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Functional Skills Level 2
MATHEMATICS
8362/2

Paper 2 Calculator

Mark scheme

January 2020

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 Examiner.

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.

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 $a \leq$ 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.

Section A

Q	Answer	Mark	Comments
1	C	B1	accept plan circled
	Additional Guidance		

Q	Answer	Mark	Comments
2	(3 , –2)	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
3	1670 × 0.27 or 450.9 or 1670 × 1.27	M1	oe
	2120.9	A1	
	Additional Guidance		
	Build up methods need to be shown in full or be correct to access the method mark		

Q	Answer	Mark	Comments
4	Horizontal line from 40 to the line	M1	oe eg reads across from 20 and multiplies by 2 implied by mark at correct point on line or horizontal axis
	18	A1	
	Additional Guidance		
	18 with no, or incorrect, working on graph		M1A1

Q	Answer	Mark	Comments
5	$4\frac{11}{20}$	B1	oe eg $\frac{91}{20}$ or 4.55
	Additional Guidance		

Q	Answer	Mark	Comments
6	0.375 in middle row	B1	
	$\frac{3}{20}$ in bottom row	B1	oe fraction eg $\frac{15}{100}$ SC1 correct answers reversed
	Additional Guidance		
	Two correct values in a cell, eg $\frac{15}{100} = \frac{3}{20}$		B1
	Two values in a cell, one of which is incorrect eg $\frac{15}{100} = \frac{1}{6}$		B0

Q	Answer	Mark	Comments
7	**Alternative method 1**		
	37 × 42 or 1554 or 0.5 × 37 × (71 – 42) or 536.5	M1	oe must be a correct method for either the rectangle or triangle
	37 × 42 + 0.5 × 37 × (71 – 42) or 1554 + 536.5	M1	oe eg may be done in stages
	2090.5	A1	
	Alternative method 2		
	37 × 71 or 2627 or 0.5 × 37 × (71 – 42) or 536.5	M1	oe must be a correct method for either the rectangle or triangle
	37 × 71 – 0.5 × 37 × (71 – 42) or 2627 – 536.5	M1	oe eg may be done in stages
	2090.5	A1	
	Alternative method 3		
	0.5 × (42 + 71) or 56.5	M1	oe
	0.5 × (42 + 71) × 37 or 56.5 × 37	M1	oe
	2090.5	A1	
	Additional Guidance		
	Ignore subsequent rounding or truncation once 2090.5 seen		

Section B

Q	Answer	Mark	Comments
8(a)	**Alternative method 1**		
	15 000 × 5 or 75 000 and 45 000 × 9 or 405 000 and 75 000 × 12 or 900 000 and 105 000 × 4 or 420 000	M1	may be seen in the table condone consistent use of lower or upper boundaries for this mark condone one omission or error (of any nature)
	(15 000 × 5 + 45 000 × 9 + 75 000 × 12 + 105 000 × 4) or (75 000 + 405 000 + 900 000 + 420 000) or 1 800 000	M1	oe must be using mid-class values condone one error in fx's
	1 223 600 ÷ 23 or 53 200 and their 1 800 000 ÷ 30 or 60 000 or their 1 800 000 ÷ 30 × 23 or 1 380 000	M1dep	dep on M2
	60 000 and 53 200 and (company) A or 1 380 000 and (company) A	A1	

Mark scheme and additional guidance continue on next page

8(a)	**Alternative method 2**		
	15 000 × 5 or 75 000 and 45 000 × 9 or 405 000 and 75 000 × 12 or 900 000 and 105 000 × 4 or 420 000	M1	may be seen in the table condone consistent use of lower or upper boundaries for this mark condone one omission or error (of any nature)
	(15 000 × 5 + 45 000 × 9 + 75 000 × 12 + 105 000 × 4) or (75 000 + 405 000 + 900 000 + 420 000) or 1 800 000	M1	oe must be using mid-class values condone one error in fx's
	1 223 600 ÷ 23 × 30 or 1 596 000	M1	
	1 800 000 and 1 596 000 and (company) A	A1	

	Additional Guidance	
	If work is in the table and they start again in the working space, mark the work that leads to their answer. If there is no answer then apply the usual rules of choice.	

Q	Answer	Mark	Comments
8(b)	$\frac{34}{53}$	B1	oe fraction, decimal or percentage eg 0.64(1)… or 64(.1…)%
	Additional Guidance		
	Ignore subsequent cancelling or conversion to decimal or percentage once 34/53 has been seen		
	Ignore additional probability words such as likely, etc		
	Do not accept ratio or expressions such as 34 out of 53		

Q	Answer	Mark	Comments
8(c)	$\frac{9}{53}$	B1	oe fraction decimal or percentage eg 0.1698… or 0.17 or 16.98(…)% or 17% SC1 $\frac{34}{n}$ in 8(b) and $\frac{9}{n}$ in 8(c), where $34 < n < 64$
	Additional Guidance		

Q	Answer	Mark	Comments
8(d)	36 000 ÷ 75 or 480 or 75 × 1460 or 109 500	M1	oe
	(36 000 ÷ 75) ÷ 1460 (× 100) or 36 000 ÷ (75 × 1460) (× 100) or 0.32(8..) (× 100) or 0.329 (× 100) or 0.33 (× 100)	M1dep	oe
	32 or 32.(8…) or 32.9 or 33	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
9(a)	300 ÷ (3 + 2) or 60	M1	$\frac{300}{(3+2)} \times 3 \times 240 \div 1000$ gains M4 steps may be done in any order
	their 60 × 3 or 180	M1	
	their 180 × 240 or 43 200	M1	
	their 43 200 ÷ 1 000 or 43 kg 200(g)	M1	
	43.2	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
9(b)	$9 \times 2.8^2 \times \pi$ or [221.4, 221.7] or $9 \div 6$ or 1.5	M1	volume
	their [221.4, 221.7] ÷ 6 or their $1.5 \times 2.8^2 \times \pi$ or [36.9, 37]	M1	division by 6
	425×1000 or 425 000 or 1000 ÷ their [36.9, 37] or [27, 27.1]	M1	multiplies by 1000
	their 425 000 ÷ their [36.9, 37] or 425 × their [27, 27.1]	M1	division of water by volume of water in each tin their 425 000 must be digits 425
	[11 475, 11 518]	A1	
	Additional Guidance		
	Using $2 \pi r$ instead of πr^2 may score up to M0 M1 M1 M1 A0		
	[16100, 16114] from using $2 \pi r$ =158.256, 158.256 ÷ 6 = 26.376 then 425 000 ÷ 26.376 implies 3 marks		
	[2683, 2684] from using $2 \pi r$ =158.256, then 425 000 ÷ 158.256 implies 2 marks		
	[2.683, 2.684] from using $2 \pi r$ =158.256, then 425 ÷ 158.256 implies 1 mark		
	Missing out 9 for the volume of the cylinder may score up to M0 M1 M1 M1 A0		
	Allow up to M2 even if not subsequently used		
	Further work after [11 475, 11 518] M4 A0		

Q	Answer	Mark	Comments
10(a)	**Alternative Method 1**		
	589 + 186 + 65 + 87.50 or 927.5(0)	M1	
	their 927.5(0) × 12 or 11 130	M1dep	
	8700 + 4800 – their 11 130	M1dep	oe
	2370	A1	
	Alternative method 2		
	589 × 12 or 7068 or 186 × 12 or 2232 or 65 × 12 or 780 or 87.5(0) × 12 or 1050	M1	
	589 × 12 + 186 × 12 + 65 × 12 + 87.5(0) × 12 or 7068 + 2232 + 780 + 1050 or 11 130	M1dep	
	8700 + 4800 – their 11 130	M1dep	oe
	2370	A1	
	Alternative method 3		
	589 + 186 + 65 + 87.50 or 927.5(0)	M1	
	(8700 + 4800) ÷ 12 or 1125	M1	oe
	(their 1125 – their 927.50) × 12	M1dep	dep on M1M1
	2370	A1	
	Additional Guidance		
	2370 followed by answer 11130 gains M2 only		

<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="6">10(b)</td><td>1.015 seen or implied</td><td>M1</td><td>implied by any annual value
eg 2030 or 2060.45 etc</td></tr>
<tr><td>2000×1.015^7
or [2219.67, 2219.70]</td><td>M1dep</td><td>oe</td></tr>
<tr><td>[2219.67, 2219.70] to 2 dp</td><td>A1</td><td></td></tr>
<tr><td colspan="3">Additional Guidance</td></tr>
<tr><td colspan="2">Working out values by year gives
<table>
<tr><th>Year</th><th>Age</th><th>Amount (£)</th></tr>
<tr><td>1</td><td>15</td><td>2030</td></tr>
<tr><td>2</td><td>16</td><td>2060.45</td></tr>
<tr><td>3</td><td>17</td><td>[2091.35, 2091.36]</td></tr>
<tr><td>4</td><td>18</td><td>[2122.72, 2122.73]</td></tr>
<tr><td>5</td><td>19</td><td>[2154.56, 2154.58]</td></tr>
<tr><td>6</td><td>20</td><td>[2186.87, 2186.90]</td></tr>
<tr><td>7</td><td>21</td><td>[2219.67, 2219.70]</td></tr>
</table></td><td></td></tr>
<tr><td colspan="2">Going to the 8th year (answer ≈ 2252.99) scores a maximum of M1</td><td></td></tr>
<tr><td colspan="2">2000 + 210 or 2210 implies M1</td><td></td></tr>
<tr><td colspan="2">210 on its own is M0</td><td></td></tr>
</table>

Q	Answer	Mark	Comments
11(a)	$6 \times \sqrt{\left(\frac{6.4}{4}\right)^2 + \left(\frac{5.5}{2}\right)^2}$ or $6 \times [3.18, 3.2]$	M1	oe substitute values into formula
	[19.08, 19.2]	A1	
	$4 \times 100 \div$ their [19.08, 19.2] or $4 \div$ (their [19.08, 19.2] $\div 100$)	M1dep	dep on 1st M mark
	[20.8, 20.97]	A1ft	ft their [19.08, 19.2]
	20	B1ft	correct truncation from their [20.8, 20.97] ft their [20.8, 20.97], must be a value with at least 1 decimal place
	Additional Guidance		
	20 with no working		zero
	When substituting into the formula condone missing brackets if recovered		
	Eg Correct substitution into the fomula evaluated to 19.089… followed by answer 19 gains M1 A1 M0 A0 B1ft		
	Eg Correct substitution into the fomula without showing 19.089… followed by answer 19 gains M1 A1 M0 A0 B1ft		
	Eg Correct substitution into the fomula evaluated to 19.089… followed by truncation to 19 then 400 ÷ 19 evaluated to 21.05… (which may not be shown) with answer 21 gains M1 A1 M1 A0ft B1ft		

Q	Answer	Mark	Comments
11(b)	**Alternative method 1**		
	$1 - \frac{2}{11}$ or $\frac{9}{11}$	M1	oe fractions
	their $\frac{9}{11} \div (2 + 1)$ or $\frac{3}{11}$	M1dep	oe eg $\frac{9}{33}$
	their $\frac{3}{11} \times 2$	M1dep	oe
	$\frac{6}{11}$	A1	oe fraction eg $\frac{18}{33}$
	Alternative method 2		
	Chooses a multiple of 11 as the number of pendants and finds the number of red pendants or total of blue and yellow pendants	M1	eg 22 chosen and $22 \times \frac{2}{11} = 4$
	Finds the number of yellow pendants for their chosen multiple of 11	M1dep	eg 22 chosen and $(22 - 4) \div (2 + 1) = 6$
	Finds the number of blue pendants for their chosen multiple of yellow	M1dep	eg 22 chosen and $(22 - 4) \div (2 + 1) \times 2 = 12$
	$\frac{6}{11}$	A1	oe fraction eg $\frac{12}{22}$
	Additional Guidance		
	In alt 2 a multiple of 11 may be 11		
	Answer 6:3 or 6 (blue) gains M3 from alt 2		
	R : B : Y 2 : 6 : 3		M3

Q	Answer	Mark	Comments
12(a)	**Alternative method 1**		
	108 ÷ 48 (× 60) or 2.25 (hours) or 2 hours 15 minutes or 135 (minutes)	M1	driving time
	their 135 + 34 + 25 or 194 (minutes) or 3 hours 14 minutes	M1	oe their 135 must be a driving time
	2.30 – their 3 hours 14 minutes	M1dep	dep on previous mark
	11.16 (am)	A1	SC3 11.16 pm
	Alternative method 2		
	108 ÷ 48 (× 60) or 2.25 (hours) or 2 hours 15 minutes or 135 (minutes)	M1	driving time
	2.30 – their 135 minutes or 12.15	M1	oe their 135 must be a driving time
	their 12.15 – (34 minutes + 25 minutes)	M1dep	oe dep on previous mark
	11.16 (am)	A1	SC3 11.16 pm
	Additional Guidance		
	108 ÷ 48 = 2.25, and then 2.25 used as 2 hours 25 minutes with answer 11.06 (am)		M1M1M1A0
	2.25 without working shown used as 2 hours 25 minutes with answer 11.06 (am)		M1M1M1A0
	2h25min or 145 minutes without division or 2.25 seen may gain up to M0 M1 M1 A0		
	For 2nd M mark their 135 may be in hours or minutes.		

Q	Answer	Mark	Comments
12(b)	108 ÷ 12.5 or 8.64	M1	number of litres used
	their 8.64 × 128.8 or [1112, 1113]	M1	their 8.64 must be a number of litres
	their [1112, 1113] ÷ 100 or [11.12, 11.13]	M1	conversion from p to £
	their [11.12, 11.13] × 2 or [22.24, 22.26]	M1	double for return journey
	their [22.24, 22.26] ÷ 4 or [5.56, 5.57]	M1	value per person
	46.56 or 46.57	A1	SC4 43.78 or 43.79 SC4 48.41 or 48.42
	Additional Guidance		
	The five steps above may be done in any order, but 128.8 or 1.288 must be multiplied by a number of litres.		
	Example 108 × 2 = 216 M1 216 ÷ 4 = 54 M1 54 ÷ 12.5 = 4.32 M1 128.8 ÷ 100 = 1.288 M1 4.32 × 1.288 = 5.56 M1 5.56 + 41 = 46.57 A1		
	Example 108 × 2 = 216 M1 216 ÷ 12.5 = 17.28 M1 17.28 × 128.8 = 2225.664 M1 2225.664 ÷ 4 = 556.4 M1 556.4 ÷ 100 = 5.56 M1 5.56 + 41 = 46.57 A1		
	Example 108 × 12.5 = 1350 M0 1350 × 128.8 = 173880 M0 1350 is not a number of litres 173880 ÷ 100 = 1738.8 M1 1738.8 ÷ 4 = 434.7 M1 M0 no doubling for the return journey 434.7 + 41 = 475.7 A0		
	The SC is for those who forget to include the return journey or divide by 3		

Q	Answer	Mark	Comments
12(c)	**Alternative method 1**		
	12 and 59 identified	M1	eg $\frac{12}{59}$
	$12 \div 59 \times 100$ or 20.3…	M1dep	
	20.3(%)… and Yes	A1	
	Alternative method 2		
	12 and 59 identified	M1	
	$12 \div 59$ or 0.203… and $20 \div 100$ or 20% = 0.2	M1dep	
	0.203… and 0.2 and Yes	A1	
	Alternative method 3		
	12 and 59 identified	M1	
	59×0.2 or 11.8	M1dep	oe method to work out 20% of 59
	11.8 and Yes	A1	
	Alternative method 4		
	12 and 59 identified	M1	
	$\frac{12}{59}$ and (20% =) $\frac{12}{60}$	M1dep	
	$\frac{12}{59}$ and (20% =) $\frac{12}{60}$ and Yes	A1	
	Alternative method 5		
	12 and 59 identified	M1	
	$\frac{60}{295}$ and $\frac{59}{295}$	M1dep	oe common denominators
	$\frac{60}{295}$ and $\frac{59}{295}$ and Yes	A1	

Additional guidance on next page

	Additional Guidance	
	If all 3 probabilities found, ie 12/59, 32/59, 15/59 first M1 is still awarded as 12/59 identified. If 12/59 is then chosen then all the other marks are available.	

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