

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic – Mark Scheme

Number

Finding the percentage an amount has been changed by

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.

Alternative method 1

280 – 80 or 200

M1

their $200 \div 80 (\times 100)$

or $2.5 (\times 100)$

oe

M1dep

250

A1

Alternative method 2

$280 \div 80$ or 3.5

oe

M1

$280 \div 80 \times 100 (-100)$

or their $3.5 \times 100 (-100)$

or $350 (-100)$

or $(\text{their } 3.5 - 1) (\times 100)$

or $2.5 (\times 100)$

oe

M1dep

250

A1

[3]

Q2.

Alternative method 1

5400×0.27 or 1458

1.27 seen

M1

6858

A1

Alternative method 2

$5400 \div 10 \times 2 + 5400 \div 10 \div 2 + 5400 \div 100 \times 2$

or 1458

M1

6858

A1

Alternative method 3

$5400 \div 10 \times 3 - 5400 \div 100 \times 3$

or 1458

M1

6858

A1

[2]

Q3.

$$\frac{20}{100}$$

$$\times 130 \text{ or } 26$$

or 1.2 seen

$$\frac{1}{4}$$

$$\times 195 \text{ or } 48.75$$

$$\frac{3}{4}$$

or seen

$$\text{or } \frac{1}{4} \times 200 \text{ or } 50$$

M1

130 + their 26

$$\text{or } 1.2 \times 130$$

$$\frac{3}{4}$$

$$\times 195$$

or 195 – their 48.75

oe

$$\text{or } \frac{3}{4} \times 200$$

or 200 – their 50

M1dep

130 + their 26

$$\text{or } 1.2 \times 130$$

and

$$\frac{3}{4}$$

$$\times 195$$

or 195 – their 48.75

or 156 or 146.25 or 146

oe

130 + their 26

$$\text{or } 1.2 \times 130$$

and

$$\frac{3}{4}$$

$$\times 200$$

or 200 – their 50

or 156 or 150

M1dep

156 and 146.25

or 156 and 146

156 and 150

A1

Just bykes

Strand (iii)

ft their 156 and their 146.25 or 146 or 150 provided both methods are fully correct

Q1ft

[5]

Q4.

$$\frac{6}{100} \times 23.5(0) (= 1.41)$$

oe

M1

their $1.41 + 23.5(0) (= 24.91)$
oe $1.06 \times 23.5(0)$ M2

M1 dep

their $24.91 \times 4 (= 99.64)$
 or
 $100 \div \text{their } 24.91 (= 4.(\dots))$
 $100 \div 4 (= 25)$

M1

Yes and 99.64
 or
 Yes and 4.(...)
Yes and 24.91 (<) 25

A1

Alternative method 1

$4 \times 23.5(0) (= 94)$

M1

$$\frac{6}{100} \times \text{their } 94 (= 5.64) \text{ or } 100 - \text{their } 94 (= 6)$$

oe

M1

their $94 + \text{their } 5.64 (= 99.64)$
 or
 $\frac{\text{their } 6}{\text{their } 94} \times 100 (= 6.(\dots))$
oe 1.06×94 M3 dep on second M1

M1 dep

Yes and 99.64 or Yes and 6.(...)

A1

Alternative method 2

$100 \div 4 (= 25)$

M1

their $25 - 23.5(0) (= 1.5(0))$

M1

$$\frac{\text{their } 1.5(0)}{23.5(0)} \times 100 (= 6.(\dots))$$

M1

Yes and 6.(...)

A1

[4]

Q5.

Alternative method 1

53 – 46 or 7
or 53 million – 46 million
or 7 million oe

M1

$$\frac{7}{46} (\times 100) \text{ or } 0.152 (\dots)$$

oe

Accept 0.15 if correct method shown

M1dep

15.2(…) (%)

Accept 15(%) if correct method shown

A1

Alternative method 2

$$\frac{53}{46} (\times 100) \text{ or } 1.152\dots$$

or 115.2(…)

M1

1.152… – 1 or 0.152(…)

or 115.2(…) – 100

M1dep

oe

Accept 1.15 if correct method shown

Accept 115 if correct method shown

Accept 0.15 if correct method shown

15.2(…) (%)

Accept 15(%) if correct method shown

A1

Alternative method 3

Any correctly evaluated percentage of 46 (million)

eg

1(%) is 0.46 (million)

5(%) is 2.3 (million)

10(%) is 4.6 (million)

M1

15(%) (increase) is 52.9 (million)

or 15.1(%) (increase) is 52.946 (million)

or 15.2(%) (increase) is 52.992 (million)

or 15.3(%) (increase) is 53.038 (million)

or 15.4(%) (increase) is 53.084 (million)

or 15.5(%) (increase) is 53.13 (million)

oe 15(%) is 6.9 (million)

or 15.1(%) is 6.946 (million)

or 15.2(%) is 6.992 (million)

or 15.3(%) is 7.038 (million)

or 15.4(%) is 7.084 (million)

or 15.5(%) is 7.13 (million)

and 7 (million)

M1dep

15.2(…) (%)

Accept 15(%) with two of the trials listed above (or better), one with an answer below 53 million (or 7 million), the other with an answer above 53 million (or 7 million)

A1

Additional Guidance

Incorrect number of zeros used for millions cannot score A mark

15(%) scores at least 2 unless clearly from incorrect working

[3]

Q6.

(a) 31

B1

(b) $84 + 72 + 51 + 60 + 47 - 53 - 74 - 79 - 53 - 47$ oe

$84 + 72 + 51 + 60 + 47$ **and**

$53 + 74 + 79 + 53 + 47$

M1

8 (left) and No

314 and 306 and No

A1

Alternative method

their $31 + (72 - 74) + (51 - 79) + (60 - 53)$

their $31 + (-2) + (-28) + 7$ oe

M1

8 (left) and No

A1ft

(c) $1430 - 1250 (= 180)$

$\frac{1430}{1250} (\times 100)$

M1

$\frac{\text{their } 180}{1250} \times 100$ or 0.144 oe

1.144 or 114.4

14.4

A1

[6]

Q7.

$\frac{20}{8}$

or 2.5 seen or implied

$\frac{8}{20}$

or $\frac{8}{20}$ or 0.4 seen or implied

or $75 + 75 + 37.5$ or 187.5

or $50 + 50 + 25$ or 125

or $40 + 40 + 20$ or 100

or $2 + 2 + 1$ or 5

oe

M1

Two from

187.5 or 125 or 100 or 5

For 187.5 allow [187, 188] or 190

A1

187.5 and 125 and 100 and 5

For 187.5 allow [187, 188] or 190

SC1 for [112, 113] and 75 and 60 and 3

A1

[3]

Q8.

Alternative method 1

400×0.37 or 4×37 or 148
or 1.37 seen

oe

548

M1

A1

Alternative method 2

$400 \div 10 \times 3 + 400 \div 10 \div 2 +$
 $400 \div 100 \times 2$
or $40 \times 3 + 20 + 4 \times 2$ or 148

oe

548

M1

A1

Alternative method 3

$400 \div 10 \times 4 - 400 \div 100 \times 3$
or $40 \times 4 - 4 \times 3$ or $160 - 12$ or 148

oe

548

M1

A1

[2]

Q9.

Alternative method 1

Any one of

$$60\,000 \div 420\,000 \text{ or } 0.14... \text{ or } 14.(...)\% \text{ or } \frac{1}{7}$$

$$\text{or } 480\,000 \div 420\,000 \text{ or } 1.14... \text{ or } 114.(...)\% \text{ or } \frac{8}{7}$$

$$\text{or } 420\,000 \div 60\,000 \text{ or } 7$$

$$\text{or } 420\,000 \div 480\,000 \text{ or } 0.875 \text{ or } 87.5\% \text{ or } \frac{7}{8}$$

$$\text{or } 60\,000 \div 540\,000 \text{ or } 0.11... \text{ or } 11.(...)\% \text{ or } \frac{1}{9}$$

$$\text{or } 540\,000 \div 60\,000 \text{ or } 9$$

oe

$$\text{eg } 60\,000 : 420\,000 \text{ or } 1 : 7$$

or

$$480\,000 : 420\,000 \text{ or } 8 : 7$$

M1

Any one of

$$60\,000 \div 480\,000 \text{ or } 0.125 \text{ or } 12.5\% \text{ or } \frac{1}{8}$$

$$\text{or } 540\,000 \div 480\,000 \text{ or } 1.125 \text{ or } 112.5\% \text{ or } \frac{9}{8}$$

$$\text{or } 480\,000 \div 60\,000 \text{ or } 8$$

$$\text{or } 480\,000 \div 540\,000 \text{ or } 0.88... \text{ or } 0.89 \text{ or } 88.(...)\% \text{ or } 89\% \text{ or } \frac{8}{9}$$

must be a matching pair (could be different forms) to award M2
(see A1 for list of matching pairs)

oe

$$\text{eg } 60\,000 : 480\,000 \text{ or } 1 : 8$$

or

$$540\,000 : 480\,000 \text{ or } 9 : 8$$

M1

$$\frac{1}{7} \text{ and } \frac{1}{8} \text{ and No}$$

or

$$\frac{8}{7} \text{ and } \frac{9}{8} \text{ and No}$$

or

$$0.14... \text{ and } 0.125 \text{ and No}$$

or

$$14.(...)\% \text{ and } 12.5\% \text{ and No}$$

or

$$1.14... \text{ and } 1.125 \text{ and No}$$

or

$$114.(...)\% \text{ and } 112.5\% \text{ and No}$$

or

$$7 \text{ and } 8 \text{ and No}$$

or

$$\frac{7}{8} \text{ and } \frac{8}{9} \text{ and No}$$

or

$$\frac{1}{9} \text{ and } \frac{1}{8} \text{ and No}$$

or

$$9 \text{ and } 8 \text{ and No}$$

$$\text{or } 0.11... \text{ and } 0.125 \text{ and No}$$

or 11.(...)% and 12.5% and No
 or 0.875 and 0.88... or 0.89 and No
 or 87.5% and 88.(...)% or 89% and No
 oe
 eg 1 : 7 and 1 : 8 and No

A1

Alternative method 2

No and any one of

$$\frac{60\,000}{420\,000} \times 480\,000 \text{ and } [67\,200, 68\,640]$$

or

$$\frac{60\,000}{480\,000} \times 540\,000 \text{ and } 67\,500$$

or

$$\frac{60\,000}{480\,000} \times 420\,000 \text{ and } 52\,500$$

or

$$\frac{60\,000}{540\,000} \times 480\,000 \text{ and } [52\,800, 53\,334]$$

or

$$\frac{420\,000}{480\,000} \times 540\,000 \text{ and } 472\,500$$

or

$$\frac{480\,000}{420\,000} \times 480\,000 \text{ and } [547\,200, 548\,640]$$

or

$$\frac{480\,000}{540\,000} \times 480\,000 \text{ and } [422\,400, 427\,200]$$

or

$$\frac{540\,000}{480\,000} \times 420\,000 \text{ and } 472\,500$$

oe

B2 any one of the calculations

B1 any one of the fractions oe

for equivalent fractions, decimals and percentages see

Alternative method 1

B3

Additional Guidance

In Alt 1, for M2 the matching pair do not have to be in comparable form

eg 14.3% and $\frac{1}{8}$ and No

M1M1A0

For comparable fractions, they must be in their lowest terms or have the same numerators or the same denominators for the A1

eg Alt 1 $\frac{60\,000}{420\,000}$ and $\frac{60\,000}{480\,000}$ and No

M1M1A1

For comparable ratios, they must be in their lowest terms or have the same LH sides or the same RH sides for the A1

eg Alt 1 60 000 : 420 000 and 60 000 : 480 000 and No

M1M1A1

If working with percentages, condone absence of % symbol

eg Alt 1 14 and 12.5 and No

M1M1A1

Both are increases of 60 000 and it is then over different amounts so cannot be the same percentage

M0M0A0

[3]

Q10.

$$\frac{10}{100}$$

$$\times 65.5 \text{ or } 6.55$$

oe

0.9 or 90% seen

58.95

M1

A1

[2]

Q11.

Alternative method 1

$$200 \times 0.17 \text{ or } 2 \times 17 \text{ or } 34 \text{ or } 1.17 \text{ seen}$$

oe

234

M1

A1

Alternative method 2

$$200 \div 10 + 200 \div 10 \div 2 + 200 \div 100 \times 2$$

oe

234

M1

A1

[2]

Q12.

Alternative method 1

$$60 \times (1 - 0.15) \text{ or } 60 \times 0.85 \text{ or } 51$$

or

$$40 \times (1 - 0.1) \text{ or } 40 \times 0.9 \text{ or } 36$$

oe

$$60 \times 0.15 \text{ or } 9$$

$$\text{or } 40 \times 0.1 \text{ or } 4$$

M1

$$2 \times \text{their } 51 + 2 \times \text{their } 36 \text{ or } 174 \text{ oe}$$

$$2 \times \text{their } 9 + 2 \times \text{their } 4 \text{ or } 26$$

their 51, their 36, their 9 and their 4 must come from a correct method

M1dep

$$(2 \times 60 + 2 \times 40) \times 0.75$$

$$\text{or } 200 \times 0.75 \text{ or } 150$$

$$\text{or } (2 \times 60 + 2 \times 40) \times 0.25$$

$$\text{or } 200 \times 0.25 \text{ or } 50 \text{ oe}$$

M1

174 and 150 and No

or 224 and 200 and No

or 26 and 50 and No

SC3 176 and 150 and No

or 226 and 200 and No

or 24 and 50 and No

A1

Alternative method 2

$60 \times (1 - 0.15)$ or 60×0.85 or 51

or

$40 \times (1 - 0.1)$ or 40×0.9 or 36

oe

60×0.15 or 9

or 40×0.1 or 4

M1

$2 \times$ their 51 + $2 \times$ their 36 or 174

oe

$2 \times$ their 9 + $2 \times$ their 4 or 26

their 51, their 36, their 9 and their 4 must come from a correct method

M1dep

$$\frac{(2 \times 60 + 2 \times 40) - \text{their } 174}{2 \times 60 + 2 \times 40} \times 100$$

or $\frac{200 - \text{their } 174}{200} \times 100$

or 13(%)

or $\frac{174}{200} \times 100$ and $100 - 25$

or 87(%) and 75(%)

oe

$$\frac{2 \times \text{their } 9 + 2 \times \text{their } 4}{200} \times 100$$

or $\frac{26}{200} \times 100$ or 13(%)

or

$$\frac{200 - (2 \times \text{their } 9 + 2 \times \text{their } 4)}{200} \times 100$$

and $100(\%) - 25(\%)$

or 87(%) and 75(%)

M1dep

13% and No

or 87% and 75% and No

oe

SC3 12% and No

or 88% and 75% and No

A1

Additional Guidance

Ignore incorrect statements or calculations with full mark response

Consistently working with half of a perimeter can score up to 4 marks

SC3 must come from transposing length and width values

Accept length and width values transposed for up to 3 marks

eg 60×0.9 with 40×0.85 and $2 \times 54 + 2 \times 34$

M1M1

eg 60×0.9 with 40×0.9 and $2 \times 54 + 2 \times 36$ (not transposed)

M1M0

eg 60×0.1 or 40×0.15 or 6

M1

[4]

Q13.

Method to calculate the increase on the salary or the decrease to the bonus

$$\text{eg } 26\,000 \times 0.06 \text{ or } 1560$$

$$\text{or } 4000 \times 0.09 \text{ or } 360$$

or decimal multiplier 1.06 or 0.91

oe fraction

M1

Method to calculate the value of the increased salary or the decreased bonus

$$\text{eg } 26\,000 \times 1.06 \text{ or } 27\,560$$

$$\text{or } 4000 \times 0.91 \text{ or } 3640$$

or

Method to calculate the difference between the increase on the salary and the decrease to the bonus

$$\text{eg their } 1560 - \text{their } 360 \text{ or } 1200$$

$$31\,200 \text{ implies } M2$$

M1dep

Method to calculate the decimal multiplier or percentage of the total annual pay

$$\text{eg } \frac{31\,200}{30\,000}$$

or

$$1.04 \text{ or } 104(\%)$$

oe

or

Method to calculate the decimal multiplier or percentage change in the total annual pay

$$\text{eg } \frac{\text{their } 1560 - \text{their } 360}{26\,000 + 4000}$$

$$\text{or } \frac{1200}{30\,000}$$

or

$$0.04 \text{ or } 4(\%)$$

oe

M1

4(%) increase

A1

Additional Guidance

For first M mark do not accept a misread of increase for decrease eg 1.09

M0

$$26\,000 \times 1.06 = 27\,560 \text{ and } 4000 \times 1.09 = 4360$$

$$27\,560 + 4360 = 31\,920 \text{ and } \frac{31\,200}{30\,000}$$

M1M1M1A0

$$24\,440 + 4360 = 28\,800 \text{ and } \frac{28\,800}{30\,000}$$

M0M0M1

$$100 + 6 = 106\%$$

M0

$$26\,000 \times 1.06\%$$

M1M0

[4]

Q14.

3 + 2 or 5

and

$$5\frac{1}{2} + 3\frac{1}{2} \text{ or } 9$$

$$\text{or } 5\frac{1}{2} - 3 \text{ or } 2\frac{1}{2}$$

or

and

$$3\frac{1}{2} - 2 \text{ or } 1\frac{1}{2}$$

or 4

oe eg 180 + 120 or 300 and 330 + 210 or 540

$$\text{implied by } 5\frac{1}{2} + 3\frac{1}{2} - 3 - 2$$

M1

$$\frac{9-5}{5} \text{ or } \frac{2\frac{1}{2}+1\frac{1}{2}}{3+2} \text{ or } \frac{4}{5} \text{ or } 0.8$$

$$\text{or } \frac{5\frac{1}{2}+3\frac{1}{2}}{3+2} (\times 100) \text{ or } \frac{9}{5} (\times 100)$$

or

or 1.8 (× 100)

or 180

$$\text{oe eg } \frac{5\frac{1}{2}+3\frac{1}{2}-3-2}{3+2}$$

$$\text{eg } \frac{540-300}{300} \text{ or } \frac{240}{300} \text{ or } 1.8 - 100$$

M1dep

80

A1

Additional Guidance

Allow working fully in minutes but units must be consistent in a single calculation

eg 2 h 30 and 1 h 30

M1

eg 3 + 2 = 5 and 330 + 210 = 540

M1

eg 3 + 120 and 330 + $3\frac{1}{2}$ unless recovered

M0

$$3 + 2 = 6, 5\frac{1}{2} + 3\frac{1}{2} = 9, 9 - 6 = 3, 3 = 50\%$$

M1M1A0

$$3 + 2 = 6, 5\frac{1}{2} + 3\frac{1}{2} = 9, \text{ answer } 50\% \text{ (3 is implied)}$$

M1M1A0

9 - 6 = 3, 3 = 50% (no method shown for 6)

M0M0A0

[3]

Q15.

$$240 \times 1.075$$

B1

[1]

Q16.

Alternative method 1

$$\frac{6}{5} \text{ or } \frac{3}{4}$$

oe fractions, decimals or percentages,

but not $\frac{6}{5}$ as a mixed number

M1

$$\frac{6}{5} \times \frac{3}{4} \text{ or } \frac{18}{20} \text{ or } \frac{9}{10}$$

or 0.9 or 90% or 0.1 or 10% oe fractions or decimals, but not $\frac{6}{5}$ as a mixed number

M1dep

$$\frac{1}{10}$$

oe fraction

A1

Alternative method 2

Chooses value for price and increases by $\frac{1}{5}$

correct method or value for either eg (£)5 and (£)6

or chooses number of laptops and decreases by $\frac{1}{4}$
20 (laptops) and 15 (laptops)

M1

Chooses value for price and increases by $\frac{1}{5}$ and chooses number of laptops and decreases by $\frac{1}{4}$

$\frac{\text{reduced income}}{\text{original income}} (\times 100)$
eg $\frac{6 \times 15}{5 \times 20} (\times 100)$

$\frac{\text{reduction}}{\text{original}} (\times 100)$
eg $\frac{5 \times 20 - 6 \times 15}{5 \times 20} (\times 100)$

M1dep

$$\frac{1}{10}$$

oe fraction

A1

Additional Guidance

For full marks, accept a fraction equivalent to $\frac{1}{10}$ incorrectly simplified, but not converted to a decimal or percentage

M1M1A1

M1M1A0

If both methods tried and answer incorrect, award better method mark
Accept variables in any working for M1M1

[3]

Q17.

Alternative method 1

(10% =) 19 or (50% =) 95 or (20% =) 38 or (30%) = 57 or (5% =) 9.5 or
(1% =) 1.9 etc

*Any correct comparison of a percentage and a value except
100% = 190*

M1

Any combination of values that make 35% eg 95 – their 19 – their
9.5, their 19 + their 19 + their 19 + their 9.5
or 66.5

*Must be correct values or valid method shown leading to their
values*

256.5 or 256 $\frac{1}{2}$ or 256.50p

M1dep

256.50

*Strand (i) ft 190 + their 35% if M1, M0 awarded
Must be correct money notation*

Q1ft

Alternative method 2

0.35 or 1.35 seen or $\frac{35}{100}$ or $\frac{135}{100}$ or 135%

M1

0.35 × 190 or 1.35 × 190 or 66.5

or $\frac{135}{100} \times \frac{190}{1}$ or $\frac{35}{100} \times \frac{190}{1}$

oe 256.5 or 256 $\frac{1}{2}$ or 256.50p

M1dep

256.50

Strand (i) Must be correct money notation

Q1

Additional Guidance

19

M1

38

$$5\% = 19 \div 2 = 8$$

$$35\% = 19 + 38 + 8 = 65$$

M0dep

255

Q1ft

$$10\% = 19$$

M1

$$20\% = 38$$

$$5\% = 8$$

$$35\% = 19 + 38 + 8 = 65$$

M1dep

255

Q0

$$10\% = 19$$

M1

$$20\% = 38$$

$$5\% = 9.5$$

$$35\% = 19 + 38 + 9.5 = 64.5$$

M1dep

254.50

Q0

$$190 \times 1.35$$

Uses box method to get 256.5

265.50

Transcription error.

M1

M1dep

Q1

$$10\% = 19$$

M1

$$20\% = 36$$

$$5\% = 9.5$$

$$35\% = 19 + 36 + 9.5 = 44.5$$

M0dep

224.50

Q0ft

[3]

Q18.

Alternative method 1

60×40 or 2400 oe

M1

their 2400 – 2000 or 400

or 2000 – their 2400

M1dep

$$\frac{\text{their } 400}{2000} (\times 100) \text{ or } 0.2 \text{ oe}$$

M1dep

20(%)

A1

Alternative method 2

60×40 or 2400 oe

M1

their 2400 – 2000 or 400

or 2000 – their 2400

M1dep

10% = $2000 \div 10$ or 1% = $2000 \div 100$ **and** correctly finds multiplier using build up or division to find percentage equivalent to total their 400 oe

*Correct build up to find percentage equivalent to total their
(their 2400 – 2000) or their (2000 – their 2400) implies M3*

M1

20(%)

A1

Alternative method 3

60×40 or 2400

M1

$$\frac{\text{their } 2400}{2000} (\times 100) \text{ or } 120(\%) \text{ or } 1.2$$

M1dep

their 120 – 100 or their 1.2(0) – 1(.00)

or 100 – their 120

or 1(.00) – their 1.2(0) or 0.2 oe

M1dep

20(%)

A1

Additional Guidance

20% on answer line and no working

M1M1M1A1

480×5 (= 2400) from 5 years scores minimum M1

$60 \times 40 = 1800$ and 200 scores minimum M1M1

$$60 \times 40 = 1800 \text{ and } 200 \text{ and } \frac{200}{2000}$$

M1M1M1A0

$$60 \times 40 = 1800 \text{ and } \frac{200}{2000}$$

M1M1M1A0

$$\frac{2000}{\text{their } 2400} (= 1.2) \text{ does not score second method mark on ALT3}$$

[4]

Q19.

$$(6800 \div 10) + (6800 \div 100) \times 2$$

$$(= 816)$$

$$680 + 2 \times 68$$

$$6800 \times 0.12$$

M1

6800 + their 816

$$6800 \times 1.12 \text{ gets M2}$$

M1 dep

7616

A1

[3]

Q20.

$$\frac{30}{100} \times 4 \text{ or } 1.2(0) \text{ or } 120$$

$$\frac{70}{100}$$

or $\frac{70}{100}$

oe

M1

4 – their 1.2(0) or 2.8

$$\frac{70}{100} \times 4$$

or $\frac{70}{100} \times 4$

oe

M1dep

(£) 2.80

*Strand (i) Must have correct units
do not accept 2.80p or 280p or 2.8*

Q1

[3]

Q21.

$$\frac{40}{100} \times 8(.00) (= 3.2(0))$$

$$\text{oe } 1.4 \text{ seen oe eg } \frac{140}{100}$$

M1

8 + their 3.2(0)

$$\frac{140}{100} \times 8(.00)$$

M1 dep

11.20

Q1

*Strand (i)
Do not accept 11.2
11.2 or 1120 implies M2*

[5]

Q22.

Sight of 0.945

B1 390×0.945 **M1**

368.55

*Allow incorrect rounding after correct answer seen or 368 or
369 with working
SC1 for 411.45*

A1**Alternative 1**

$390 \times 5.5 \div 100 (= 21.45)$
oe

M1

390 – their 21.45

M1

368.55

*Allow incorrect rounding after correct answer seen or 368 or
369 with working
SC1 for 411.45*

A1**Alternative 2**

$(10\% = 39), 5\% = 19.5, (1\% = 3.9), 0.5\% = 1.95$
oe

390 – Their $(5\% + 0.5\%)$

368.55

*Allow incorrect rounding after correct answer seen or 368 or
369 with working
SC1 for 411.45*

[3]**Q23.** 360×0.875

oe

M1

315

A1**[2]**

Q24.

25% increase = 1.25

*oe***B1**

20% decrease = 0.8

*oe***B1** $1.25 \div 0.8 (= 1.5625) (\times 100)$ *oe, eg $125 \div 80 (\times 100)$* **M1**

56.25 or 56

*Digits 15625 or 156 is 3 marks, A0**SC2 $1.25 \div 1.2 = 1.04...$ (or equivalent, eg $125 \div 120 = 1.04166..$)***A1****Alternative 1**

Values chosen for X and Y and F calculated correctly (Call this P)

*If values are decimals then must be given to 1 dp**Allow M1 if one of $X + 25\%$ or $Y - 20\%$ calculated incorrectly*X increased by 25% **and** Y decreased by 20% **and** $X \div Y$ calculated correctly (call this Q)*If values are decimals then must be given to 1 dp**Allow M1 if one of $X + 25\%$ or $Y - 20\%$ calculated incorrectly***M2** $Q \div P (\times 100)$ *oe Dependent on at least M1***M1Dep**

56.25 or 56

*Digits 15625 or 156 is 3 marks, A0***A1****Alternative 2** $x \times 1.25 (= p)$ *x any quantity**25% increase in x***M1** $y \times 0.8 (= q)$ *y any quantity**20% decrease in y***M1**Their $p \div$ their q **M1**

56.25 or 56

A1**[4]**

Q25.

No and valid explanation

eg No and $0.8 \times 0.9 = 0.72$

or No and saves 28%

or No and 10% is off a smaller amount

B1

Additional Guidance

A value may be used in an explanation

eg $0.9 \times 0.8 \times 200 = 144$ and $0.7 \times 200 = 140$ so No

B1

2nd discount is reducing an already reduced price so No

B1

10% off reduced price is not 10% off original price and No

B1

Cannot just add the percentages as they are of different amounts so No

B1

10% of the already reduced price is not 10% on top of the 20% discount

B1

No and 30% is too much

B0

Incorrect overall percentage saving stated eg No and saves 22%

B0

[1]

Q26.

(a) $£50 \times 0.92$

B1

Alternative method 1

(b) $9 \div 0.45$ or 20

or $9 \div 45$ or 0.2

oe

$5\% = 1 \text{ (kg)}$ or $1\% = 0.2 \text{ (kg)}$ or $10\% = 2 \text{ (kg)}$

M1

their $20 - 9$

or their 0.2×55

oe

$55 \div 5$ or $9 + 2$

M1dep

11

A1

Alternative method 2

$$\frac{y}{9} = \frac{55}{45}$$

oe

e.g. $y : 9 = 55 : 45$

M1

$$9 \times \frac{55}{45}$$

oe

M1dep

11

A1

[4]

Q27.

1.04 × 53 (000 000)
or 55.12 (million)
or 55.1 (million)
or 55 (million)

oe
57.24 (million) or 57.2 (million)

M1

1.04 × 1.04 × 53 (000 000)
or 1.04 × their 55.12 (million)

oe
M2 for $(1.04)^2 \times 53$ seen

M1dep

57 324 800 or 57 325 000
or 57 320 000
or 57 300 000 or 57.3 million

oe
Accept 57 million if working shown
Ignore further rounding of correct answer

A1

[3]

Q28.

(a) 1430 – 1250 (= 180)

$$\frac{1430}{1250} (\times 100)$$

M1

$$\frac{\text{their } 180}{1250} \times 100 \text{ or } 0.144$$

oe 1.144 or 114.4

M1dep

14.4

A1

(b) At least 3 non-overlapping, exhaustive boxes with units

B1 at least 3 non-overlapping, exhaustive boxes without units

B1 at least 3 with gaps but no overlaps or

B1 at least 3 with overlaps but no gaps or

B1 2 exhaustive and non-overlapping

B2

[5]