



GCSE Mathematics

Grades 2-3 Resource Calc Test 2

Mark scheme

8300 Grades 2-3 Resource Calc Test 2

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(a)	$1020 \div 5 (\times 2)$ or $204 (\times 2)$	M1	oe
	408	A1	SC1 612
	Additional Guidance		
	$\frac{408}{1020}$ on answer line		M1A0
	Condone 408 out of 1020		M1A1
	For 0.4×1020 , accept $40\% \times 1020$ but do not accept 40% of 1020 unless recovered		
1(b)	$\frac{4}{7}$	B1	oe fraction
	Additional Guidance		
	Conversion to decimal or percentage		B0
2	32	B1	
3	0.8	B1	
	Additional Guidance		

Question	Answer	Mark	Comments
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4	Pair of numbers satisfying all criteria	B2	B1 pair of numbers satisfying two criteria eg $c = 20$ $d = 14$ or $c = 7$ $d = 0$
	Additional Guidance		
	c and d can be decimals eg $c = 8.6$ $d = 2.6$		B2
	Correct integer values for B2 $c = 9$ $d = 3$ $c = 8$ $d = 2$ $c = 7$ $d = 1$ $c = 6$ $d = 0$ $c = 5$ $d = -1$		
	Examples of correct integer values for B1 $c = 10$ $d = 4$ $c = 4$ $d = -2$		

5	13	B1	
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6	8×25 or 200 or 25^2 or 625	M1	oe
	8×25 or 200 and $25^2 - b$ or $625 - b$ or $25^2 - 8 \times 25$ or $625 - 200$	M1dep	oe may be seen in an equation
	425	A1	
	Additional Guidance		
	Embedded answer		M1M1A0

Question	Answer	Mark	Comments
7	Alternative method 1		
	$3115 \div 6.23$ or 500	M1	3115×0.028 or 87.22
	their 500×0.028	M1dep	their $87.22 \div 6.23$
	14	A1	
	Alternative method 2		
	$6.23 \div 0.028$ or 222.5	M1	$6.23 \div 3115$ or 0.002 or $\frac{1}{500}$
	$3115 \div$ their 222.5	M1dep	$0.028 \div$ their 0.002 or $0.028 \div$ their $\frac{1}{500}$
	14	A1	
	Alternative method 3		
	$0.028 \div 6.23$ or 0.00449(...) or 0.0045 or $\frac{2}{445}$	M1	
	$3115 \times$ their 0.00449(...) or 3115×0.0045 or $3115 \times$ their $\frac{2}{445}$	M1dep	
	14	A1	
	Additional Guidance		
	500×0.028 and 14×0.028	M1M1A0	
	500×0.028 and 14^3	M1M1A0	
	500×0.028^3	M1M0	

Question	Answer	Mark	Comments
8	Alternative method 1		
	Subtracts 17, 34, 51 or 68 from 84 or subtracts any multiple of 3 from 84 or subtracts any three equal positive whole numbers from 84	M1	implied by 67, 50, 33 or 16 or implied by a multiple of 17 plus three positive whole numbers that sum to 84 or implied by a multiple of 3 and another positive whole number that sum to 84 or implied by four positive whole numbers, three of which are equal, that sum to 84
	Subtracts 17, 34, 51 or 68 from 84 and then divides by 3 or subtracts any multiple of 3 from 84 and then divides by 17 or subtracts any three equal positive whole numbers from 84 and then divides by 17	M1dep	implied by 22.3(...), 16.6(...) or 16.7, 11 or 5.3(...)
	51, 11, 11, 11	A1	any order
	Alternative method 2		
	A correctly evaluated trial using addition of a multiple of 17 and three equal positive whole numbers or addition of a multiple of 17 and a multiple of 3	M1	
	A different correctly evaluated trial using addition of a multiple of 17 and three equal positive whole numbers or addition of a multiple of 17 and a multiple of 3	M1dep	
	51, 11, 11, 11	A1	any order

Additional Guidance is on the next page

8 cont	Additional Guidance	
	Answer of 51 and 11 with indication of three 11s in working	M1M1A1
	Answer line blank with 51 and three 11s indicated as their four numbers	M1M1A1
	Answer line blank with 51 and three 11s in working	M1M1A0
	Answer of 51 and 11 with no indication of three 11s in working	M1M1A0
	34, 20, 20, 10 implies first method mark as a multiple of 17 plus three positive whole numbers that sum to 84	M1M0

Question	Answer	Mark	Comments
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9	50×2 or 100	M1	
	80	A1	SC1 120 or 5 or 60
	Additional Guidance		
	80, 50, ... on answer line		M1A1
	80, 50, ... in working with answer line blank		M1A1
	80, 50, ... in working with 35 on answer line		M1A0
	$80 + 20 \div 2 = 50$ without answer 80 (embedded answer)		M1A0

Question	Answer	Mark	Comments
10	Alternative method 1		
	900 ÷ 600 or 1.5	M1	oe implied by 4.30 (pm) or 16.30
	(8 – 3) – their 1.5 or 5 – their 1.5 or 3.5	M1dep	oe
	their 3.5 × 720	M1dep	oe
	2520	A1	
	Alternative method 2		
	$900 \div \frac{600}{60}$ or 900 ÷ 10 or 90	M1	oe implied by 4.30 (pm) or 16.30
	(8 – 3) – (their 90 ÷ 60) or 5 – (their 90 ÷ 60) or 3.5 or (8 – 3) × 60 – their 90 or 5 × 60 – their 90 or 210	M1dep	oe
	their 3.5 × 720 or their 210 × 720 ÷ 60	M1dep	oe
	2520	A1	
	Additional Guidance		
	Condone 3:30 or 3.30 for 3.5(hours)	M1M1	
	Condone 1:30 or 1.30 for 1.5(hours)	M1	

Question	Answer	Mark	Comments
11	9.5×100 or 950 or $20 \div 100$ or 0.2 or $2 \times 20 \div 100$ or 0.4	M1	oe 930 implies 950 9.3 implies 0.2
	their $950 - 2 \times 20$ or their $950 - 40$ or 910 or $9.5 - 2 \times \text{their } 0.2$ or $9.5 - \text{their } 0.4$ or 9.1	M1dep	oe eg $950 - 20 - 20$ oe eg $9.5 - \text{their } 0.2 - \text{their } 0.2$
	910 cm or 9.1 m	A1	oe
	Additional Guidance		
	Up to M2 may be awarded for correct work, with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	9 m 10 cm on answer line		M1M1A1
	Units may be seen in working but must be seen with the correct value eg 910 on answer line with 910 cm seen in working		M1M1A1
	$9.5 - 2 \times 20 = 910$ centimetres or 9.1 metres		M1M1A1
	$9.5 - 2 \times 20 = 910$ or 9.1		M1M1A0
	Do not ignore further incorrect conversion after correct answer seen eg $910 \text{ cm} = 91 \text{ m}$		M1M1A0

Question	Answer	Mark	Comments
12	Rectangle: 4	B1	
	Triangle: $0.5 \times ? \times 16 = 24$ or $(2 \times) 24 \div 16$ or $(2 \times) 1.5$ or 2×24 or 48	M1	oe
	3	A1	
	Additional Guidance		
	Ignore any units given		
13	$0.5 \times 9 \times 5.6$	M1	oe
	25.2	A1	
	Additional Guidance		
	25 on answer line with 25.2 in working		M1A1
	25 on answer line with no or incorrect working		M0
14	41, 43 and 47	B2	B1 at least two of 41, 43 and 47 with at most one other number

Question	Answer	Mark	Comments
15	Alternative method 1		
	2450 ÷ (2 + 5) or 2450 ÷ 7 or 350	M1	oe
	their 350 × 5 or 1750 or their 350 × 2 or 700 or their 350 ÷ 4 or 87.5(0)	M1dep	oe 2450 × $\frac{5}{7}$ is M2 2450 × $\frac{2}{7}$ is M2 2450 ÷ 28 is M2
	their 1750 ÷ 4 or (2450 – their 700) ÷ 4 or their 87.5(0) × 5 or 437.5(0)	M1dep	oe dep on M2 350 × $\frac{5}{4}$ is M3
	437.5(0) and Yes	A1	accept 437.5(0) > 430
	Alternative method 2		
	2450 ÷ 4 or 612.5(0)	M1	oe
	their 612.5(0) ÷ (2 + 5) or their 612.5(0) ÷ 7 or 87.5(0)	M1dep	oe 2450 ÷ 28 is M2
	their 87.5(0) × 5 or their 612.5(0) – their 87.5(0) × 2 or 437.5(0)	M1dep	oe dep on M2 612.5(0) × $\frac{5}{7}$ is M3
	437.5(0) and Yes	A1	accept 437.5(0) > 430

Question	Answer	Mark	Comments
16	$\frac{1}{4}$, $\frac{4}{10}$, 0.404, 44% with no incorrect conversions Accept values in any correct format	B2	B1 two correct conversions to decimals or two correct conversions to percentages or two correct fractions with common denominators
	Additional Guidance		
	Condone missing percentage signs		
	0.25, 0.4, 0.404, 0.44		B2
	25%, 40%, 40.4%, 44%		B2
	25%, $\frac{2}{5}$, 0.404, 44% with no other working (all correct, even though in different formats)		B2
	$\frac{1}{4}$, $\frac{4}{10}$, 0.404, 44% with no working		B2
	$\frac{1}{4}$, $\frac{4}{10}$, 0.404, 44% with conversions to 25%, 40%, 40.04% (one incorrect conversion)		B1
	25%, 40%, 40.04% (two correct conversions)		B1
	44%, 0.404, $\frac{4}{10}$, $\frac{1}{4}$ (in reverse order) with no working for B1		B1

Question	Answer	Mark	Comments
17	$360 \div 9 (= 40)$ and $40 \times 7 = 280$ or $360 \div 9 (= 40)$ and $40 \times 2 (= 80)$ and $80 + 280 = 360$ or $40 \times 2 (= 80)$ and $40 \times 7 (= 280)$ and $80 + 280 = 360$ or $280 \div 7 (= 40)$ and $40 \times 9 = 360$ or $2:7 = 80:280$ and $80 + 280 = 360$ or $360 - 280 (= 80)$ and $80:280 = 2:7$	B2	oe B1 $360 \div 9$ or $280 \div 7$ or 40 oe or $\frac{2}{9}$ or $\frac{7}{9}$ or $360 - 280$ or 80 oe
	Additional Guidance		
	80 and 280 shown on the diagram is not oe for $80 + 280 = 360$		
	$360 \div 9 \times 7 = 280$		B2
	$360 \div 9$ and 40×2 and $2:7 = 80:280$		B2
	$360 \div 9 = 40$ and $2:7 = 80:280$ (40×2 or 40×7 missing)		B1
	$40 \times 7 = 280$ without $360 \div 9$ eg $40 \times 7 = 280$ and $80 + 280 = 360$ ($360 \div 9 = 40$ or 40×2 missing)		B1
	$80:280$ and $80 + 280 = 360$ ($2:7 = 80:280$ missing)		B1
	$360 \div 9 = 40$ and $80 + 280 = 360$ (40×2 or 40×7 missing)		B1
	$280 \div 7 = 40$ and $360 - 280 = 80$ (40×2 or 40×9 missing)		B1
	$280 \div 7$ and 40×2 and $80:280 = 2:7$ ($80 + 280 = 360$ missing)		B1
	$80 + 280 = 360$		B1

Question	Answer	Mark	Comments
18	Alternative method 1		
	$360 \div 180$ or 2	M1	implied by a correct angle or implied by a correctly drawn angle in pie chart $\pm 2^\circ$
	Any two of $45 \times \text{their } 2$ or 90° $75 \times \text{their } 2$ or 150° $50 \times \text{their } 2$ or 100° $10 \times \text{their } 2$ or 20°	M1dep	implied by any two correctly drawn angles in pie chart $\pm 2^\circ$
	Pie chart with four sectors drawn, two of which are correctly drawn with angles from 90° , 150° , 100° and 20°	M1dep	$\pm 2^\circ$ lines must be ruled
	Fully correct pie chart and sectors labelled with flavours	A1	$\pm 2^\circ$ lines must be ruled

Mark scheme for Question 18 continues on next page

Question	Answer	Mark	Comments
18 cont	Alternative method 2		
	$45 \div 180 \times 100$ or 25% or $75 \div 180 \times 100$ or $41\frac{2}{3}\%$ or 42% or $50 \div 180 \times 100$ or $27\frac{7}{9}\%$ or 28% or $10 \div 180 \times 100$ or $5\frac{5}{9}\%$ or 6%	M1	oe
	Any two of $45 \div 180 \times 360$ or 90° $75 \div 180 \times 360$ or 150° $50 \div 180 \times 360$ or 100° $10 \div 180 \times 360$ or 20°	M1dep	implied by any two correctly drawn angles in pie chart $\pm 2^\circ$
	Pie chart with four sectors drawn, two of which are correctly drawn with angles from 90° , 150° , 100° and 20°	M1dep	$\pm 2^\circ$ lines must be ruled
	Fully correct pie chart and sectors labelled with flavours	A1	$\pm 2^\circ$ lines must be ruled
	Additional Guidance		
	All four sectors must be correctly labelled with letters or words for the accuracy mark		

Question	Answer	Mark	Comments
19	6, 15, 24, 60 in any order	B2	B1 for 6, 15, 24, 60 with no more than one additional value or three correct values with no more than one incorrect value
	Additional Guidance		
	Ignore repeated values for B2 and B1		
	6, 10, 15, 24, 60		B1
	6, 10, 15, 24		B1
	6, 10, 15, 24, 36		B0
	$2 \times 3, 5 \times 3, 2 \times 12, 5 \times 12$		B0
	$6xy, 15xy, 24xy, 60xy$		B0