



Free-Standing Mathematics Qualification **Mathematics**

4982 Using Spatial Techniques
Mark scheme

4982
June 2016

Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk.

Key to mark scheme abbreviations

M	mark is for method
m or dM	mark is dependent on one or more M marks and is for method
A	mark is dependent on M or m marks and is for accuracy
B	mark is independent of M or m marks and is for method and accuracy
E	mark is for explanation
✓ or ft or F	follow through from previous incorrect result
CAO	correct answer only
CSO	correct solution only
AWFW	anything which falls within
AWRT	anything which rounds to
ACF	any correct form
AG	answer given
SC	special case
oe	or equivalent
A2,1	2 or 1 (or 0) accuracy marks
-x EE	deduct x marks for each error
NMS	no method shown
PI	possibly implied
SCA	substantially correct approach
c	candidate
sf	significant figure(s)
dp	decimal place(s)

No Method Shown

Where the question specifically requires a particular method to be used, we must usually see evidence of use of this method for any marks to be awarded.

Where the answer can be reasonably obtained without showing working and it is very unlikely that the correct answer can be obtained by using an incorrect method, we must award **full marks**. However, the obvious penalty to candidates showing no working is that incorrect answers, however close, earn **no marks**.

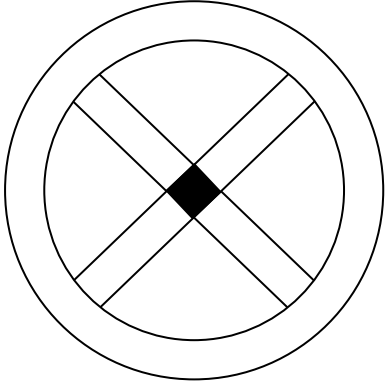
Where a question asks the candidate to state or write down a result, no method need be shown for full marks.

Where the permitted calculator has functions which reasonably allow the solution of the question directly, the correct answer without working earns **full marks**, unless it is given to less than the degree of accuracy accepted in the mark scheme, when it gains **no marks**.

Otherwise we require evidence of a correct method for any marks to be awarded.

Question	Solution	Mark	Total	Comment
1(a)	cm	B1	1	
1(b)	m	B1	1	
1(c)	m ²	B1	1	
1(d)	inches	B1	1	
	Total		4	

Question	Solution	Mark	Total	Comment
2	tape measure	B1	1	
	Total		1	

Question	Solution	Mark	Total	Comment
3(a)	Point indicated within central crossing area.	B1	1	
				Point must be clear if lines drawn.
3(b)	4	B1	1	
3(c)	20	B1	1	
	Total		3	

Question	Solution	Mark	Total	Comment
4	$(x =) 180 - 110$	M1	4	oe Do not accept if then divided by 2 SC3 if both method marks awarded but answers wrong way round.
	$(x =) 70$	A1		
	$(y =) 360 - (110 + 105 + 70)$	M1		
	$(y =) 75$	A1		
	Total		4	

Question	Solution	Mark	Total	Comment
5(a)	(Triangular) prism	B1	1	Allow approximate spelling
5(b)	$180 \div 3$	M1	2	or 3×60 oe
	60°	A1		
5(c)	$\frac{1}{2} \times 6 \times 5$	M1	2	oe
	15	A1		
5(d)	30×6 or 180	M1	4	$30 \times 6 \times 5 = M0$
	their 180×3 or 540	dM1		
	their $540 + 2 \times$ their 15	M1		oe their 540 can be any number
	570	A1ft		ft $540 + 2 \times$ their (c) correctly evaluated
Total			9	

Question	Solution	Mark	Total	Comment
6(a)	Length = 60 (cm) Base = 12 (cm) Height = 10 (cm)	B2	3	B1 for any 2 correct Condone lack of units, but must be correct if stated.
	Angle $x = 60^\circ, 60^\circ$	B1ft		ft from 5(b) Ignore units
6(b)	$\frac{1}{2} \times$ their base \times their height \times their length	M1ft	2	$\frac{1}{2} \times 60 \times 12 \times 10$
	3600	A1ft		ft from 6(a) SC1 for 450
Total			5	

Question	Solution	Mark	Total	Comment
7	Arc centred on A or B	B1	3	Radius more than $\frac{1}{2}AB$
	Arcs centred on A and B with the same radius, which cross above and below the line	B1		
	Perpendicular bisector drawn, $90^\circ \pm 2$, midpoint ± 0.2 cm	B1		Correct ruled line with no arcs B0B0B1
Total			3	

Question	Solution	Mark	Total	Comment
8	Any two of [6.4, 6.6] and [3.3, 3.5] and [3.1, 3.3]	M1	3	Max M1M1A0 if both are 165 SC2 for two correct SC1 for one correct
	Their [6.4, 6.6] × 50 and their [3.3, 3.5] × 50 and their [3.1, 3.3] × 50	M1		
	[320, 330](cm) and [155, 165](cm) and [165, 175](cm) or [3.2, 3.3] m and [1.55, 1.65] m and [1.65, 1.75] m	A1		
	Total		3	

Question	Solution	Mark	Total	Comment
9(a)	2.1 – 0.15 or 210 – 15 or 195	M1	2	Accept 195 cm if units changed
	1.95	A1		
9(b)	0.65	B1	1	
9(c)	2 × their 1.95 + 2 × their 0.65	M1	2	oe ft their height and width Accept 520 cm if units changed
	5.2	A1ft		
9(d)	Pentagon	B1	1	Allow approximate spelling
	Total		6	

Question	Solution	Mark	Total	Comment
10	50 or 40 or 2000	M1	2	Accept other valid estimate plus comment
	50 × 40 = 2000	A1		
	Total		11	
	TOTAL		40	