

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic – Mark Scheme

Geometry

Transformations – Enlargement by a positive scale factor

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.

- (a) Fully correct diagram with vertices within 1mm

B1 for 2 or 3 sides correct from a full hexagon.

B1 for symmetrical diagram (about vertical line) with bottom vertex correct.

Ignore any internal lines.

B2

- (b) (×) 3 (×) or 1 : 3

Accept – 3 or both

B1

[3]

Q2.

Correct shape drawn

B1 two or three correct sides

or

enlargement of the whole shape,

with $sf < 1$ and $sf \neq \frac{1}{3}$

B2

Additional Guidance

Mark intention but whole shape must be on the grid

Shape can be in any position or orientation

[2]

Q3.

Enlarge(ment)

B1

$\frac{1}{2}$

oe condone half

B1

(1, –7)

condone missing bracket(s)

B1

Additional Guidance

For the third mark, a vector on its own does not imply a translation

Do not accept halved or half the size

Multiple transformations stated or implied

BOB0B0

[3]

Q4.

Enlarge(ment)

Allow poor spelling but do not accept any word that may imply a 'shrink' eg delargement

B1

(Scalefactor) $\frac{1}{3}$

*Implied by word 'by' or 'of'
If decimal 0.33 minimum
Do not accept ratio, eg 3 : 1 or 1 : 3*

B1

(centre) (10, 10) or 10, 10

Do not accept $\begin{pmatrix} 10 \\ 10 \end{pmatrix}$

If no centre given in script look on diagram for rays clearly showing centre at (10, 10)

B1

Additional Guidance

Any combined transform

B0

Enlarge factor 3 from (10, 10)

B2

Enlarged by $\frac{1}{3}$ from (1, 4)

Enlarge by scale factor $\frac{1}{3}$ from (10, 10)

B2

Shrink of $\frac{1}{3}$ from (8, 10)

B1

Enlarged factor $\div 3$ from (4, 10)

B1

3 times smaller

B0

[3]

Q5.

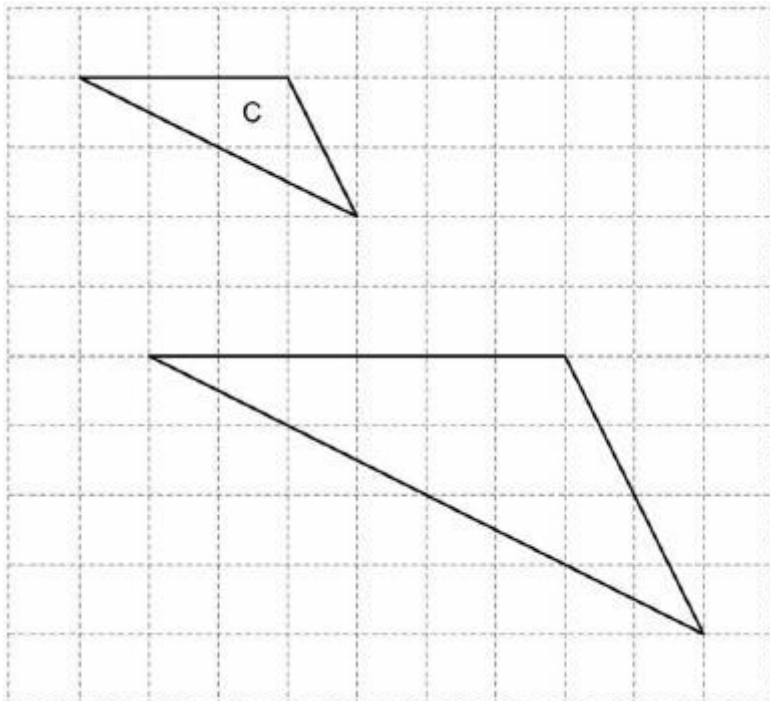
Enlargement drawn with scale factor 2 using given side
any orientation

B1

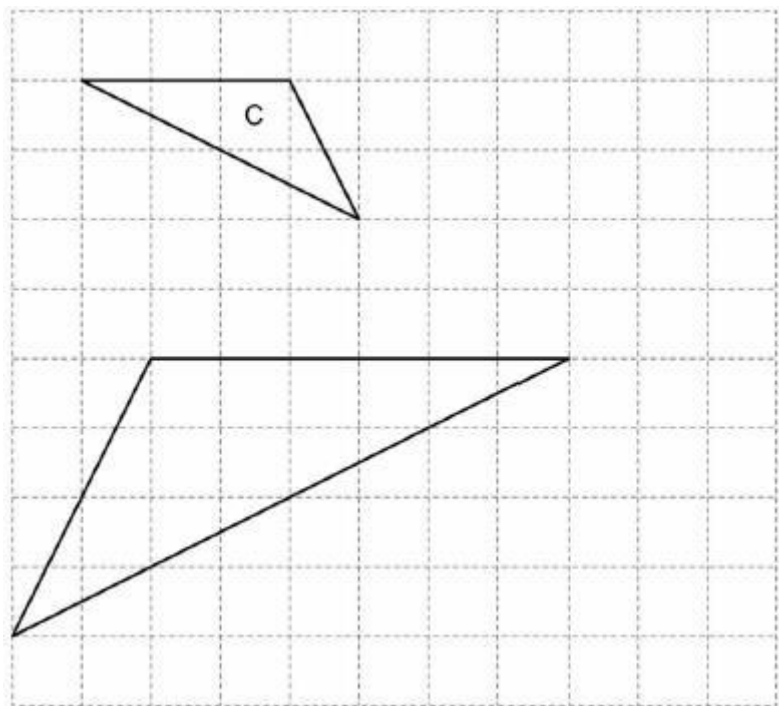
Additional Guidance

Mark intention

Ignore any labels



B1



B1

[1]

Q6.

Enlargement

B1

(scale factor) 3

oe

B1

(centre) (3,0) or this point marked on grid

oe

B1

[3]

Q7.

Enlargement

B1

(scale factor) $\frac{1}{3}$

oe

B1

(centre) origin

oe

B1

[3]

Q8.

Fully correct enlargement

B1 for 2 or 3 correct sides

B1 for fully correct enlargement using SF 2 or 4

B2

[2]

Q9.

Fully correct enlargement by scale factor 2

*B1 for enlargement with incorrect scale factor
or B1 for two sides correct*

B2

[2]

Q10.

$\frac{2}{3}$

oe fraction

B1

Additional Guidance

$\frac{2}{3} = 0.66\dots$

B0

[1]

Q11.

Enlargement

B1

$\frac{1}{4}$

scale factor
oe eg 0.25**B1**

(3, 9) or A

centre

do not allow $\begin{pmatrix} 3 \\ 9 \end{pmatrix}$ **B1****Additional Guidance**

Do not accept reduction or unenlargement or negative

1st B0Do not accept $\div 4$ **2nd B0**

A combination of transformations cannot score the first B1

eg1 Enlarge sf $\frac{1}{4}$ Translate $\begin{pmatrix} 0 \\ 6 \end{pmatrix}$ **B0B1B0**eg2 Enlarge sf $\frac{1}{4}$ 1.5 right up 6 (3, 9)**B0B1B1**Do not allow $\begin{pmatrix} 3 \\ 9 \end{pmatrix}$ for (3, 9) but do not regard as implying a combination of transformationseg Enlargement sf 0.25 $\begin{pmatrix} 3 \\ 9 \end{pmatrix}$ **B1B1B0**

Enlargement, sf 4 about (3, 9)

B1B0B1

Enlarge(d) 0.25 A

B1B1B1Condone *ABC* is an enlargement of *ADE***1st B1**

Condone enlargement with other words unless referring to another transformation

eg1 Enlargement making shapes bigger

1st B1

eg2 Enlarged then moved using a vector

1st B0eg3 Enlarged which means *B* moves to *D* and *C* moves to *E***1st B1**

If more than one point is listed it must be clear which point is their centre

eg (1, 1) (5, 1) (3, 9) (2, 7)

3rd B0

Reflected in the point (3, 9)

B0B0B1**[3]**

Q12.

Isosceles triangle with base 2 cm and height 3 cm in any orientation

$\pm 1/4$ square on base or height

B1

isosceles triangle with base 2 cm or height 3 cm in any orientation

or

acute angled triangle with base 2 cm and height 3 cm in any orientation

B2

Additional Guidance

Mark intention for isosceles triangle within tolerance, lines do not need to be ruled

Enlargement can be drawn wholly or partially inside the original

Correct vertices not connected

B1

Right angled isosceles triangle

B0

[2]

Q13.

Enlargement

B1

Scale factor (x) $\frac{1}{3}$

B1

Centre (5, 1)

B1

Additional Guidance

Enlarge (x) $\frac{1}{3}$ (5,1)

B1B1B1

Reduction or makes bigger or unenlargement or increase or negative enlargement

1st B0

Any other transformation mentioned or implied such as reflection, rotation or translation loses the mark for enlargement

eg enlarged and moved up 4 or enlarged and $\begin{pmatrix} -2 \\ 2 \end{pmatrix}$

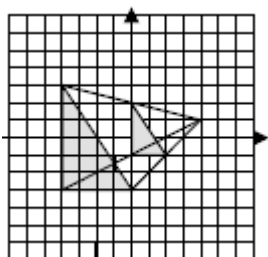
1st B0

Do not accept $\div 3$ for scale factor

2nd B0

[3]

Q14.



*B1 for any correctly sized triangle anywhere.
B1 for 2 vertices correct.
B1 for at least two rays from corners through (4, 1)*

B2
[2]

Q15.

Fully correct at

B1 for correct size

(3, 6), (5, 7), (5, 5), (7, 6)

B1 for at least two correct points as vertices

B2
[2]

Q16.

Fully correct enlargement with vertices at $(-3, -4)$, $(-4, -2)$ and $(-4, -4)$

*B1 for any enlargement SF $\frac{1}{3}$
B1 for 2 correct vertices*

B2
[2]

Q17.

(a) 3×3 , 'times 3', '1:3'

Ignore units

B1

(b) **Alternative method 1**

2 and 18 seen

Can be seen in a subtraction or on diagram

M1

9

A1

Alternative method 2

3^2

ft their sf 3×3

M1

9

A1ft
[3]

Q18.

(a) [1.4, 1.6]

*accept as ratio in form 1: [1.4, 1.6] or as $\times$ [1.4, 1.6]
'increase by half' etc. B0*

B1

(b) 18

ft $12 \times$ their (a)

B1ft

[2]

Q19.

Correct enlargement

Seen or implied

$\frac{1}{2}$
or $\frac{1}{2} \times 3 \times 2$ oe
or Area factor 9
or 9 and 6 seen

B1

$\frac{1}{2}$
or $\frac{1}{2} \times 9 \times 6$ oe
or $\frac{1}{2} \times 3 \times 2 \times 3^2$

M1

27

ft their triangle

A1ft

[3]

Q20.

(a) 12

B1

cm²

B1

(b) ($\times$) 2

Do not accept 'double' or 'twice as big'

B1

[3]

Q21.

12 $\times$ 4

oe
Correct enlargement SF2 drawn

M1

48

A1

cm²

B1

[3]

Q22.

- (a) 4×5.1 or 20.4
 or 4×9.4 or 37.6
 or 4×3.7 or 14.8

M1

20.4 and 37.6 and 14.8

*Any order**SC1 for 1.275, 2.35 and 0.925***A1**

- (b) $4 \times 4 \times 4$ or 4^3
 or $5.1 \times 9.4 \times 3.7$ or 177(.378)
 or their $(20.4 \times 37.6 \times 14.8)$
 or 11 352(.192)

M1

64

A1**[4]****Q23.**

- (a) $\frac{1}{2}$ or 0.5 or 50%
 oe

B1

- (b) 10×6 or 60
 or 5×3 or 15

M1

60 and 15

 $2^2 : 1^2$ *States Area A is four times Area B oe***A1**

4 : 1

*SC2 for 1 : 4***A1****Additional Guidance**

Units given alongside answer, eg 4 cm : 1 cm

M1 A1 A0

60 : 15

M1 A1 A0

15 : 60

M1 A1 A0**[4]**