



GCSE Mathematics

Grades 2-3 Resource Non-Calc Test 1

Mark scheme

8300 Grades 2-3 Resource Non-Calc Test 1

Version: 1.0

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.

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.

If a student uses a method which is not explicitly covered by the mark scheme the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt.

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.
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.
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.
oe	Or equivalent. Accept answers that are equivalent. eg accept 0.5 as well as $\frac{1}{2}$
[a, b]	Accept values between a and b inclusive.
[a, b)	Accept values $a \leq \text{value} < b$
3.14...	Accept answers which begin 3.14 eg 3.14, 3.142, 3.1416
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 student has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the student. In cases where there is no doubt that the answer has come from incorrect working then the student should be penalised.

Questions which ask students to show working

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

Questions which do not ask students to show working

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

Misread or miscopy

Students often copy values from a question incorrectly. If the examiner thinks that the student 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.

Continental notation

Accept a comma used instead of a decimal point (for example, in measurements or currency), provided that it is clear to the examiner that the student intended it to be a decimal point.

Question	Answer	Mark	Comments
1	5×4 or 20	M1	oe
	18	A1	
2	$22 - 4$ or 18 or $22 \div 2$ or 11 or $4 \div 2$ or 2	M1	oe
	their $18 \div 2$ or their $11 - \text{their } 2$	M1dep	oe
	9	A1	may be seen on diagram SC1 20 or 14
	Additional Guidance		
	Ignore units or incorrect statements eg the lines are parallel		
	Condone poor notation eg $22 - 4 \div 2 = 9$		M1M1A1
	Embedded answer of 9		M1M1A0

Question	Answer	Mark	Comments
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3	All 3 correct matches	B3	B1 for each correct match
	Additional Guidance		
	Matching to more than one box on the right is choice for that match		
			B3

4	9	B1	
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Question	Answer	Mark	Comments
5	$\frac{1}{5} \times 30$ or $\frac{1}{8} \times 80$ or 10 or $\frac{5}{8} \times 80$	M1	oe
	6 or 50	A1	
	56	A1	SC2 54
	Additional Guidance		
	May be seen as a set of equivalent fraction numerators eg $\frac{1}{5} = \frac{6}{30}$ and $\frac{5}{8} = \frac{10}{16} = \frac{100}{160} = \frac{50}{80}$, $6 + 50 = 56$		M1A1A1
	eg $\frac{1}{5} = \frac{6}{30}$ and $\frac{5}{8} = \frac{10}{16} = \frac{100}{160} = \frac{50}{80}$, answer $\frac{56}{110}$		M1A1A0
	6 out of 30 or 50 in 80 56 out of 110	M1A1 M1A1A1	
	Up to M1 may be awarded for correct work, with no or incorrect answer, even if seen amongst multiple attempts		

Question	Answer	Mark	Comments
6	$96 \div 8$ or 12 or $8 \times 12 = 96$ or 96×5 or 480 or $96 \div 8 \times 5$ or $8 \div 5$ or 1.6 or $\frac{8}{5}$ or $5 \div 8$ or 0.625 or $\frac{5}{8}$	M1	oe
	60	A1	
	Additional Guidance		
	Build up method must be complete at least as far as, and must include, 96, but allow one error in the build up of 5s (oe) for M1 eg 8 16 24 32 40 48 56 64 72 80 88 96 5 10 15 20 25 30 35 45 50 55 60 65		M1 A0

Question	Answer	Mark	Comments
7	Alternative method 1		
	6×8 or 48 or 2^2 or 2×2 or 4	M1	may be on diagram
	$48 \div 4 = 12$ or $48 \div 12 = 4$ or $4 \times 12 = 48$ or $\frac{4}{48} (=) \frac{1}{12}$	A1	oe eg $48 \div 2 = 24$ and $24 \div 2 = 12$
	Alternative method 2		
	$6 \div 2$ or $2 \div 6$ or $8 \div 2$ or $2 \div 8$	M1	
	$3 \times 4 = 12$ or $\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$ with full working seen	A1	Need to justify where this product comes from with M1 work seen
	Alternative method 3		
	One row of 4 squares drawn or one column of 3 squares drawn	M1	Mark intention, not accuracy of drawing, 2m labels not required
	Rectangle split into 4 columns and 3 rows	A1	

Additional Guidance on the next page

7	Additional Guidance	
	$(2 \times 2 = 4, 6 \times 8 = 48 \text{ and}) 4 \text{ is } \frac{1}{12} \text{ of } 48$	M1A1
	4 12s are 48	M1A1
	$8 \times 6 = 48, 12 \div 48 = 4$ (cannot condone incorrect order as 'show that')	M1A0
	$\frac{4}{48}$ so correct	M1A0
	Beware 4 (or 12) arising from incorrect working eg $2 + 2 = 4, 8 + 6 = 14, 14 - 2 = 12$	M0A0
	$2 \times 2 + 2 \times 2 = 8$ (misconception on area of rug) cannot score for 2×2	M0A0
	$6 \times 8 = 48$ and $48 \times 2 = 96$ (ignore additional 'method' and give M1 for 48) $6 \times 8 = 48$ and $48 \div 2 = 24$ (ignore additional 'method' and give M1 for 48) $6 \times 8 \times 2$ (ignore additional 'method' and give M1 for 6×8)	M1A0
	$6 \times 8 = 48$ and $48 \div 2 \div 2 = 12$ (equivalent to dividing by 4)	M1A1
	Ignore references to perimeter or units if it is clear they are working out area	

8	Alternative method 1		
	8×2 or 16	M1	implied by $8 : 16$
	their $16 + 8$ or 24	M1dep	8×3
	48	A1	
	Alternative method 2		
	$(1 + 2 = 3)$ $3 + 3$ or 6	M1	
	their 6×8	M1dep	their 6 must be from $3 + 3$
	48	A1	
	Additional Guidance		
	Beware 24 coming from incorrect working eg Misread of 8 girls who do not sing in the show, leading to answer of 24	M1M1A0	

Question	Answer	Mark	Comments
9	2, 3, 4, 5 and 6 identified	M1	
	20	A1	
	Additional Guidance		
	Values are identified even if used in a wrong calculation eg $2 \times 3 \times 4 \times 5 \times 6$ or answer 23 456		
	20 is M1A1 unless clearly obtained from wrong working		
10	$\frac{17}{20}$	B2	B1 for $\frac{85}{100}$ oe fraction eg $\frac{850}{1000}$ B1 for their fraction correctly cancelled to simplest form
	Additional Guidance		
	On answer line $\frac{85}{100}$ and $\frac{17}{20}$ (either order) with or without an '='		B2
	$\frac{17}{20} = \frac{4}{5}$		B1
	If you only see $\frac{8.5}{10}$ or $\frac{42.5}{50}$ or $\frac{0.85}{1}$		B0

Question	Answer	Mark	Comments
11	$3 + 7$ or 10	M1	implied by 10 symbols or 6.2
	$62 \div \text{their } 10 \times 3$ or 6.2×3 or 18.6 or $62 \div \text{their } 10 \times 7$ or 6.2×7 or 43.4	M1dep	oe full method to work out either number
	18.6 or $\frac{93}{5}$ or $18\frac{3}{5}$ and 43.4 or $\frac{217}{5}$ or $43\frac{2}{5}$	A1	oe decimals, fractions or mixed numbers either order
	Additional Guidance		
	18.6 and 43.4 in working, but truncated or rounded to 18 or 19 and 43 on the answer line	M1M1A1	
	$62 = 10x$	M1	
	$\frac{x}{62} = \frac{3}{10}$ or $\frac{y}{62} = \frac{7}{10}$	M1	

Question	Answer	Mark	Comments
12	Alternative method 1 – algebra based on Sunita's age		
	5×3 or 15	M1	may be implied by their algebraic total of the three ages being divided by 3
	$x - 1$ or $2x$ or $4x - 1$	M1	oe expressions any letter throughout
	$x + \text{their } (x - 1) + \text{their } 2x = \text{their } 15$ or $4x - 1 = \text{their } 15$	M1dep	oe equation eg $\frac{x + x - 1 + 2x}{3} = 5$ dep on M1M1
	$(x =) 4$	M1dep	correct solution to their equation if the solution has a decimal part allow truncation or rounding to the nearest whole number
	8	A1	
	Alternative method 2 – algebra based on Joel's age		
	5×3 or 15	M1	may be implied by their algebraic total of the three ages being divided by 3
	$\frac{y}{2}$ or $\frac{y}{2} - 1$ or $2y - 1$	M1	oe expressions any letter throughout $2y - 1$ must not come from $y + y - 1$
	$y + \text{their } \frac{y}{2} + \text{their } (\frac{y}{2} - 1) = \text{their } 15$	M1dep	oe equation eg $\frac{y + \frac{y}{2} + \frac{y}{2} - 1}{3} = 5$ dep on M1M1
	$2y + \text{their } y + \text{their } (y - 2) = 2 \times \text{their } 15$ or $4y - 2 = 30$ or $2y - 1 = 15$	M1dep	their equation with no denominator
	8	A1	

Question 24 continues on the next page

Question	Answer	Mark	Comments
12 cont	Alternative method 3 – trial and improvement		
	5×3 or 15	M1	may be implied by their total of the three ages being divided by 3
	Trial of three numbers which fit the criteria, with either their sum correctly evaluated or their sum divided by 3	M1	eg $2 + 1 + 4 = 7$ or $(2 + 1 + 4) \div 3$ condone missing brackets
	Second trial of three numbers which fit the criteria, with either their sum correctly evaluated or their sum divided by 3	M1dep	dep on previous M1 eg $3 + 2 + 6 = 11$ or $(3 + 2 + 6) \div 3$ condone missing brackets
	4, 3 and 8 selected as their final combination	M1dep	any order implies M4
	8	A1	
	Additional Guidance		
	Up to M4 may be awarded for correct work seen in multiple attempts even if not subsequently used		
	Correct expressions, but the sum of the three ages is equated to 5 eg $4x - 1 = 5$		M0M1M0M0A0
	In alt 1, the correct value of x or the correct age for Joel for their two terms for Beth and Joel, with one correct, implies the first 4 marks eg x and $x + 1$ and $2x$, with $x = 3.5$ or answer 7		M1M1M1M1A0
	In alt 2, the correct value of y for their two terms for Sunita and Beth, with one correct, implies the first 4 marks eg y and $\frac{y}{2}$ and $(\frac{y}{2} + 1)$, with $y = 7$ or answer 7		M1M1M1M1A0
	In alt 1 and alt 2, condone missing brackets in equations if not recovered for up to M1M1M1 eg $x + x - 1 + 2x \div 3 = 5$ not recovered		M1M1M1M0A0

Question	Answer	Mark	Comments
13	$\frac{6}{18}$ or Converts both fractions to an appropriate common denominator with at least one correct numerator	M1	eg $\frac{33}{54}$ and $\frac{18}{54}$
	$\frac{5}{18}$	A1	oe fraction eg $\frac{15}{54}$ SC1 $\frac{17}{18}$ (oe fraction)
	Additional Guidance		
	Ignore incorrect attempt to simplify after correct answer seen		
	$\frac{22}{30}$ and $\frac{10}{30}$ not an appropriate denominator		M0

Question	Answer	Mark	Comments
14	Any correct product of 36 using a prime factor	M1	2 and 18 2 and 2 and 9 3 and 12 3 and 3 and 4 2 and 3 and 6 May be on a factor tree or repeated division
	2 and 2 and 3 and 3	A1	oe May be on a factor tree or repeated division
	$2^2 \times 3^2$ or $3^2 \times 2^2$	A1	
	Additional Guidance		
	Allow any number of 1s included as factors for up to M1A1 only		
	$1 \times 2^2 \times 3^2$		M1A1A0
	$2^2, 3^2$		M1A1A1
	$2 + 2 + 3 + 3$		M1A1A0
	$2^2 + 3^2$		M1A1A0
	$2^2 3^2$ or $2^2, 3^2$		M1A1A0
	$2 \times 2 \times 3 \times 3$ and $2^2 \times 3^2$ on answer line but $2 \times 2 \times 3 \times 3 = 2^2 \times 3^2$ on answer line		M1A1A0 M1A1A1
	$2^2 \times 3^2 = 6^4$		M1A1A0
	6×6 with no prime factorisation		M0A0A0

Question	Answer	Mark	Comments
15	Alternative method 1		
	Angle $DAB = 70$	B1	may be on diagram
	Angle $ABC = 360 - \text{their } 70 - 90 - 120$ or Angle $ABC = 80$	M1	may be on diagram
	Valid reason	A1	eg $180 - 80 = 100$ $80 + 100 = 180$ angles on a straight line add to 180 $(360 - 80 - 80)/2 = 100$
	Alternative method 2 working backwards from $x = 100$		
	Angle $ABC = 180 - 100$ or Angle $ABC = 80$	M1	may be on diagram
	Angle $DAB = 360 - \text{their } 80 - 90 - 120$ or Angle $DAB = 70$	M1dep	may be on diagram
	Valid reason	A1	eg opposite angles are equal vertically opposite angles (are equal) $180 - 70 = 110$ and $180 - 110 = 70$
	Additional Guidance		
	Incorrect angles seen anywhere around A or B cannot score the A1		

Question	Answer	Mark	Comments
16	$\frac{5}{6} \times 96$ or 80	M1	oe eg $96 \div 6 \times 5$ implied by 176
	$\frac{1}{4} \times$ their 80 or 20	M1dep	oe eg $80 \div 4$
	$\frac{2}{3} \times 96$ or 64	M1	oe eg $96 \div 3 \times 2$ accept 0.66 or better for $\frac{2}{3}$
	84(.00)	A1	SC2 100.8(0) or [77.32, 77.34] condone incorrect money notation eg 84.0 or 84.00p
	Additional Guidance		
	SC2 for 100.8(0) is from misreading as Andrew gets £96		
	SC2 for [77.32, 77.34] is from $\frac{2}{3}$ of 80 plus $\frac{1}{4}$ of 96		
	Do not accept ' $\frac{5}{6}$ of 96' or ' $\frac{1}{4}$ of 80' or ' $\frac{2}{3}$ of 96' for M marks unless accompanied by a correct method or value		
17	5	B1	
	Additional Guidance		
	Condone $10 - 5 = 5$		B1
	Condone $x = 5$		B1
	$\frac{10}{2}$		B0
17(b)	-10	B1	