 seen
	(b)		12 40	3	M1 for correct start eg. addition of two times **or** subtraction of one time from 1430 M1 for a complete method A1 for 12 40 (pm)

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
12			126 or 176	4	M1 for correct unit conversion of 2 m or 3 m or 20 cm M1 for method to find number in width or number in length **or** 14 or 9 or 16 or 11 M1 (dep on M1) for "number in length" × "number in width" eg 14 × 9 eg 16 × 11 A1 for 126 or 176
*13			Amsterdam with figures	3	B1 for a correct conversion from miles to km or km to miles eg 8 km = 5 miles eg 28 miles = 44 km M1 for a correct method to convert 280 miles to km or 500 km to miles **or** 420 – 460 (km) **or** 300 − 320 (miles) C1 (dep on M1) for statement with correct conclusion and correct conversions (420 – 460 km or 300 – 320 miles)
14			correct shape	2	M1 for at least 2 correctly enlarged sides A1 for correct shape **SC:** B1 for a fully correct enlargement scale factor 2 or 4
15	(a) (b) (c)		18 56 33	1 1 2	B1 cao B1 cao M1 for 23 and 56 identified A1 cao

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*16			No with reason	3	M1 for 17, 20 .**or** + 3 **or** $3n + 2$ M1 for method to show that 34 is not in the sequence eg continue sequence to at least 32 eg attempt to solve $3n + 2 = 34$ C1 (dep on M2) for statement with conclusion eg No with 32, 35 shown eg $n = 32 \div 3$ which is not a whole number
17			700 cm^3	3	M1 for $20 \times 5 \times 7$ A1 for 700 B1 (indep) for cm^3
18			4	3	B1 for 11.8 − 12.2 (cm) or 1180 − 1220 (km) M1 for "12" × 100 ÷ 300 oe A1 for 3.9 – 4.1 from correct figures or ft from "12" × 100 ÷ 300 oe
19			1340	4	M1 for 500 × 4 (= 2000) M1 for 960 – 300 (= 660) or "2000" + 300 (= 2300) or "2000" – 960 (= 1040) M1 (dep on M2) for a fully correct method eg "2000" – "660" or "2300" – "960" or "1040" + 300 A1 cao

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
20	(a)		$\frac{5}{12}$	2	M1 for $\frac{150}{360}$ or equivalent fraction A1 cao
	(b)		42	2	M1 for 60 ÷ 12 (= 5) **or** 210 ÷ 60 (= 3.5) oe A1 cao
	(c)		not enough information	1	B1 for 'not enough information' ticked **and** appropriate explanation given
21			25	4	M1 for 600 ÷ 4 (= 150) M1 for 4500 ÷ "150" (= 30) M1 for 750 ÷ "30" A1 for 25 with supporting working **OR** M1 for 4500 ÷ 750 (= 6) M1 for 600 ÷ 4 (= 150) or 600 ÷ "6" (= 100) M1 for "150" ÷ "6" or "100" ÷ 4 A1 for 25 with supporting working **OR** M1 for 4500 ÷ 750 (= 6) or 750 ÷ 4500 (= $\frac{1}{6}$) M1 for $\frac{1}{4}\times"\frac{1}{6}"$ $\left(=\frac{1}{24}\right)$ M1 for $"\frac{1}{24}"\times 600$ A1 for 25 with supporting working

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*22			130 + correct reasons	4	M1 for angle *BFG* = 65 (may be seen on diagram) M1 (dep) for correct method to calculate *x* eg (*x* =) 65 + 65 (= 130) **or** (*x* =) 180 − (180 − 2 × 65) (= 130) C2 for *x* =130 **and** full appropriate reasons related to method shown (C1 (dep on M1) for any one appropriate reason related to method shown) eg alternate angles are equal ; base angles in an isosceles triangle are equal; angles in a triangle add up to 180°; angles on a straight line add up to 180°; exterior angle of triangle = sum of two interior opposite angles co-interior angles (allied angles) add up to 180°
23	(a)		2 reasons	2	B2 for two different reasons (B1 for 1 reason) eg No units (of distance) eg Overlapping intervals (2 and/or 3 in two boxes) eg Missing box (no box for more than 6 (km/miles) or 'other' or 4.5 (km/miles))
	(b)		Question	2	B1 for a suitable question which includes a time frame (time frame could appear with response boxes) B1 for at least 3relevant non-overlapping **and** exhaustive response boxes [Do not allow inequalities in response boxes]

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
24	(a)		$e(3e + 5)$	1	B1 for $e(3e + 5)$
	(b)		4	3	M1 for intention to expand brackets eg $7k - 21$ **or** division of all terms on RHS by 7 as a first step M1 for correct method to isolate terms in k in an equation A1 cao
	(c)		$a = 2f - 1$	2	M1 for a correct first step eg intention to multiply both sides by 2 A1 cao
25			$2 \times 2 \times 3 \times 3 \times 5$	3	M1 for continual prime factorisation (at least two consecutive steps correct) **or** at least two stages of a factor tree correct M1 for a fully correct factor tree **or** list 2, 2, 3, 3, 5 A1 for $2 \times 2 \times 3 \times 3 \times 5$ or $2^2 \times 3^2 \times 5$
26			9	4	M1 for method to find the area of one rectangle eg 15×8 (=120) or 15×11 (=165) M1 (dep) for subtraction from/by given area eg 138 − "120" (=18) or "165" – 138 (=27) M1 for final step from complete method shown eg 15 − "18"÷ 3 or for "27" ÷ 3 A1 cao **OR** M1 for a correct expression for the area of one rectangle eg $(8 + 3) \times (15 - x)$ or $8 \times x$ M1 (dep) for a correct equation eg $(8 + 3) \times (15 - x) + 8 \times x = 138$ M1 for correct method to isolate x eg $3x = 27$ A1 cao

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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: 1MA0_1F			
Question		**Modification**	**Notes**
1		Take out Jannu	
2	(b)	Table layout modified 2 cm grid provided with 14 squares across and 12 squares up Space on left and at the bottom for labeling	
5		Shapes H and I removed	
7		*a* changed to *e* *c* changed to *f*	
10		Spinner straightened up,● at centre to represent spike	
13		2 cm grid provided	
14		1½ cm grid provided Enlargement given Question reversed – 'Describe fully the transformation that maps Shape A onto Shape B	

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PAPER: 1MA0_1F			
Question		**Modification**	**Notes**
15		Horizontal lines inserted to separate rows	
17		Model provided	

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Question 19

Many students were able to make progress with this question and gain at least one mark. This was awarded for finding the maximum number of batches of 16 biscuits for one ingredient or the amount of one ingredient needed for one biscuit or for doubling the quantities in the recipe in the first stage of a build-up method, e.g. 350 g butter, 150 g sugar, 500 g flour. Many students went on to gain the second mark for showing a process to find the maximum number of biscuits for one ingredient or for an answer of 32. Students should be aware that it is possible to make a non-integer number of batches unless the question states otherwise. Some of the students that used a unitary method of solution and showed a complete process rounded or truncated intermediate values and lost the accuracy mark.
A common incorrect start to the process was to add together quantities of the different ingredients.
The presentation of work on this question was often poor with calculations spread all over the working space.

Question 28

This question was generally answered quite well and it was pleasing that many students were able to gain the first mark for finding the number of workers used each day by Ali's company or by Hayley's company. Most went on to give a fully correct solution. Having found the two correct values (18 and 24) a few students did not complete the process by subtracting 18 from 24. Some students could not use the formula correctly and a common error was to work out 720×40 and 720×30.

Question 26

Many were able to secure the first process mark for finding the area of one of the lawns (45 m^2 or 140 m^2) or the amount of seed available (10kg) but did not proceed any further with many reasoning incorrectly that if 3kg covered 5 × 9 area, then 6kg would cover 10 × 18, more than is needed. Other students were successful in gaining the second process mark mainly for the coverage of 1 kg of grass seed (15m^2). The most successful approaches seen where students were able to reach the correct conclusion were finding the amount of grass seed needed (9.3…kg) and comparing it with 10kg or finding the area that could be seeded with 10kg (150m^2) and comparing it with 140m^2.

Part (b) required reasoning supported by correct figures and as a result, students were not successful in gaining many marks.

Question 17

Whilst the context of this question was not unfamiliar, many students worked purely on complete batches of 12 biscuits in part (a), not realising that additional biscuits could be made from the remaining ingredients. Consequently, an answer of 36 was the modal answer which gained 3 of the 4 available marks. A variety of processes were seen in determining the greatest number of biscuits (or batches), build-up methods being most prominent. Work was often poorly laid out and not shown sequentially and many worked with only one or two ingredients, losing potential credit.

In part (b) it was sufficient to identify 'flour' solely as the critical ingredient preventing more biscuits (or batches) being made. However, few did this, referring to "other ingredients" or butter as well as or instead of flour.

Question 18

The most popular method in answering this question was by working out the amount of sugar required to make 20 and then 5 scones. Some did simply work out 40 × 2.5
In the former method, loss of marks was a result of not explicitly identifying the number of scones that were being considered. or finding the amount of sugar required for 20 scones accurately but then simply adding 5 more grams for the 5 extra scones.

A significant number just multiplied by 25, thinking the ingredients given were for one scone. Some students wasted considerable time by working out the amount of each ingredient in making 25 scones.

Question 20

Most candidates were able to gain 2 marks for at least 3 correct ingredients for 25 scones. It would seem that asking them to go further caused some confusion and errors were made. Some candidates were able to get as far as 3 marks but failed to get the final mark as they had made an earlier inaccurate calculation for flour. Working was often set out poorly particularly that worked out the amount for 5 scones and then added two lots of amounts for 10 scones.

Question 16

This question was generally well answered although arithmetic errors were common. Many students wasted valuable time by working out the amount of all three ingredients required to make 60 biscuits. Most correctly found 3 lots of 250 but some did try to find the amount of flour required to make one biscuit and then multiplied by 60. The method here gained credit but rarely was a correct final answer seen because of poor division of 250 by 20.
Some students misinterpreted the question and assumed that Harry already had 250g of flour and that the question was asking how much more was needed. Multiplying 250 by 4 was also a common mistake.

Question 17

This question was answered well with most students able to gain the full 3 marks for 3 correct values. The most common method seen was to find the amount needed for 10 biscuits and then to add this to the amount needed for 20 biscuits or to multiply by 3. Very few students found a scale factor from 20 to 30 e.g. 30 ÷ 20 = 1.5 and worked from there. A variety of incorrect methods were seen including multiplying all the ingredients by 30 or adding 10 or 60 to all the ingredients.

Question 17

In this question learners were presented with a list of ingredients for 10 pancakes and the amount of each ingredient available to Sam. They were asked whether there was enough of each ingredient to make 15 pancakes.

The most common successful approach was to find the amount of each ingredient needed to make 15 pancakes and compare this to the amount available followed by a conclusion that there was not enough milk. Some learners showed the correct process with errors in evaluation, or found the correct figures for 15 pancakes but gave an incorrect conclusion, and so gained 2 of the available marks. Where partial working was seen, generally where only some of the ingredients were considered, it was generally possible to award 1 mark for a correct process to find the amount needed of 1 ingredient. A common error when working with finding the amount of ingredients needed was unsuccessfully working with decimals when calculating how many eggs were needed.

A less common approach was the process to find the quantities of pancakes that can be made with each ingredient. Where this was seen it was common to award 2 marks as there were often errors in the evaluation of the calculations. It was common, however, to award 1 mark for finding that it was possible to make 20 pancakes with the amount of flour available. In some instances, learners obtained close, but not correct values, without showing their working.

Some learners chose to work out how much of each ingredient would be left after 10 pancakes were made and to find the amount needed to make 5 pancakes. Where all of the correct figures were found and the correct conclusion given then full marks were awarded. Where an incorrect conclusion was given or some of the values were incorrect then 2 marks was given.

In other cases, learners attempted a hybrid of the different possible approaches. Provided that the calculations allowed for each ingredient to be considered and the values were accurate for each ingredient then this was awarded 3 marks if the correct conclusion (not enough milk) was seen. If values were inaccurate or there was not the correct final conclusion then 2 marks for the method were awarded.

A relatively common error was for learners not to consider each of the ingredients in turn or not to show all of their working. Learners should ensure that they read the question carefully and include all working when this is required.



Examiners' Report

Principal Examiner Feedback

November 2023

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Foundation (Non-Calculator) Paper 1F

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GCSE (9 – 1) Mathematics – 1MA1
Principal Examiner Feedback – Foundation Paper 1

Introduction

This paper provided good coverage across the specification and allowed students the opportunity to demonstrate their ability across the grades. Plenty of success was seen across the early part of the paper as students showed confidence picking up marks in the first half of the paper.

Challenges arose when questions contained a context and with it large amounts of text; extracting the key pieces of information and applying it using the correct mathematical processes are an area for improvement. Good amounts of working out were seen which certainly helped students, especially those which had arithmetic errors as part of their solution.

Question 21 onwards proved challenging for this cohort with very few students gaining full marks and the mode score being 0 marks on almost all questions. Nevertheless, the majority of questions were at least attempted in a bid to gain some credit.

For those questions requiring a written conclusion, most responses did have some sort of decision showing that students are well-accustomed to this sort of demand in a question.

Areas of the specification that need to be improved upon are highlighted in the list at the end of this report.

REPORT ON INDIVIDUAL QUESTONS

Question 1

A good number of students were able to give a correct answer of 6 but there were a significant number who did not and a wide variety of incorrect answers were given. The most common incorrect answers were 4 (from finding the median) and 5 (from finding the mean).

Question 2

This question was answered well with the majority of students able to give a correct answer of 31. Of those that didn’t gain B1, 209 was the most common incorrect answer from adding instead of subtracting; 41 was also seen when students were unable to deal with the tens correctly.

Question 3

This simplifying question saw mixed results. The majority of students were able to give a correct answer of $12a$ but there were a variety of incorrect answers seen. Students should note that this

type of simplifying question requires no multiplication signs in the answer; $12 \times a$ and $3 \times 4a$ were often seen and gained no marks.

Question 4

Measuring angles is an area of the specification that needs attention. Although some students did gain a correct answer in range, with 40 most commonly seen, there were a whole range of incorrect answers given such as 35, 50 and 140.

Question 5

The majority of this cohort were able to gain B1 for a correct answer of 60. Of those that didn't, 50 and 150 were the most common incorrect answers seen.

Question 6

The majority of students gained 3 marks for an answer of 2300 on this question. For those that didn't it was an error in conversion which was often seen with 1 litre = 100 millilitres being the most common incorrect conversion used; these students could still gain 1 mark if they had a correct process to find the difference using one of the incorrect conversions stated in the mark scheme. Those students who converted 3 litres into millilitres were more successful than those who converted 700 ml into litres and errors in arithmetic were noted when doing 3000 – 700. A small number of students arrived at 2300 but spoiled their answer by then trying to convert to litres; this was still allowed if the student gave an answer of 2.3 litres but 2.3 on its own lost the A mark and this was seen on occasions. Some students also missed that the question was about 3 litres and instead subtracted 700 from 1 litre (1000 ml) obtained 300 ml and gained no marks.

Question 7

Part (a) was answered very well with the majority gaining B1 for an answer of 15. Some students found the difference between 1 and 5 and added this to 3. Part (b) saw less success with more incorrect answers seen than in (a), the most common being 10 from dividing 20 by 2 instead of 4. There were still a good proportion of the cohort who gained B1 for an answer of 4.

Question 8

Part (a) saw mixed results. A good number of students were able to find the correct frequencies for 2 marks. Many gave the correct frequencies in the tally column and something incorrect such as frequency/24 as a fraction which gained 1 mark. Some also confused the definitions of tally and frequency and put the information in the wrong column. It was encouraging to see that a number of students were crossing out items in the list as they entered their tally marks in the frequency table and were using the correct bar notation for recording the tallies. Part (b) was answered well with many gaining B1 for a correct answer; those that didn't often gave a number

for their answer instead of the correct word. Part (c) saw the full range of marks awarded with most students gaining full marks. Of those that didn't, the most common error was an incorrect linear scale, although these students could still gain 2 marks for labelling bars and correct height bars for their scales and many did. Students often struggled to correctly scale the vertical axis, sometimes writing the numbers between the squares instead of on the gridline or using multiples of 3 or 5 which often led to errors.

Question 9

For part (i) and (ii) the majority of students answered the questions correctly to gain 2 marks. Of those that didn't, giving the answer in an incorrect notation, such as ratio, was often the issue; students should be reminded that correct notation for probabilities are fractions, decimals or percentages. Some students gave an answer of $\frac{8}{22}$ for (ii), e.g. the probability for 'pink' instead of 'not pink'. In (iii) the majority of students gained B1 for a correct answer with 0 and $\frac{0}{22}$ given in equal measure. Incorrect answers generally involved incorrect notation such as 0:22 or worded answers, e.g. impossible.

Question 10

It was pleasing to see the majority of students gain 3 marks on this question. The most common process seen was to divide 60 by 20 and then multiply 250 by 3 to arrive at 750. The majority of students who reached this point also gave a positive decision to gain the full 3 marks. Some students used a 'build-down' process starting at 900 and subtracting 250 three times to deduce there would be 150 grams left. Some students attempted to find the amount needed for one cookie and go from there but this process often led to arithmetic errors. Common incorrect processes often revolved around arithmetic errors and a small number of students reached an accurate figure to compare but gave an incorrect or no decision. Some students worked with the other ingredients too but this was ignored as long as it did not contradict their final answer. A number of students believed doubling and then doubling again went from 20 to 60 rather than 80 and therefore gained no credit.

Question 11

Less than half of students in this cohort were able to gain 2 marks for a correct enlargement. Of those that didn't, the main error was in the height of the triangle and the positioning of the top vertex; most were able to gain B1 for a base of 6 cm. Some students misread the scale factor and enlarged the shape by a different scale factor – usually 2 – if done correctly B1 could still be gained.

Question 12

Part (a)(i) was answered well with most students able to gain 2 marks for an answer of 26. Of those that didn't, it was common to see incorrect algebraic expressions such as $6g + 20h$ and 23 + 45 was often seen. Part (a)(ii) saw less success with many students unable to make any progress with the substitution. Many were unsure as to which letters should be substituted for which values and substituting g for 38 was often seen. For those that did manage to show a correct substitution, some were able to rearrange correctly to reach an answer of 13. One commonly seen incorrect answer was $g = 26$. Students should be advised to write the correct answer on the answer, on occasions 13 could be seen embedded in a calculation but the wrong answer given on the answer line, leading to 0 marks. Part (b) saw mixed results as less than half of students in this cohort gained 2 marks. Of those that didn't, many gained 1 mark, usually in one of two ways; successfully working out 3×-3 as -9 but being unable to accurately subtract 2 or for a full substitution; common incorrect answers included -7, 7 and 11. Some students wrote notes saying 2 negatives make a positive, leading to the misconception that the negative for the 9 and the subtraction sign meant the two values needed to be added, leading to an answer of 11.

Question 13

This question saw the full range of marks awarded. Some students were able to work through the process to reach an answer of 23p or £0.23. Of those that didn't, it was common to see 2 or 3 marks awarded, in particular for students who reached 160 or 460 but could go no further. Those that earned 3 marks gave a complete process with arithmetic errors in the process. It is encouraging to see that more students are fully demonstrating their method enabling them to gain marks despite their final answer being incorrect. Centres should continue to encourage their students to set out their working in a logical order so that they can access Method and Process marks. Some students dealt with the information and started the process incorrectly such as $100 \div 3$ or started correctly e.g. $100 \div 5$ but went wrong after that such as 20 + 8 and an answer of 28p. Some students incorrectly divided £3 by 5 following their process of dividing 100 by 5, resulting in an answer of 60p or 68p (after adding 8p) whereas others mixed up units within their working, e.g. 300/100 = 3g instead of 3p.

Question 14

This question saw the full range of marks awarded. Of those students who managed to plot the correct 5 points it was usual to see this accompanied by a straight line through the points. Some students gained 2 marks, usually for a line segment through 3 correct points; students should be able to recognise that an equation of the form $y = mx + c$ produces a straight line and therefore if one point is not in line with the others it will likely be incorrect. Some students gained 1 mark for producing 2 correct points either plotted or stated in the workspace but there were difficulties in calculating y when x was negative. More than half of the cohort gained 0 marks so this is an area of the specification that needs to be worked on.

Question 15

This question saw the full range of marks awarded. The majority of the cohort made a good start with a process to find 25% of 12,000. It was common to see students using the build-up method to work out percentages of amounts but this alone could not be credited with method or process marks if arithmetic errors were made and the process is not complete e.g. all steps seen such as 10% = 12,000 ÷ 10 = 1,200. Many then picked up the 2nd process mark for subtracting the deposit from 12,000 and also the 3rd for a complete process. It was common to see the accuracy mark not gained as students were unable to carry out the arithmetic for the division; 405 and 45 were commonly seen incorrect answers. Some students were not able to gain the first P mark but were able to gain the second and third P mark for a correct process using their deposit value and this was often seen. 12,000 was often misread as 1,200.

Question 16

Around two thirds of this cohort were able to gain 2 marks by reaching a value to show that Shah had passed the exam, usually 42 or 75(%). Some students had a correct method but could not carry it out accurately. Others were not able to gain any marks as they set up a fraction such as $\frac{45}{60}$ but were not able to go any further. Some students reached 42 or 75 but failed to interpret the results correctly, often saying that Shah did not pass the exam.

Question 17

The majority of students were able to gain at least 1 mark for correctly inverting the second fraction and multiplying. It was common to see the second mark gained too, usually for reaching $\frac{18}{5}$. Students who attempted to find a common denominator, e.g. $\frac{18}{30} \div \frac{5}{30}$ often made no further progress. The final step proved to be the most challenging for this cohort but some were able to successfully convert to a mixed number. Students should read the demand of the question carefully as 3.6 given as an answer was seen.

Question 18

The majority of students opted to use column multiplication for this arithmetic question. Some students managed correct place value in their structure and a good number of those managed to reach the digits 1512 to gain the first accuracy mark and place the decimal point correctly to the gain the full 3 marks. Common errors seen were incorrect place value in the columns, as well as incorrect arithmetic when adding the columns, usually arriving at the digits 378 or in trying to break down the components but only using 6 × 2 and 0.3 × 0.4, giving an answer of 13.2. Some students reached 1512 but were unable to place the decimal point in the correct place; centres need to continue to encourage students to use approximation to decide on a sensible place for their decimal point.

Question 19

It was rare to see a correct answer in (a)(i) with incorrect answers of 0 and 5 seen often. (a)(ii) also saw little success with the majority of students gaining B0; common incorrect answers included 0.05, −10 and −25. Part (b) saw mixed results, some students were able to make a correct first step, usually adding the powers for the numerator to reach 2^9. From there students either went onto gain 2 marks for a correct answer or incorrectly simplified, with $2^9 \div 2^3 = 2^3$ most commonly seen. A good proportion of the cohort gained no marks, making an incorrect first step such as $2^5 \times 2^4 = 4^9$ or $2^5 \times 2^4 = 2^{20}$. Some students also evaluated the terms as ordinary numbers and worked from there; if 64 was reached this gained M1 and was seen regularly.

Question 20

Part (a) saw most students make a good attempt at a factor tree. A good number of students were able to complete their factor tree accurately and also write their prime factors as a product. The factor tree was attempted by most students and well set out. There was a good understanding of the need for prime factors and very few included 1. Of those that did not gain 2 marks, common errors included incorrectly considering 39 as a prime number and arithmetic errors when considering the next pair of prime factors. For part (b) it was more common to see 1 mark gained rather than 2. Students were able to produce either the prime factors of 130, at least 4 factors of 156 or 130 or a common factor of 156 and 130. Of those students who gained no marks, finding the lowest common multiple was the most commonly seen incorrect method.

Question 21

Part (a) saw the full range of marks awarded. Some students completed a fully correct process to reach an answer of 3.5 or equivalent. Of those that didn't, some reached as far as $14 \div 4$ but could not follow the process through with 3.2 quite often seen as the result of the division; students and centres should note that $\frac{14}{4}$ gained full marks. Some students were able to find the total length of the 5 sticks but made no further progress. There were also a good number who did not manage to make a correct first step and gained 0 marks; a common error was to calculate 4×7 or 4×4.2 rather than 5×4.2. Part (b) saw little success as most students gained no marks, with common incorrect responses centring around the mean increasing or the length of the other 4 sticks being reduced.

Question 22

It was rare to see a fully correct construction and 90° angle at *P* on this question. Almost all students on this paper did not know what arcs were required. Many students did however gain 1 mark for drawing a 90° angle at *P* without the correct construction lines.

Question 23

Very few students were able to gain full marks on this question. A small number made a positive start and gained one of the first two P marks, the equations most commonly seen were $x = 2y$, $2x + y = 180$ and $y + w = 180$. Division by 3, rather than 5, of the 180° in the triangle was commonly seen. Most students understood the correct angle facts for angles in a triangle / on a straight line. Many students ignored the fact the triangle was isosceles and calculated the angles as if it was an equilateral triangle, giving 60° angles which led to $180 - 60 = 120$ as the incorrect answer. Many students attempted to assign values to x and y, these values were usually incorrect but if the correct values were seen this usually led to a correct value for w as well.

Question 24

This was another challenging multi-step question for this cohort; the majority gained 0 marks. Some were able to make a correct start and set up an equation in x, although some failed to include the x from shelf **A**. Progress from there required a correct process to solve their equation and substitute the value for x into one of the expressions for shelves **B** or **C**, any students that did this successfully often gained the 3rd P mark as well for 7500 ÷ "25". It was rare to see any students get as far as the 4th P mark but those that did usually went on to gain full marks assuming their arithmetic had been correct. There were many completely incorrect solutions seen such as expanding $(3x + 1)(2x - 5)$ or setting $3x + 1$ equal to 7500 and going from there.

Question 25

Those that knew the density, mass, volume formula generally scored 2 marks. Of those that did not gain 2 marks, most scored 0 for incorrect use of mass and volume, with the most common error being to multiply 27 and 10 instead of divide. Other incorrect methods involved trying a volume unit conversion, confusing units^3 with 10^3 and dividing 27 by 1000, and being unable to choose between m/v and $m \times v$ and stating both.

Question 26

It was common to see students gain the first method mark for rounding one of the figures appropriately, 6 or 8 on the numerator being seen most often. The majority then struggled with the next step which was to carry out an accurate calculation. Some were able to reach the digits 16, from attempting 48 ÷ 0.3 but resulting in incorrect place value. Some students attempted to work out the accurate calculation and then round the answer, gaining no marks. A few students were able to deal with the decimal value of 0.3 in the denominator by multiplying both the top and bottom of their fraction by 10. This is a useful skill for centres to continue teaching their students but in general dividing by decimals is a skill that needs more practice. Some students rounded 0.26 down to 0 which led to 48 ÷ 0 and were confused with what to do with the calculation.

Question 27

For part (a) there were many good attempts to expand the brackets but these attempts rarely resulted in credit being awarded. Common errors included $6x$ or $5x$ instead of $6x^2$ and incorrect signs being used. Those students using the grid method to expand the quadratic were usually successful at gaining at least 1 mark. In part (b) a small number of students were able to give a correct factorisation. Some students who gained B0 were able to give a pair of brackets with the product of the constants being -16, such as $(x + 2)(x - 8)$.

Summary

Based on the performance on this paper, students/centres should work on:

- measuring angles accurately.
- improving numeracy skills, including division skills for integers and decimals, multiplication skills for decimals.
- the interpretation of problems involving ratio.
- the formation of algebraic equations and solving them along with subsequent substitution to apply to problems in context.
- drawing a straight line graph by correctly calculating a table of values.
- using equilateral, isosceles and right-angled triangles to solve angle questions.
- encouraging students to show a full method for percentage calculation, noting that before method marks can be awarded a full explanation of each step has to be shown. If the answer is just stated then process marks will be lost if there are any arithmetic errors.
- encouraging students to set out their working using logical steps.
- encouraging students to read the question carefully so that they understand what they are required to do and what format the answer should be stated in.
- encouraging students to use approximations to check if their answers are sensible.
- encouraging students to set their work out in an orderly fashion.
- improving the expertise and accuracy required in geometric constructions.

and

- in questions requiring finding the prime factors of a number, encourage a more structured approach of dividing the number by the smallest prime numbers successively until the result was a prime number.
- ensure students know common metric equivalents from the specification, from one unit to another.
- practise arithmetic processes involving negative numbers.

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