

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic – Mark Scheme

Ratio, proportion and rates of change

Sharing amounts in a given ratio (calculator)

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

$72 \div 6 \times 5$ or 60 oe

$72 \div 6 \times 11$ or 132 implies M1

M1

72×1.5 or 108 oe eg $72 \times 3 \div 2$

14×12 implies M2

M1

60 and 108 and 240

or $250 - 60 - 108 = 82$

oe eg1 168 and 240

eg2 60 and 108 and 10

eg3 168 and $(250 - 72 =) 178$

A1

Alternative method 2

6×1.5 or 9

oe eg1 $6 \times 3 \div 2$

eg2 $6 : 5 : 9$

M1

$72 \div 6 \times (6 + 5 + \text{their } 9)$

or $72 \div 6 \times 5$ and $72 \div 6 \times \text{their } 9$

oe eg 12×20

14×12 implies M2

M1dep

9 and 240

or 60 and 108 and 240

or $250 - 60 - 108 = 82$

oe eg1 168 and 240

eg2 60 and 108 and 10

eg3 168 and $(250 - 72 =) 178$

A1

Additional Guidance

Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts

In Alt 1 the 2nd mark is not dependent

In Alt 2 the 2nd mark is dependent

240 alone or 240 with no correct method

M0

$72 \div 6 \times 11 = 132$ and $132 + 108 = 240$

M1M1A1

$1\frac{1}{2} \times 72 = 36$ and $72 + 36 = 108$ and $72 + 60 + 108 = 240$

M1M1A1

$1\frac{1}{2} \times 72 = 36$

M1

$1\frac{1}{2}$ of 72 = 36

M0

$72 \div 11$

M0

[3]

Q2.

(a) $720 \div 6$ or 120

$720 \div 6 \times 5$ or 600

M1

600 and 120

A1

Additional Guidance

120 and 600 (order reversed)

M1A0

(b) $135 + 70 + 35$ or 240

M1

their $240 \div 6$ or 40

M1dep

$2 \times$ *their* 40 or 80

M1dep

10 *ignore fw*

A1

Additional Guidance

Gemma 10, Beth 5, answer 15 scores full marks

M1M1M1A1

(120 and) 80 and 40 may be written next to the 3 : 2 : 1 in the question

M1M1M1A0

Beware of 10 from incorrect working

e.g. $135 \div 3 = 45$, $70 \div 2 = 35$, $35 \div 1 = 35$, answer 10 scores 0

M0M0M0A0

[6]

Q3.

45×8 or 360

oe

number of 2p coins

may be embedded

M1

$45 \times 8 \times 2$

or 360×2

or 720 or 7.2(0) *oe*

value of 2p coins

implied by 1170 or 11.7(0)

M1dep

$17.7(0) -$ *their* $7.2(0) - 45 \times 0.1(0)$

or

$1770 -$ *their* 720 $- 45 \times 10$

or

6(.00) or 600 *oe*

value of 5p coins

implied by 7.2 : 6 oe ratio not in simplest form

or 6 : 7.2 *oe ratio*

M1dep

6 : 5

accept $1.2 : 1$ or $\frac{6}{5} : 1$ or $1\frac{1}{5} : 1$

or $1 : 0.83(\dots)$ or $1 : \frac{5}{6}$

A1

Additional Guidance

Up to M3 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts

Allow working in pence or pounds throughout

Must work consistently in pence or pounds for the third mark (or recover)

Ignore units in the ratio eg 6p : 5p or £1.20 : £1

M3A1

720 may be seen in a ratio with the value of the 10p coins

eg 720 : 450 or 7.2 : 4.5

M2

600 may be seen in a ratio with the value of the 10p coins

eg 600 : 450 or 6 : 4.5

M3

For information:

Coin	10p	2p	5p
Number	45	360	120
Value	£4.50	£7.20	£6.00

[4]**Q4.**

80×6 or 480

or

80×7 or $480 + 80$

oe

implied by 80 : 480

M1

560

A1**[2]****Q5.**

(32, 8)

B2 E (32, ...) or E (... , 8)

B1 C (17, 18) or D (23, 14)

SC1 C (a, b) and D (a + 6, b - 4)

B3**Additional Guidance**

Mark the answer line for B3 and B2 (if blank check working lines and diagram)

B1 or SC1 is likely to be seen in working lines or on the diagram

Condone missing brackets eg C 17, 18

B1

Coordinates can be implied eg $D x = 23 y = 14$

B1

Condone answers given as vectors for B2, B1 or SC1

B1

eg $C \begin{pmatrix} 17 \\ 18 \end{pmatrix}$

eg

SC1 C cannot be (5, 26) or (11, 22) and coordinates of D must be evaluated

eg C (15, 17) and D (21, 13)

SC1**[3]**

Q6.

Alternative method 1

$$(a =) 45 \div 3 \times 7 \text{ or } 105$$

oe may be on diagram

M1

$$(y =) \frac{360 - 45 - \text{their } 105}{4 + 1}$$

$$\text{or } \frac{210}{5} \text{ or } 42$$

oe may be on diagram

M1dep

$$(a =) 105 \text{ and } (y =) 42 \text{ or } 105 : 42$$

and

$$(a : y =) 5 : 2 \text{ with M2 awarded}$$

A1

Alternative method 2

$$(a =) 45 \div 3 \times 7 \text{ or } 105$$

oe may be on diagram

M1

$$(y =) \text{their } 105 \div 5 \times 2 \text{ or } 42$$

oe may be on diagram

M1dep

$$45 + 105 + 42 + 168 = 360$$

$$\text{and } 42 \times 4 = 168$$

or

$$360 - 45 - 105 - 42 = 168$$

$$\text{and } 168 \div 4 = 42$$

A1

Additional Guidance

$$105 : 42$$

M1M1A0

[3]

Q7.

$$\frac{3}{8} \times 120 \text{ or } 45$$

oe

may be implied or embedded

$$\text{eg } \left(1 - \frac{3}{8}\right) \times 120 \text{ or } \frac{5}{8} \times 120 \text{ or } 75$$

M1

$$(120 - \text{their } 45) \div (2 + 1)$$

or

$$75 \div 3 \text{ or } 25 \text{ oe}$$

may be implied or embedded

$$\text{eg } 75 \times \frac{2}{3} \text{ or } \frac{5}{8} \times 120 \times \frac{2}{3}$$

M1dep

$$50$$

A1

Additional Guidance

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

$$25 : 50 \text{ on answer line}$$

M1M1A0

[3]

Q8.

$360 \div 9 (= 40)$ 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 $80 : 280 = 2 : 7$

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

B2

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

[2]

Q9.

40 (women) and 44 (men)
and No

or

40 : 44 and No

or

84 and No

or

8 (women leave) and 2 (men arrive) and No

oe

B1 40 (women) and 44 (men)

or 40 : 44

or 84

or 8 (women leave) and 2 (men arrive)

B2

Additional Guidance

NB 84 from incorrect working eg $41 + 43 = 84$

B0

For B1 the values may be seen among others

eg1 20 : 22 30 : 33 40 : 44 50 : 55

eg2 21, 42, 63, 84, 105, ...

eg3 10, 20, 30, 40, 50, ... and 11, 22, 33, 44, 55, ...

44

eg4 84 (implies 84)

B1

For B2 the value(s) must be chosen by eg circling or a list stopping at that point and No must be indicated

[2]

Q10.

Obtains an equivalent ratio

or writes out multiples of 11 (to 33)

eg 8 : 14

12 : 21

11, 22, 33

M1

33

A1

[2]

Q11.

Alternative method 1

States or implies that 2 is one third of 6

and

States or implies that 5 is one third of 15

and $180 \div 3 = 60$ or $60 \times 3 = 180$

and Yes

B1 for

states or implies that 2 is one third of 6

or

states or implies that 5 is one third of 15

or $180 \div 3 = 60$ or $60 \times 3 = 180$

B2

Alternative method 2

$$180 \div (1 + 2 + 3) \times 2 = 60$$

or

$$180 \div 6 \times 2 = 60$$

and

$$180 \div (4 + 5 + 6) \times 5 = 60$$

or

$$180 \div 15 \times 5 = 60$$

and Yes

B1 for

$$180 \div (1 + 2 + 3) \times 2 = 60$$

or

$$180 \div 6 \times 2 = 60$$

or

$$180 \div (4 + 5 + 6) \times 5 = 60$$

or

$$180 \div 15 \times 5 = 60$$

B2**Alternative method 3**

30° and 60° and 90°

and

48° and 60° and 72°

and Yes

*B1 for**30° and 60° and 90°**or**48° and 60° and 72°***[2]****Q12.**

$$13 - 5 \rightarrow 4152$$

$$\text{or } 8 \rightarrow 4152$$

*oe**eg*

$$4152 \div 8 \text{ or } 519 \text{ seen}$$

*or 8 parts is 4152***M1**

$$\frac{x + 4152}{x} = \frac{13}{5}$$

$$\text{or } 5x + 20\,760 = 13x$$

$$\text{or } 20\,760 = 8x$$

$$\text{or } 2595 = x$$

$$\text{or (number of men =) } 6747$$

$$\text{or (number of women =) } 2595$$

$$\text{or (total number of people =) } 12\,926$$

$$\text{or } 4152 \div 8 \times 7 \text{ or } 519 \times 7$$

*oe***M1dep**

$$3633$$

A1**[3]**

Q13.

Alternative method 1

360 – 110 or 250

or 360 – 110 – 110 or 140

May be seen on diagram

oe

M1

3360 ÷ their 140 or 24

or 2640 (men) or 6000 (women)

Their 140 must be from 360 – 110 – 110 oe

M1dep

8640

SC2 4838 or 4839

A1

Alternative method 2

$$100 - \frac{110}{360} \times 100$$

or 100 – 30.5(...) or 100 – 30.6

or 69.4(...) or 69.5(%)

$$\text{or } 100 - \frac{110}{360} \times 100 - \frac{110}{360} \times 100$$

or 100 – 30.5(...) – 30.5(...)

or 100 – 30.6 – 30.6

or 38.8(...) or 38.9(%)

May be seen on diagram

oe

M1

3360 ÷ (their 69.4 – their 30.5)

or 3360 ÷ their 38.8(...)

or 86.4

$$\text{Their 69.4 must be from } 100 - \frac{110}{360} \times 100$$

$$\text{Their 30.5 must be from } \frac{110}{360} \times 100$$

M1dep

8640

SC2 4838 or 4839

A1

Alternative method 3

$$\frac{250}{360}x - \frac{110}{360}x = 3360$$

$$\text{or } m = \frac{110}{360} \times (m + 3360 + m)$$

$$\text{or } w = \frac{250}{360} \times (w + w - 3360)$$

Sets up a correct equation to work out total (x), men (m) or women (w)
oe

M1

$$x = 3360 \div \left(\frac{250 - 110}{360} \right)$$

$$\text{or } m = 336\,000 \div 140 \text{ or } 2640$$

$$\text{or } w = 840\,000 \div 140 \text{ or } 6000$$

oe

M1dep

$$8640 \quad \text{SC2} \quad 4838 \text{ or } 4839$$

A1**Additional Guidance**

Condone 8639.9... → answer 8640

M2 A1

$$2640 \text{ or } 6000$$

M2

4838 and 4839 come from 3360 women

SC2**[3]****Q14.**

$$(x =) 4 \times 2 \text{ or } (x =) 8$$

or

area of top right rectangle is 12×2 or $12 \div 4 \times \text{their } 8$ or 24

or

area of bottom left rectangle is $56 \div 2$ or $4 \times 56 \div \text{their } 8$ or 28

may be on diagram

implied by length of bottom left or bottom right vertical section is 7

M1

Area of top right rectangle is 12×2 or $12 \div 4 \times \text{their } 8$ or 24

and

area of bottom left rectangle is $56 \div 2$ or $4 \times 56 \div \text{their } 8$ or 28

or

Total area is

$$(4 + \text{their } 8) \times (12 \div 4 + 56 \div \text{their } 8) \text{ or } 12 \times 10 \text{ or } 120$$

may be on diagram

M1dep

(Total shaded area is) 52

implied by 52 : 68

A1

$$13 : 17 \text{ or } 1 : \frac{17}{13} \text{ or } \frac{13}{17} : 1$$

ft simplification of their ratio or conversion into the form 1 : n or n : 1 with M2A0 or M1M0A0 scored

B1ft

Additional Guidance

If their ratio cannot be simplified by dividing by a common factor they can only score B1ft by converting into the form $1 : n$ or $n : 1$

$$\frac{52}{120} : \frac{68}{120}$$

M1M1A1B0

68 : 52 simplified to 17 : 13

M1M1A0B1ft

13 cm² : 17 cm²

M1M1A1B0

For B1, accept values as decimals rounded or truncated to 2 dp or better
eg 1 : 1.31 or 0.76 : 1

B1**[4]****Q15.****Alternative method 1**

$$64 + x + x + 24 = 360$$

oe

M1

$$2x = 360 - 24 - 64$$

$$\text{or } x = 136$$

M1

$$\text{their } \frac{136}{360} \times 5220$$

oe

M1

1972

A1**Alternative method 2**

$$360 - 64 \text{ or } 296$$

M1

$$\frac{296 - 24}{2} \text{ or } 136$$

oe

M1

$$\text{their } \frac{136}{360} \times 5220$$

oe

M1

1972

A1**[4]**

Q16.**Alternative method 1**

$192 \div (7 + 6 + 11)$ or $192 \div 24$ or 8

May be implied

M1

$7 \times$ their 8 or 56

and $6 \times$ their 8 or 48

and $11 \times$ their 8 or 88

56 : 48 : 88 is M2

M1dep

Their $56 (\times 1) +$ their $48 \times 2 +$ their 88×3

or $56 + 96 + 264$ or 416

May use x , $2x$ and $3x$ (any letter)

M1dep

$532.48 \div$ their 416

Allow working in pence

M1dep

1.28

A1

Alternative method 2

$7 (\times 1) + 6 \times 2 + 11 \times 3$

or $7 + 12 + 33$ or 52

May use x , $2x$ and $3x$ (any letter)

M1

$532.48 \div$ their 52 or 10.24

Allow working in pence

M1dep

$192 \div (7 + 6 + 11)$ or $192 \div 24$ or 8

May be implied

M1

Their $10.24 \div$ their 8

Dep on M3

oe eg their 10.24×7 or 71.68 and their $71.68 \div (7 \times \text{their } 8)$

M1dep

1.28

A1

Additional Guidance

(Alt 1) $56 : 96 : 264$ with no subsequent addition

M1M1M0M0A0

$532.48 \div 24 (= 22.18... \text{ or } 22.19)$ with no further valid working

Zero

$532.48 \div 192 (= 2.77...)$ with no further valid working

Zero

(Alt 1) 56 and 48 and 88 (or correct method leading to them) but not subsequently used

M2

(Alt 1) 8 (or correct method leading to it) but not subsequently used

M1

(Alt 2) 10.24 (or correct method leading to it)

M2

1.28 in working with Answer 71.68 (from 1.28×56)

M4A0

[5]

Q17.

Alternative method 1

$1125 \div 5 \times 2$ or 450

oe

M1

their $450 \div 6 \times (7 \div 4)$

or 75×1.75 or 131.25

M1dep

$1125 \div$ their 131.25

M1dep

8.57... or 8.6 or $8\frac{4}{7}$ or 8

A1

Alternative method 2

$5 \div 2$ or 2.5

and

$7 \div 4$ or 1.75

oe

M1

their $2.5 \div$ their 1.75 or 1.42857...

or $\frac{10}{7}$

oe

M1dep

$6 \times$ their 1.42857...

M1dep

8.57... or 8.6 or $8\frac{4}{7}$ or 8

A1

Alternative method 3

(Small bottle fills) $6 \times \frac{4}{7}$ or $\frac{24}{7}$

M1

(Large bottle fills) their $\frac{24}{7} \times \frac{5}{2}$

or $\frac{120}{14}$

M1dep

their $120 \div$ their 14

M1dep

8.57... or 8.6 or $8\frac{4}{7}$ or 8

A1

Alternative method 4

Any two of

$$b_1 = 6g_1 \text{ and } b_2 = 2.5b_1$$

$$\text{and } g_2 = 1.75g_1$$

*oe any letters for small bottle (b_1), small glass (g_1), large bottle (b_2) and large glass (g_2)***M1**

$$b_2 = 2.5 \times 6g_1 \text{ or } b_2 = 15g_1$$

*oe***M1dep**

$$b_2 = \text{their } 15 \left(\frac{g_2}{1.75} \right)$$

M1dep

$$8.57... \text{ or } 8.6 \text{ or } 8\frac{4}{7} \text{ or } 8$$

A1**Additional Guidance**

If the student attempts more than one method, mark each method and award the highest mark

Correct answer seen in working, 9 on answer line

M1M1M1A0**[4]****Q18.**

20

$$B2 (A : B : C =) 12 : 6 : 2$$

$$\text{or } (A : B =) 12 : 6 \text{ **and** } (B : C =) 6 : 2$$

$$\text{or } A = 12 \text{ **and** } C = 2$$

$$B1 (A : B : C =) 6 : 3 : 1 \text{ oe}$$

$$\text{or } (A : B =) 12 : 6 \text{ or } (B : C =) 6 : 2$$

$$\text{or } A = 12 \text{ or } C = 2$$

B3**Additional Guidance**

Allow clear indication that A is 12 or C is 2

 $6 : 3 : 1$ must be a single ratio for B1

$$m : 6 : 2$$

B1

$$12 : 6 : n$$

B1**[3]**

Q19.

$270 \div (2.6 + 1)$ or $270 \div 3.6$ or 75
 $\frac{2.6}{(2.6+1)}$ or $\frac{2.6}{3.6}$ or 0.72(...)
or $2.6 - 1$ or 1.6
oe

M1

their 75×2.6
or $270 -$ their 75 or 195
or $270 \times$ their 0.72(...)
or their $75 \times (2.6 - 1)$
or their $75 \times$ their 1.6
 $\frac{\text{their } 1.6}{(2.6+1)}$ or 0.44(...)
oe

M1dep

120

A1

Additional Guidance

195 and 75

M1M1

$270 \div 2.6$

M0

[3]

Q20.

$210 \div 2 \times 5$
or 105×5 or $1050 \div 2$
or
 $210 : 525$
oe
e.g. 210×2.5 or $420 + 105$

M1

525

A1

Additional Guidance

Further work after reaching 525

M0A0

[2]

Q21.

$(200 + 160 + 104 + 100) \div 4$
or $564 \div 4$ or 141

M1

their $141 \div 3 \times 8$
or 47×8
or $1128 \div 3$
or 376

oe
accept $141 \times 2.66(\dots)$ or 141×2.67

M1dep

their 376×5 or 1880

M1dep

427

A1

Additional Guidance

$(270 + 400 + 483 + 300 + 427) \div 5$ embedded answer

M1M1M1A0

$(1453 + x) \div 5 = 376$ and $1453 + x = 1880$

M1M1M1

$(1453 + x) \div 5 = 376$

M1M1M0

$200 + 160 + 104 + 100 \div 4$ scores M0 unless recovered

[4]

Q22.

$330 \div (3 + 2)$ or $330 \div 5$ or 66

M1

oe eg $\frac{330}{5}$

their 66×2 or 132

oe
 $\frac{2}{5} \times 330$ scores M2

M1dep

$294 \div 7$ or 42

or

$294 \div 7 \times 3$ or 126

oe eg $\frac{294}{7}$
or $\frac{3}{7} \times 294$

M1

132 and 126 and A

A1

Additional Guidance

132 and 88.2 and A

M1M1M0A0

[4]

Q23.

$$5 - 2 (= 3)$$

oe

M1

$$\frac{210}{\text{their } 3} (\times 5)$$

or 70 seen

70 seen is M2 but not from $50 + 20$

M1 dep

$$350$$

SC2 490 or 140

A1

Alternative method

$$50 : 20$$

Or equivalent ratio with a bigger difference

M1

$$350 : 140$$

M1 dep

$$350$$

SC2 490 or 140

A1

[3]

Q24.

$$150 \div (2 + 3) \times 2$$

$$\text{or } 30$$

oe

M1

$$60$$

SC1 90

A1

[2]

Q25.

$$\frac{4860}{5 + 4 + 3} \text{ or } 405$$

$$\text{or } \frac{5}{12} \text{ or } \frac{4}{12} \text{ or } \frac{3}{12}$$

M1

$$2025 \text{ or } 1620 \text{ or } 1215$$

A1

$$2025 \text{ and } 1620 \text{ and } 1215$$

Must be in correct order

A1

Additional Guidance

ANSWERS MUST BE IN THE CORRECT ORDER

BEWARE:

4860/5 = 972, 4860/4 = 1215, 4860/3 = 1620 which gives two correct answers in the wrong order, so answers must be from correct working (972 flags up an incorrect method)

M0A0A0

[3]

Q26.

$$455 \div (1 + 2 + 4) (= 65)$$

oe

M1

4 × their 65

$$\frac{4}{7} \times 455 \text{ scores M2}$$

M1 dep

260

Accept 65 : 130 : 260

A1

[3]

Q27.

Alternative method 1

$$7.5 \div 0.005 \text{ or } 7500 \div 5 \text{ or } 1500$$

oe

M1

their 1500 ÷ 5 × 3 oe

M1

900

SC1 90 or 9 000

A1

Alternative method 2

$$7.5 \div 5 \times 3 \text{ or } 4.5$$

oe eg 7.5 : 4.5

M1

$$\text{their } 4.5 \div 0.005 \text{ or } 4500 \div 5$$

oe

M1

900

SC1 90 or 9 000

A1

Alternative method 3

$$\frac{1000}{5} \div 5 \times 3 \text{ or } 120$$

oe

M1

7.5 × their 120

M1

900

SC1 90 or 9 000

A1

[3]

Q28.

$$224 \div 4 (= 56)$$

M1

their 56 × 3

$$\text{M2 } 224 \times 0.75 \text{ (oe)}$$

M1 dep

168

A1

[3]

Q29.

7.35×4 or $29.4(0)$

oe

M1

$7.35 \div 3$ or $[2.42, 2.45]$

oe

implied by 14.54

allow 0.33 or better

M1

their $29.4(0) - (16.99 - \text{their } 2.45)$

oe

dep on M1M1

M1dep

14.86

A1

Additional Guidance

Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts

The first two marks may be seen in either order

Do not allow use of 0.3

[4]

Q30.

Alternative method 1

500×10 or 5000

M1

their $5000 \div 1500$

or repeated addition of 1500 (at least 3)

Allow their 5000 from 500×10

or 500×11

M1

$3\frac{1}{3}$ or 3.3 (..)

4500 or 6000

$3\frac{1}{3}$ or 3.3(..) can be implied by an an answer of 4 from correct working

A1

4 (bottles)

ft their fraction or decimal answer rounded up to nearest integer.

SC2 for 4 with no working or unsupported

B1 ft

Alternative method 2

1500 ÷ 10 or 150

*1 bottle of water is enough for 150 ml apple juice***M1**

500 ÷ their 150

*or repeated addition of 150 (at least 3)**Allow their 150 from 1500 ÷ 10**or 1500 ÷ 11***M1**

3½ or 3.3 (..)

*450 or 600**3½ or 3.3(..) can be implied by an an answer of 4 from correct working***A1**

4 (bottles)

*ft their fraction or decimal answer rounded up to nearest integer.**SC2 for 4 with no working or unsupported***B1 ft****[4]****Q31.**

60 ÷ 2 (= 30)

or 90 seen

360 ÷ (2 + 3 + 7)

or 210 seen

or 12 (parts) seen

M1

60 ÷ 2 × 12

oe 360 ÷ 12 (= 30)

or 60 + 90 + 210

M1

360

*2 × 30 = 60***A1****[3]****Q32.****Alternative method 1**States or implies that 5 in the ratio for triangle A translates to five eighths of 180.
and

States or implies that 5 in the ratio for triangle B translates to five twelfths of 180.

No as the fractions are not equal.

*B1 for**States or implies that 5 in the ratio for triangle A translates to five eighths of 180.**or**States or implies that 5 in the ratio for triangle B translates to five twelfths of 180.***B2**

Alternative method 2

$$180 \div (1 + 2 + 5) \times 5 = 112.5$$

or

$$180 \div 8 \times 5 = 112.5$$

and

$$180 \div (3 + 4 + 5) \times 5 = 75$$

or

$$180 \div 12 \times 5 = 75$$

and No

B1 for

$$180 \div (1 + 2 + 5) \times 5 = 112.5$$

or

$$180 \div 8 \times 5 = 112.5$$

or

$$180 \div (3 + 4 + 5) \times 5 = 75$$

or

$$180 \div 12 \times 5 = 75$$

B2**Alternative method 3**

$$22.5^\circ \text{ and } 45^\circ \text{ and } 112.5^\circ$$

and

$$45^\circ \text{ and } 60^\circ \text{ and } 75^\circ$$

and No

B1 for

$$22.5^\circ \text{ and } 45^\circ \text{ and } 112.5^\circ$$

or

$$45^\circ \text{ and } 60^\circ \text{ and } 75^\circ$$

[2]**Q33.****Alternative method 1**

$$(\text{guitars} =) 80 \div 2 \quad \text{or} \quad 40$$

oe

M1

$$\text{their } 40 \div (3 + 4 + 1) \quad \text{or} \quad 5$$

oe

M1dep

$$3 \times \text{their } 5$$

oe

$$\frac{3}{3+4+1} \times 40 \quad \text{is M3}$$

M1dep

$$15$$

A1

Alternative method 2

$$80 \div (3 + 4 + 1) \quad \text{or} \quad 10$$

oe

M1

$$3 \times \text{their } 10 \quad \text{or} \quad 30$$

oe

M1dep

$$\text{their } 30 \div 2$$

oe

M1dep

15

A1**Alternative method 3**

$$(\text{guitars} =) 80 \div 2 \quad \text{or} \quad 40$$

oe

M1

$$x + \frac{4}{3}x + \frac{1}{3}x = \text{their } 40$$

*oe equation with x as number of keyboards***M1dep**

$$\frac{14}{3}x = \text{their } 40$$

oe equation in form $ax = b$ **M1dep**

15

A1**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

Other algebraic approaches are possible

eg (guitars =) $80 \div 2$ or 40 M1

$3x + 4x + x = \text{their } 40$

but does not score 2nd M1 until $(x =) \text{their } 40 \div (3 + 4 + 1)$

[4]

Q34.

18.9 ÷ 0.45 or 42

oe

M1

their 42 ÷ 7 × 8 or 48

oe eg $\frac{8}{7} \times \text{their } 42$
or $[1.14, 1.143] \times \text{their } 42$

M1dep

0.45 ÷ 9 × 5 or 0.25

oe eg $\frac{5}{9} \times 0.45$ or $[0.55, 0.56] \times 0.45$
 $\frac{8}{7} \times \frac{5}{9} \times 18.9$ oe scores M3

M1

12

A1

Additional Guidance

Up to M3 may be awarded for correct work with no, or incorrect answer, even if this is seen amongst multiple attempts

Any single calculation or set of calculations that are a correct method and lead to 12

M3

Note that the single calculation $\frac{8}{7} \times \frac{5}{9} \times 18.9$ does not use 0.45

M3

An oe for $\frac{8}{7} \times \frac{5}{9} \times 18.9$ is $\frac{8}{7} \times \frac{18.9}{0.45} \times \frac{5}{9} \times 0.45$

M3

Values may be seen in ratios eg 42 : 48

M1M1

[4]

Q35.

No ticked

and

correct reason

or

correct evaluation of the surface areas for any numerical or algebraic values

or

correct ratio of the surface areas

eg 2 faces are hidden

B1 No ticked

B2

Additional Guidance

Ignore irrelevant reasons or evaluations alongside a correct reason or evaluation, unless contradictory

“No” may be implied by a correct reason

Accept reasoning that uses A as a cube

No ticked and

A has 6, B has 10 (condone sides for faces)

B2

A has 3, B has 5

B2

A has 6 sides, on B each cube only has 5

B2

Ratio is 3:5 (accept equivalent ratios)

B2

The bottom and the top are missing (or covered)

B2

When they are put together you lose two faces

B2

You wouldn't count two sides (condone sides for faces)

B2

Some of the faces are covered

B2

You cannot see one side because they are stacked together

B2

One face covered

B2

Part of the area of A is covered where it joins B

B2

Both touching sides

B2

Yes ticked or Cannot tell ticked

B0

[2]

Q36.

Alternative method 1

2 parts $\rightarrow$ 116

oe

M1

$116 \div 2 \times 16$

oe

M1

928

A1

Alternative method 2

Writes at least 3 ratios or numbers of boys and girls equivalent to 9 : 7

eg 18 : 14 and 180 : 140 and 360 : 280

M1

522 and 406

M1

928

A1

[3]

Q37.

(a) 90 seen or implied

B1

$90 \div 6$ or 15

or $90 \div 6 \times 5$ or 75

oe

M1

30

A1

Additional Guidance

30 without working

B1M1A1

(b) Angle $LMN = 80$

or angle $MLP = 58$

May be on diagram

M1

$180 - 80 - 58$

oe

M1

42

A1

[6]

Q38.

$$g = 180 - 63 \quad \text{or} \quad 117$$

may be seen on diagram

M1

$$f = \text{their } 117 \div 3 \times 2 \quad \text{or} \quad 78$$

oe
may be seen on diagram

M1dep

$$h = 180 - \text{their } 78 \quad \text{or} \quad 102$$

may be seen on diagram
equivalent ratios to 13 : 17 implies M3

M1dep

$$13 : 17$$

accept $1 : \frac{17}{13}$ or $\frac{13}{17} : 1$

A1

Additional Guidance

Up to M3 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts