

GCSE Mathematics (1MA1)

Themed papers – Similarity

Compiled from student-friendly mark schemes

Please note that this mark scheme is not the one used by examiners for making scripts. It is intended more as a guide to good practice, indicating where marks are given for correct answers. As such, it doesn't show follow-through marks (marks that are awarded despite errors being made) or special cases.

It should also be noted that for many questions, there may be alternative methods of finding correct solutions that are not shown here – they will be covered in the formal mark scheme.

NOTES ON MARKING PRINCIPLES

Guidance on the use of codes within this mark scheme

M1 – method mark. This mark is generally given for an appropriate method in the context of the question. This mark is given for showing your working and may be awarded even if working is incorrect.

P1 – process mark. This mark is generally given for setting up an appropriate process to find a solution in the context of the question.

A1 – accuracy mark. This mark is generally given for a correct answer following correct working.

B1 – working mark. This mark is usually given when working and the answer cannot easily be separated.

C1 – communication mark. This mark is given for explaining your answer or giving a conclusion in context supported by your working.

Some questions require all working to be shown; in such questions, no marks will be given for an answer with no working (even if it is a correct answer).

Question 1 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$AE = \frac{8.1}{5.4} \times 2.6$	M1	This mark is given for a method to find the length <i>AE</i>
	3.9	A1	This mark is given for the correct answer only
(b)	$BC = 6.15 \times \frac{5.4}{8.1} = 4.1$ $AB = 6.15 - 4.1$	M1	This mark is given for a method to find the length <i>AB</i>
	2.05	A1	This mark is given for the correct answer only

Question 2 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Volume shape A : volume shape B = $= (\sqrt{3})^3 : (\sqrt{4})^3$ $= \sqrt{27} : 8$	M1	This mark is given for a method to find the scale factors of volumes
	Volume shape A = $\sqrt{27} \times \frac{10}{8}$	M1	This mark is given for a method to use the ratio of volumes to find the volume of shape A
	6.5	A1	This mark is given for the correct answer only

Question 3 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$160 \div (10 \div 8)^2$ or $160 \times (8 \div 10)^2$	M1	This mark is given for a method to determine the ratio of the areas and so find the area of the base of pot A
	102.4	A1	This mark is given for a correct answer only

Question 4 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{8}{12} \times 15 = 10$	1	This mark is given for finding a scale factor
	$x = 10 - 8 = 2$	1	This mark is given for the correct answer only
	$(12 + 3) \times 1.5$	1	This mark is given for finding another scale factor
	$x = 22.5 - 8 = 14.5$	1	This mark is given for the correct answer only
		1	This mark is given for describing both assumptions for similarity

Question 5 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Ratio of lengths of containers = $\sqrt{4} : \sqrt{9} = 2 : 3$	P1	This mark is given for a process to find corresponding lengths of the containers
	Ratio of volumes of containers = $2^3 : 3^3 = 8 : 27$	P1	This mark is given for a process to find corresponding volumes of the containers
	$\frac{27}{8}$	P1	This mark is given for a process to find how much bigger container B is than container A
	$\frac{27}{8} = 3.375$ so 4 times	C1	This mark is given for the correct number of times Tyler fills container A

Question 6 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\sqrt{4} : \sqrt{25}$ $= 2 : 5$	P1	This mark is given for a process to find the ratio of the lengths A:B
	$\sqrt[3]{27} : \sqrt[3]{64}$ $= 3 : 4$	P1	This mark is given for a process to find the ratio of the lengths B:C
	$6 : 15 : 20$	P1	This mark is given for a process to find the ratio of the lengths A:B:C
	$3 : 10$	A1	This mark is given for the correct answer only

Question 7 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Lengths ratio $= \sqrt[3]{27} : \sqrt[3]{8} = 3 : 2$	1	This mark is for finding a ratio of the lengths associated with the cone
	Areas ratio $= 3^2 : 2^2 = 9 : 4$	1	This mark is for finding a ratio of the areas associated with the cone
	Thus the surface area of cone B $= \frac{297}{9} \times 4 = 132$	1	This mark is given for the correct conclusion following correct arithmetic

Question 8 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\left(\frac{500}{150}\right)^{\frac{1}{3}} \times 5$	P1	This mark is given for a process to find a volume scale factor
	7.47	A1	This mark is given for the correct answer only

Mark scheme for 1MA1 Higher themed papers: Similarity

Performance data:

Q	Taken from			Total Marks available	TOPIC	Spec Ref	AO	% Mean marks	Edexcel mean averages Marks of candidates who achieved grade:										
	Q	Series	Paper						ALL	9	8	7	6	5	4	3	2	1	U
1a	5a	June 2017	2H	2	Ratio	R12, G19	1	43	0.86	1.89	1.61	1.22	0.83	0.47	0.19	0.06	-	-	0.03
1b	5b	June 2017	2H	2	Ratio	R12,	1	34	0.67	1.67	1.34	0.96	0.60	0.32	0.13	0.06	-	-	0.05
2	13	June 2018	3H	3	Ratio	R12, G19	3	20	0.61	2.60	1.74	0.85	0.28	0.07	0.01	0.00	-	-	0.00
3	15	Mock Set 1	3H	2	Ratio	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	22	Nov 2017	1H	5	Ratio	R19, G19	3	7	0.36	2.50	1.79	1.61	1.07	0.71	0.29	0.10			0.05
5	17	Nov 2019	1H	4	Ratio	R12	3	6	0.23	3.33	2.51	1.11	0.42	0.11	0.02	0.01	-	-	0.03
6	15	Nov 2018	1H	4	Ratio	R4, R12, G19	3	5	0.21	3.90	2.15	1.01	0.39	0.21	0.06	0.02	-	-	0.01
7	14	Nov 2017	3H	3	Ratio	R12, G19	2	3	0.08	2.12	1.82	0.71	0.37	0.08	0.02	0.00			0.00
8	17	Mock Set 3	2H	2	Ratio	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				27					3.02	18.01	12.96	7.47	3.96	1.97	0.72	0.25			0.17