

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic – Mark Scheme

Number

Finding original values in percentage calculations

v1.0

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 within the scheme 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. e.g. accept 0.5 as well as $\frac{1}{2}$
[a, b]	Accept values between a and b inclusive.
3.14...	Allow answers which begin 3.14 e.g. 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.

Q1.

88(%) or 0.88 oe eg 1 – 0.12

M1

2 200 000 ÷ 88 (× 100)

or 25 000 (× 100) oe eg $2.2 \times 10^6 \div (100 - 12) (\times 100)$

or $2\,200\,000 \times [1.136, 1.14]$

or 2 500 000

M1dep

2.5×10^6

oe standard form eg $2.500\,000 \times 10^6$

SC1 2.2×10^6 oe standard form seen

SC1 any value seen converted to standard form

A1

Additional Guidance

M1 or SC1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts

M1 may be seen in a trial or incorrect working

eg $3\,000\,000 \times 0.88$ or 88% of 2 200 000

M1

2 200 000 ÷ 88% not recovered

M1M0

$2\,200\,000 \times 1.12 = 2\,464\,000$

$2.464 \times 10^6 = 2.5 \times 10^6$

SC1

[3]

Q2.

(a) 80

B1

44 and 36 ft their 80 – 44

B1ft

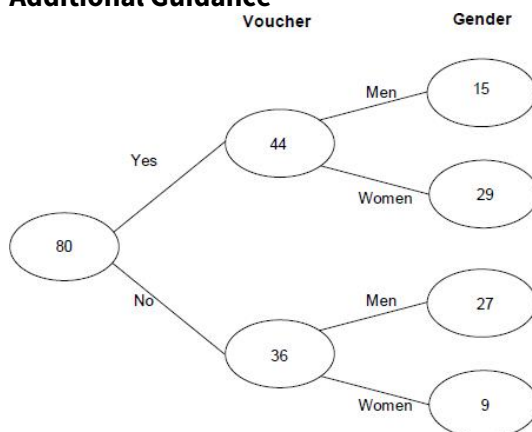
27 and 9 ft their $36 \div 4 \times 3$
and ft their $36 \div 4$

B1ft

15 and 29 ft 42 – their 27
and ft 38 – their 9
Total on ft must be 44

B1ft

Additional Guidance



B1B1B1B1

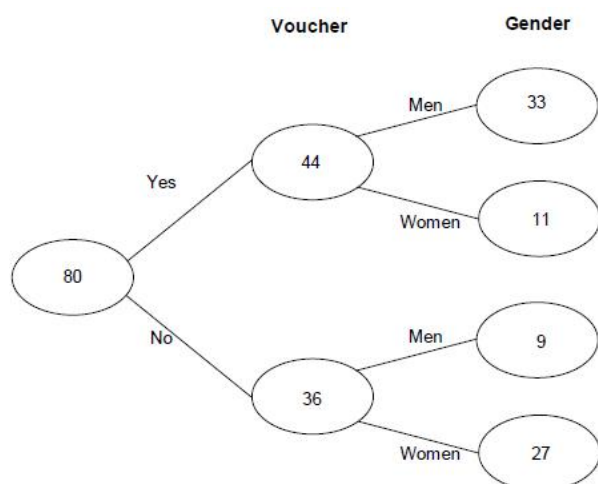
Mark diagram only, do not allow misread

Values may be rounded up or down to whole numbers provided the total is correct

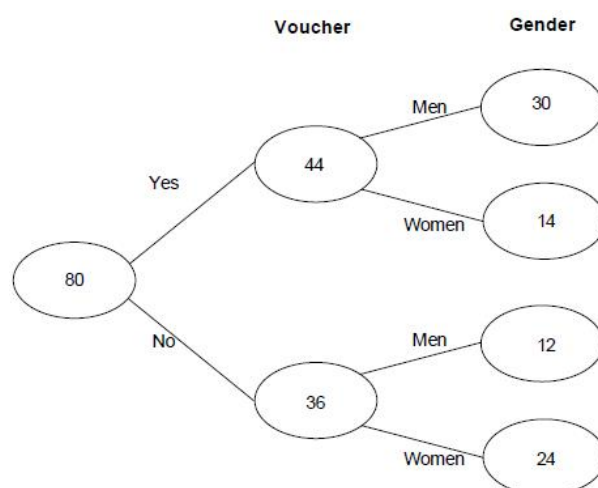
Penalise the use of relative frequencies on the first occurrence only

If relative frequencies are shown the denominator must be 80 and not simplified

eg $\frac{3}{4}$ and $\frac{1}{4}$ is B0



B1B1B0B1ft



B1B1B0B1ft

- (b) 85%
or 0.85

M1

27.2 ÷ 0.85
or 27.2 ÷ 85 (× 100) or 0.32

M1dep

32(.00)

Correct money notation
Allow £32.00p

A1

Additional Guidance

32.0

M1M1A0

[7]

Q3.

1.1 seen

or $110\% = 19.25$ seen

or $19.25 \div 110$

oe eg

$10\% = 1.75$

$1\% = 0.175$

M1

$19.25 \div 1.1$

or 0.175×100

or 17.5

oe

M1dep

17.50

correct money notation

A1

Additional Guidance

Condone £17.50p

M1M1A1

Answer £17.5

M1M1A0

[3]

Q4.

$1 + 0.2$ or 1.2

or

$100(\%) + 20(\%)$ or $120(\%)$

oe eg $x + 0.2x$

implied by eg $20\% = 64\ 000$

or $10\% = 32\ 000$

M1

$384\ 000 \div 1.2$

or

$384\ 000 \div 120 (\times 100)$

or

$3200 (\times 100)$

oe eg $64\ 000 \times 5$

or $32\ 000 \times 10$

M1dep

320 000

A1

Additional Guidance

M1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts

460 800 is M0 unless 1.2 oe seen

Correct answer followed by further work

M2A0

[3]

Q5.

Alternative method 1

$$600 \div 1.2 \text{ or } 500$$

or

$$528 \div 1.2 \text{ or } 440$$

oe

M1

their 500 – their 440

or

$$60$$

cost of helmet before VAT

M1

$$60 \times 0.2$$

or

$$60 \times 1.2 \text{ or } 12 \text{ or } 72$$

M1

$$\frac{12}{600} \times 100$$

oe

M1

$$2(\%)$$

A1

Alternative method 2

$$600 - 528 \text{ or } 72$$

M1

$$72 \div 1.2$$

or

$$60$$

M1

their 72 – their 60

or

$$12$$

M1

$$\frac{12}{600} \times 100$$

M1

$$2(\%)$$

A1

[5]

Q6.

$$(\pounds)280 = 80\%$$

oe

M1

$$280 \div 80 \times 100 \text{ or } 280 \div 0.8$$

oe

M1

$$(\pounds)350 \text{ and No}$$

oe

A1

[3]

Q7.

112.5% or 1.125 or $\frac{9}{8}$

or

$19.53 \div 112.5 (\times 100)$

or $0.1736 (\times 100)$

oe eg $1 + 0.125$

or

$19.53 \div 9 \times 8$ or 2.17×8

M1

17.36

A1

Additional Guidance

M1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts

M1 may be seen in a trial (the answer to the trial can be ignored)

eg 15×1.125

M1

19.53×1.125

M1

Do not allow misreads for 12.5%

eg1 $19.53 \div 1.0125$

M0

eg2 $19.53 \div 112$

M0

112.5 not recovered

M0

[2]

Q8.

$140\% = £2.66$

or $2.66 \div 1.4$

or $(£)1.9(0)$ *oe*

M1

their $(£)1.9(0) \times 1.5$

M1dep

2.85

A1

[3]

Q9.

77% or 0.77 used

M1

$\frac{462}{77}$ or 6

M1dep

their 6×100 or 600 or their 6×23

M3 $462 \div 0.77$ or 600

M1dep

138

A1

[4]

Q10.

1.12 seen or 4.5×0.12

M1

4.5×1.12 or 5.04

M1

their $\frac{5.04}{0.9}$

M1

5.6(0)

A1

[4]

Q11.

1.24 or 124% or $\frac{124}{100}$ or $\frac{100}{124}$ seen

B1

$6014 \div 1.24$

oe $6014 \div 124 \times 100$

M1

4850

A1

[3]

Q12.

$\frac{5}{6}$ costs (£)1.2(0)

oe

B1

$\frac{1.2 \times 6}{5}$

oe

M1

1.44

144p

SC2 for answer 0.72 or 72p

A1

[3]

Q13.

(a) 7.5×10^{18}

Strand (i)

Q1

(b) Sight of 110 or 1.1(0)

M1

$6.81(8...) \times 10^{18}$ or 6.82×10^{18}

or correct answer in another form

A1

6.8×10^{18}

ft any number correctly rounded to
2 significant figures and in standard form

B1 ft

[4]

Q14.

$$108 \text{ (kg)} = 90\%$$

oe

M1

$$108 \div 90 \times 100$$

oe

M1

$$120 \text{ (kg)}$$

A1

[3]