AQA Qualifications

GCSE

MATHEMATICS (linear)

4365/1F

Mark scheme

4365

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Version 1.0 : Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available from aqa.org.uk

Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics 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.
Q	Marks awarded for quality of written communication.
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 for correct working following a mistake in an earlier step.
SC	Special case. Marks awarded for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. e.g. accept 0.5 as well as $\frac{1}{2}$
[*a*, *b*]	Accept values between *a* and *b* inclusive.
[*a*, *b*)	Accept values $a \leq$ value $< b$
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.

Examiners should consistently apply the following principles

Diagrams

Diagrams that have working on them should be treated like normal responses. If a diagram has been written on but the correct response is within the answer space, the work within the answer space should be marked. Working on diagrams that contradicts work within the answer space is not to be considered as choice but as working, and is not, therefore, penalised.

Responses which appear to come from incorrect methods

Whenever there is doubt as to whether a candidate has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the candidate. In cases where there is no doubt that the answer has come from incorrect working then the candidate should be penalised.

Questions which ask candidates to show working

Instructions on marking will be given but usually marks are not awarded to candidates who show no working.

Questions which do not ask candidates to show working

As a general principle, a correct response is awarded full marks.

Misread or miscopy

Candidates often copy values from a question incorrectly. If the examiner thinks that the candidate has made a genuine misread, then only the accuracy marks (A or B marks), up to a maximum of 2 marks are penalised. The method marks can still be awarded.

Further work

Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.

Choice

When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded but any incorrect answer or method would result in marks being lost.

Work not replaced

Erased or crossed out work that is still legible should be marked.

Work replaced

Erased or crossed out work that has been replaced is not awarded marks.

Premature approximation

Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

Paper 1 Foundation Tier

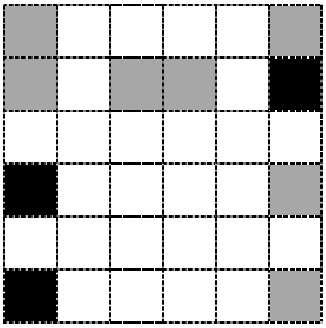
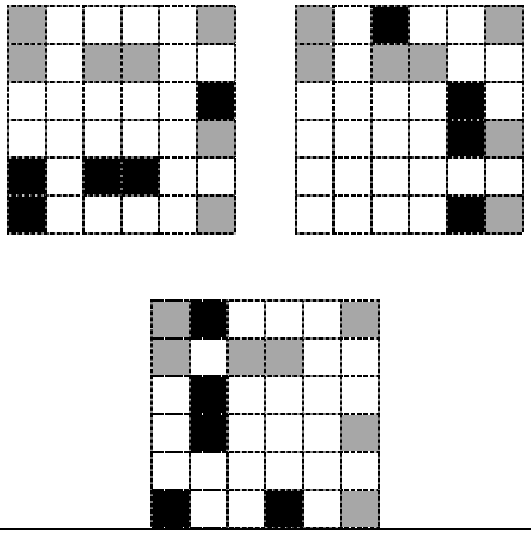
Q	Answer	Mark	Comments
1(a)	27	B1	
1(b)	20	B1	
1(c)	16	B1	
1(d)	13	B1	
2	7 in strawberry frequency column	B1	
	5 bar gate in tally for MCC	B1	
	Key = 2 people	B1	
	5 cones in vanilla and $2\frac{1}{2}$ cones in MCC	B1ft	correct or ft their key

Additional Guidance
Must use the 5 bar gate notation.
Ignore other tallies eg in the row for 30.
Mark intention for the half cone ie if it looks different then give bod since it's a hard symbol to draw.
Don't worry about alignment of symbols in the pictogram.
Allow key to be correctly modified to equivalent key.

3(a)	600	B1	
3(b)	900 – 860 or 860 + 40 = 900 or 40 or 0.9 – 0.86 or 0.86 + 0.04 = 0.9 or 0.04	M1	Condone 860 – 900 oe Condone incorrect or missing units
	40 grams or 0.04 kg	A1	SC1 940 g or 0.94 kg

Additional Guidance
If you see 860 + 40 = 900 but then further work to build up to eg 1800, mark the whole method and the only mark available is the SC1.
Once 40 g or 0.04 kg seen, ignore any attempt to change units.
40 g seen in working but then 40 on ans line – condone. M1A1

Q	Answer	Mark	Comments
4	**Alternative Method 1**		
	30 ÷ 2 ± 7 or 15 ± 7 or 15, 8 and 22 seen	M1	
	22	A1	SC1 for 8 as answer or seen in Box B
	Alternative Method 2		
	Clearly shows a number of oranges in box A and B that add to 30, subtracts 7 from the number on box A and adds to the number in Box B eg A 20 – 7 = 13, B 10 + 7 = 17	M1	
	22	A1	
5(a)	33	B1	
5(b)	16	B1	
5(c)	135	B1	

Q	Answer	Mark	Comments
6		B2	Mark bottom grid unless blank B1 for up to 5 squares shaded with at least 2 correct or B1 for any of these three patterns 
7(a)	$\frac{3}{4}$	B1	Must be a fraction
7(b)	$\frac{7}{10}$ or 70% or (75% of 10 =) 7.5	M1	Any indication eg 7 out of 10, 7 in 10, 7 and 10 seen
	No ticked **and** 70% or No ticked **and** two correct comparable fractions eg $\frac{28}{40}$ and $\frac{30}{40}$ or No ticked **and** 7.5 and 7	A1	oe eg No and he needs to win 8 (of the 10) but he's only won 7

Q	Answer	Mark	Comments
8	**Alternative Method 1**		
	278 ÷ 15 or Build up in 15s eg 15 + 15 ... or 15, 30, ... or Build down from 278 in 15s eg 278 – 15, ... or 278, 263, ...	M1	May build up or down in 30s, 45s or 90s
	18 (. ...) from a division method or Build up to 270 or at least 264 or Build down to 8 or at most 14	M1	Condone 18.8 for M2 Allow one error
	19	A1	Correct working eg 19 and 285 seen or 19 (and 18) and 270 seen or 19 and 18.5... seen or 19 and 18 remainder 8 seen
	Alternative Method 2		
	15 × 20 or 15 × 19 or 15 × 18	M1	
	15 × 18 = 270 or 15 × 19 = 285	M1	Allow an error of ± 14
	19	A1	Correct working eg 19 and 285 seen or 19 and 18 and 270 seen

Additional Guidance

Answer only of 19 M1M1A1

15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180, 195, 210, 225, 240, 255, 270, ...

278, 263, 248, 233, 218, 203, 188, 173, 158, 143, 128, 113, 98, 83, 68, 53, 38, 23, 8, ...

Q	Answer	Mark	Comments
9	**Alternative method 1**		
	45 × 4 or 180 or 0.45 × 4 or 1.8	M1	
	200 – their 180 or 20 or 2 – their 1.8 or 0.2(0)	M1dep	Subtraction may be implied by final total of coins
	10(p), 5(p), 2(p), 2(p), 1(p)	A1	
	Alternative method 2		
	200 – 45 or 155 or 2 – 0.45 or 1.55	M1	
	their 155 – 45 – 45 – 45 or 20 or their 1.55 – 0.45 – 0.45 – 0.45 or 0.2(0)	M1dep	Subtraction may be implied by final total of coins
	10(p), 5(p), 2(p), 2(p), 1(p)	A1	

Additional Guidance
Allow mixed or missing units for the M marks eg 2 – 180 M1 M1
Allow ambiguous units if recovers eg 2 – 1.8 = 0.20p followed by coins totalling 20p M1 M1 A1
Allow missing but not incorrect units on answer line
Allow MR of 2 or 3 pencils for first two marks

Q	Answer	Mark	Comments
10	Red = 0.3, Blue = 0.6, Yellow 0.1	B3	oe fractions, decimals or percentages B2 for P(B) = 2 × P(R) **and** total = 1 B2 for 3, 6, 1 seen **and** two correct probabilities B1 for P(B) = 2 × P(R) with both < 1 B1 for P(R) > P(Y) **and** total = 1 SC1 3, 6, 1 (may be in working) SC2 0.6, 0.3, 0.1 oe

Additional Guidance
Do not allow ratios for 2 or 3 marks but condone 3 : 10, 6 : 10 and 1 : 10 for SC1
Ignore probability words.
Ignore incorrect change of form or cancelling of fraction if correct probability seen.
Condone 3 and 0.3, 6 and 0.6, 1 and 0.1 seen in boxes for B3
If 3, 6, 1 in boxes but correct probabilities in working then allow B2

11(a)	$\frac{19}{7}$	B1	Must be a fraction
11(b)	$\frac{16}{24}$	B1	
11(c)	$\frac{9}{2}$ = 4.5	B1	
12(a)	9	B1	

Additional Guidance
Answer of 9 on answer line or clearly stated in script is the only acceptable answer
Do not allow embedded answers such as 6 × 9 =

Q	Answer	Mark	Comments
12(b)	$3y = 9 - 15$ or $3y = -6$ or $y = \frac{9}{3} - \frac{15}{3}$ or $y = 3 - 5$ or $(9 - 15) \div 3$	M1	oe
	–2	A1	

Additional Guidance
Embedded answer. M1 A0
T&I is M0 unless answer stated as -2 then it is full marks.

12(c)	$4w - 2w$ (= $2w$) or $7 - 2$ (= 5)	M1	oe
	$2w = 5$	A1	oe
	2.5 or $2\frac{1}{2}$ or $\frac{5}{2}$	A1ft	ft if M awarded and at most one error

Additional Guidance
Allow ft if equation written as $2w = a$ but **not** $a = 7$ or $a = 2$
or $bw = 5$ but **not** $b = 4$

$2w = 9$, $w = 4.5$ M1 A0 A1ft

$6w = 5$, $w = \frac{5}{6}$ or 0.83… M1 A0 A1ft

$6w = 9$ M0

$2w = 7$, $w = 3.5$ M1 A0 A0ft

$2w = 2$, $w = 1$ M1 A0 A0ft

$4w = 5$, $w = 1.25$ M1 A0 A0ft

Embedded answer M1 A1 A0

T&I is M0 unless answer stated as 2.5 then it is full marks

Q	Answer	Mark	Comments
13	**Alternative method 1**		
	Any valid conversion seen, eg 10 (cm) = 4 (inches) 25 (cm) = 10 (inches) 30 (cm) = 12 (inches)	M1	Numbers may be marked next to graph
	150 (cm) = 60 (inches) or 75 (inches) = [185, 190] (cm) or 75 : 150 = 1 : 2 and inch : cm = 1 : 2.5 or eg 150 ÷ 30 = 5 and 75 ÷ 12 = 6 .(...)	A1	May use any value [60, 75] (inches) correctly converted to cm to show it is not enough eg 70 inches = 175 cm
	Correct conclusion with appropriate values stated eg No and 60 or No and [185, 190] or No and each inch needs 2.5 cm and there are only 2	Q1ft	oe Strand (iii) Allow Q1ft if M1A0 awarded, an arithmetic error made in calculating conversion of 150 cm or 75 inches and a correct conclusion reached for their values. Must be using correct conversions throughout
	Alternative method 2		
	Divides 150 and 75 by a common factor of at least 5 eg 150 ÷ 10 = 15 and 75 ÷ 10 = 7.5	M1	
	Reads off accurately for one of their values eg 15 cm = 6 inches or Draws lines across and down accurately for both values	A1	
	Correct conclusion comparing their scaled value and graph value or comparing their pairs of lines	Q1ft	Strand (iii) Allow Q1ft if M1A0 awarded, an error made in reading value and correct conclusion reached for their values

Additional Guidance

Note that the list for Q1 are only examples, there are many other possible valid conclusions
eg1 70 inches = 175 cm so 150 cm is not enough
eg2 150 ÷ 30 = 5 and 75 ÷ 12 = 6 .(...) so No because need 6 times and only 5.
They must be using a correct conversion for all parts of their answer to qualify for the Q mark.
Allow arithmetic errors only.

Q	Answer	Mark	Comments
14(a)	[068, 072]	Q1	Strand (i)
14(b)	095	B1	If both answers are correct apart from missing the leading zeros in (a) and (b) eg answers 70 and 95, award 0, 1
15(a)	Correct straight line at least 2 vertical squares in length	B1	If drawn without a ruler must be within ±1mm of the actual line
15(b)	Correct straight line at least two 'diagonals' in length	B1	If drawn without a ruler must be within ±1mm of the points (1, 1), (2, 2) etc If the correct answers to both parts have been transposed, award B1 in this part
16(a)	Square, Kite and Rhombus	B2	Any order B1 any two correct
16(b)	Any valid property that distinguishes the parallelogram from the others eg no right angles diagonals different lengths	B1	Ignore any irrelevant comments but do not allow a wrong comment even if a correct one seen Any reference to line symmetry must state or imply zero

Additional Guidance
See list of exemplars

16(c)	Diagonals bisect each other	B1	
17	Anna Observation or 3 Brian Questionnaire or 1 Carl Controlled Experiment or 2	B2	B1 for 1 or 2 correct Accept any clear indication such as O, Obs, Experiment. If answer lines blank, allow correct names to be written alongside list above for B1 or B2 ie B(rian) by Questionnaire, C(arl) by controlled experiment, A(nna) by Observation

Q	Answer	Mark	Comments
18	**Alternative method 1**		
	Any product seen or implied of 2 numbers that make 12 or 15 or 20	M1	
	All three of 3, 4 and 5 stated or marked on diagram	M1dep	
	60	A1	Answer only of 60 with no product seen is 3 marks
	3 × 4 × 5 or correctly evaluated product of their 3 sides, 2 of which must be correct	Q1	Strand (ii) Product must be seen
	Alternative method 2		
	Any one of 3, 4 or 5 seen on diagram (correctly for the net) or any sides of cuboid	M1	
	Side found and corresponding cross-section identified	M1dep	
	60	A1	Answer only of 60 with no product seen is 3 marks
	Correct side and cross-section multiplied, ie 5 × 12 or 4 × 15 or 3 × 20	Q1	Strand (ii) Product must be seen

Additional Guidance
Beware of 60 from incorrect work.
No incorrect work and answer of 60 is 3 marks
1 side correct maximum 1 mark
2 sides correct maximum 2 marks
Use positive marking.

Q	Answer	Mark	Comments
19(a)	Overlapping responses eg If you did 1 hour which box would you tick?	B2	Any 2 of 3 for B2 Any 1 for B1
	No time frame eg Does not say in how long		
	Missing times eg Not enough time options		

Additional Guidance
Mark as a whole

Two correct statements and no wrong statements B2
Two correct statements and any wrong statements B1
One correct statement and one wrong statement B1
One correct statement and two or more wrong statement B0

eg **1** No place to mark 5 **2** Doesn't say in how many days B2

eg **1** No place to mark $1\frac{1}{2}$ or 5 **2** Doesn't say in how many days B1

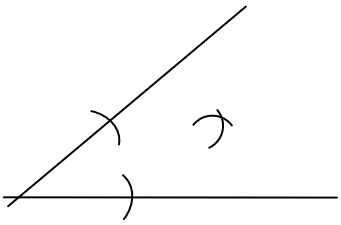
eg **1** No place to mark $1\frac{1}{2}$ **2** No place to mark 5 B1

eg **1** No place to mark $1\frac{1}{2}$ or 5 **2** BLANK B1

Beware of repeats
Ignore irrelevant statements
Do not accept references to question worded wrongly ie 'Do exercise not take it', 'Not referring to Leisure centre', 'Different types of exercise'. Ignore these as irrelevant even if not factually correct.
See list of exemplars

19(b)	Suitable response section covering 0 to 7, no gaps, no overlap, with at least 4 separate choices	B1	

Additional Guidance
Note that 5+ may have two meanings, ie ≥5 or >5. Allow whichever gives the mark if applicable.
'Other' is acceptable as a 'catch all' if not all 7 days listed, but not if 0 to 7 already covered, in which case it is overlap.

Q	Answer	Mark	Comments
20	Arc(s) centred on A of lengths within 1 cm of each other crossing both lines, and intersecting arcs centred on the intersection points 	M1	
	Angle bisector from A within tolerance	A1	Must score the M to get the A

Additional Guidance
Must see arcs on rays, ie no dots as can be measured with a ruler
Note that using bottom ray as length of arc will have just one arc about 2mm from end of oblique ray. This is same as 'two arcs'.

21(a)	LOBF drawn. Must be a straight line between (15, [110, 120]) to (25, [150, 170])	M1	
	Value read from LOBF at h = 145, may be rounded or truncated to nearest integer	A1ft	ft their line ± ½ square SC1 answer in range [21, 23] with M0 scored

Q	Answer	Mark	Comments
21(b)	Complete answer Correct substitution Correct evaluation and conclusion (See table) or $h = 4f + 60$ drawn and correct conclusion eg B is OK because on line	B2	B1 for correct substitution with incorrect evaluation and correct conclusion for their value B1 for correct substitution with partial evaluation and correct conclusion for their value if it had been evaluated B1 for correct substitution with correct evaluation and incorrect conclusion for their value B1 if $h = 4f + 60$ drawn

Person	Length	Value (calculated, stated)	Conclusion
A	11	104 (108)	No
B	25	160 (160)	Yes
C	18	132 (140)	No
D	28	172 (180)	No
E	15	120 (120)	Yes
F	21	144 (140)	No
G	17	128 (118)	No
H	26	164 (164)	Yes
I	13	112 (100)	No
J	24	156 (150)	No

22(a)	140 $4\frac{1}{2}$ or 4.5 or 4.50 or 4 h 30m 50	B3	B1 each Do not accept 4.30

22(b)	Indication that car X passes start at 15, 30, 45, 60 mins or Indication that car Y passes start at 20, 40, 60 mins or 15 for X and 20 for Y	M1	NB time in hours can score M1 ie ¼, ½, ¾ etc $\frac{1}{4}$ for X and $\frac{1}{3}$ for Y
	60	A1	Answer of 1 hour is M1, A0

Additional Guidance
60 from wrong work is zero marks but 60 from no work or no incorrect work is full marks

Q16b responses

Not all its angles are right angles B1 (implies one may be but allow as same as all angles of square and rectangle are 90)

Because it has different size angles B1 (odd one out as square and rec do not have different sized angles)

All edges of the square and rectangle are 90 ° whereas the parallelogram has corners less than 90° B1 (not saying all corners)

All the corners are not the same. B1

Its angles are not the same as a square or rectangle B1

They have equal angles B1 BOD (reference to rectangle and square)

All angles are not equal B1

All angles are equal in a square and a rectangle B1

Two of the lines are at a slant and it has no right angles B1 (not contradictory or wrong)

It has 2 pairs of parallel lines whereas the others have 2 pairs of perpendicular lines. B1 BOD (just enough to imply 90° angles)

No lines of symmetry. B1

Has no line of symmetry B1

It doesn`t have as many lines of cemetery. The others have 4 whereas it has 2. B0 (Wrong)

Because it has only 2 lines of symmetry whereas the others have more. Also it has no right angles B0 (wrong statement plus correct one)

The parallelogram has an irregular shape compared to the others. B0

Because the parallelogram is slanted B0

Because it does not have similar rotational symmetry to the rest. B0 (same rot sym as rectangle)

Only has one line of symmetry B0

The others have more than 1 line of symmetry B0 (implies parallelogram has one at least)

The square and rectangle both have two lines of symmetry but the parallelogram doesn't B0 (wrong)

It does not have two lines of symmetry B0

It doesn't have as many lines of symmetry as the other two B0

Because the parallelogram has diagonals down the side whereas the others have straight lines with no slant. B0

Because the interior angles are all different. B0 (not true)

Parallelogram does not have equal sides. B0

A parallelogram is a slanted form of rectangle. B0

It might not have equal angles. B0 (it does have equal angles)

A parallelogram may have unequal angles B0 (it does have)

Because it's a square pushed on its side B0

It has diagonal lines B0

It is slanted so all corners are different B0 (All corners are not different)

The sides are not all equal they are pushed over B0

Because the angles and sides can be different sizes/lengths. B0 (Not enough)

The parallelogram may not have any right angles B0 (it definitely does not)

Because it looks like a square but different angles B0

Q19a responses

The numbers collide 0-1,1-2. B1

Which one would you tick if you don`t do any exercise? B1

No box saying "other". B1

No days given. Hours written wrong B1

Not enough time options B1

Doesn't have enough range B1

Not specific to leisure centre. B0

Responses shouldn`t be in hours. B0

Consistency is non existent. B0

There would not be a never section as it is a leisure centre. B0

Not enough boxes B0