



---

# Functional Skills Certificate **Functional Mathematics**

Level 2  
Mark scheme

---

4368  
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](http://aqa.org.uk)

## Glossary for Mark Schemes

Examinations are marked to award positive achievement.

Marks are awarded for demonstrating the following interrelated **process skills**.

**Representing** Selecting the mathematics and information to model a situation.

- R.1** Candidates recognise that a situation has aspects that can be represented using mathematics.
- R.2** Candidates make an initial model of a situation using suitable forms of representation.
- R.3** Candidates decide on the methods, operations and tools, including ICT, to use in a situation.
- R.4** Candidates select the mathematical information to use.

**Analysing** Processing and using mathematics.

- A.1** Candidates use appropriate mathematical procedures.
- A.2** Candidates examine patterns and relationships.
- A.3** Candidates change values and assumptions or adjust relationships to see the effects on answers in models.
- A.4** Candidates find results and solutions.

**Interpreting** Interpreting and communicating the results of the analysis.

- I.1** Candidates interpret results and solutions.
- I.2** Candidates draw conclusions in light of situations.
- I.3** Candidates consider the appropriateness and accuracy of results and conclusions.
- I.4** Candidates choose appropriate language and forms of presentation to communicate results and solutions.

In particular, individual marks are mapped onto the following **skills standards**.

**Representing** Making sense of the situations and representing them.

A learner can:

- Ra** Understand routine and non-routine problems in familiar and unfamiliar contexts and situations.
- Rb** Identify the situation or problems and identify the mathematical methods needed to solve them.
- Rc** Choose from a range of mathematics to find solutions.

**Analysing** Processing and using the mathematics.

A learner can:

- Aa** Apply a range of mathematics to find solutions.
- Ab** Use appropriate checking procedures and evaluate their effectiveness at each stage.

**Interpreting** Interpreting and communicating the results of the analysis.

A learner can:

- Ia** Interpret and communicate solutions to multistage practical problems in familiar and unfamiliar contexts and situations.
- Ib** Draw conclusions and provide mathematical justifications.

To facilitate marking, the following categories are used:

- 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 following a mistake in an earlier step.
- SC** Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
- oe** Or equivalent. Accept answers that are equivalent.  
eg, accept 0.5 as well as  $\frac{1}{2}$

Q	Answer	Mark	Comment
1(a)	388	B1 Aa	circled or indicated
1(b)	3 × 52 or 156 or 4 × 65 or 260	M1 Rb	416 or 804 seen implies M1
	their (156 + 260 + 388) × 5 ÷ 100 or their 804 × 5 ÷ 100 or 40.2(0)	M1 Rc	or 0.95 seen ft their 388 from (a) their 804 must be an amount of money
	their 804 – their 40.2(0) (÷ 4)	M1 Aa	0.95 × their 804 scores M2 allow if their 804 is <b>not</b> an amount of money
	190.(95) and Yes or 191 and Yes or 804 and 763.(80) or 764 and Yes	A1ft <i>lb</i>	ft their 388 from (a)
	<b>Additional Guidance</b>		
	their 804 can be their 156 or their 260 or their 416 or their 388 These answers score M3 A1ft		
	their 388 = 378 188.(575) or 189 and Yes 794 and 754.(3) and Yes	their 388 = 410 196.(175) and Yes 826 and 784.(7) and Yes	their 388 = 508 219.(45) and No 924 and 877.(8) and No
	If 5% of their 804 is incorrect, the <b>3<sup>rd</sup> M1</b> can be awarded only if a method is seen.		
	Forgetting their 388 → 98.8(0) scores M3A0		
	<b>Misreads</b> → allow these misreads only		29 or 111 for 65 and 28 or 105 for 52

Q	Answer	Mark	Comment
1(c)	<p>Correctly uses mile values for km values totaling 960 km</p> <p>e.g. <math>250 + 250 + 100 = 600</math> (miles)</p> <p><math>150 \times 4 = 600</math> (miles)</p> <p>or</p> <p>Correctly uses km values for mile values totaling 600 miles</p> <p>eg <math>400 + 400 + 160 = 960</math> (km)</p> <p><math>240 \times 4 = 960</math> (km)</p> <p>Correctly uses a conversion factor obtained from graph</p> <p>e.g. <math>960 \div 80 \times 50 = 600</math> (miles)</p> <p><math>960 \div 240 \times 150 = 600</math> (miles)</p>	<p>B2</p> <p>Rb</p> <p>lb</p>	<p>B1 Attempts to use or incomplete use of mile values for km values totaling 960</p> <p>km values for mile values totaling 600</p> <p>any conversion factor obtained from graph</p> <p>For B1 allow all values <math>\pm \frac{1}{2}</math> small square</p> <p>SC1 1.6 or 0.625 seen or used with no evidence that the value has been obtained from the graph</p>
	<p><b>Additional Guidance</b></p> <p>250 + 250 + 100 is obtained from 400km + 400km + 160km</p> <p>150 x 4 is obtained from 240km</p> <p>These values are the easiest to read accurately but any combination can be used.</p> <p><b>Award B1 for</b></p> <p>Correct method with inaccurate readings <math>\pm \frac{1}{2}</math> square e.g. uses [395, 405] instead of 400</p> <p>Correct method but the final '= 600' or '= 960' is not given or is worked out incorrectly</p>		
1(d)	<p>their <math>600 \div 40 (\times 5)</math></p> <p>or</p> <p><math>15 (\times 5)</math></p>	<p>M1</p> <p>Ra</p>	<p>or <math>960 \div [60, 70] (\times 5)</math></p>
	(£)75		
Check	reverse or alternative calculation	<p>B1ft</p> <p>Ab</p>	eg $75 \div 5 \times 40 = 600$
<p><b>Additional Guidance</b></p> <p><b>Holistic marking</b></p> <p>Award marks for 1(d) if working seen in space for check</p> <p>Award marks for check if seen in space for 1(d)</p> <p>Treat contradictory work in both spaces as choice</p>			

Q	Answer	Mark	Comment
1(e)	stays at 3 or 4 different campsites including Point St Gilles	B1 Aa	not Caen
	distances correct and less than 5 hours (less than 375 km)	B1 Aa	allow if at least three different distances are given with a maximum of one incorrect
	return to Caen included	B1 Aa	can be > 375 km
	<p>fully correct and clearly communicated plan including</p> <p>3 or 4 different campsites named including Point St Gilles</p> <p>all distances correct and &lt; 375 km</p> <p>journey from Caen both at start (can be implied by correct distance to 1<sup>st</sup> campsite) and end (must be named)</p> <p>total number of nights at campsites given and equal to 14</p>	B2 la	<p>B1 clearly communicated plan including</p> <p>3 or 4 different campsites named</p> <p>all distances attempted</p> <p>number of nights at each campsite attempted</p> <p>For B1</p> <p>distances and number of nights can be incorrect</p> <p>campsites need not include Point St Gilles</p>
<b>Additional Guidance</b>			
<p>Ignore incorrect times if distances are given</p> <p>Correct times imply correct distances and can score B4 if distances are not given</p> <p>If La Croix Paris is the 1<sup>st</sup> campsite chosen a direct journey to a subsequent campsite is &gt; 375km so maximum possible score is B1B0B1B1</p> <p><b>Visiting the same campsite more than once</b></p> <p>Counts only as one different campsite</p> <p>If the journey to and from this campsite is the same</p> <p>For final B2 → the distance need be given only once</p> <p>For 2<sup>nd</sup> B1 → only counts as one distance</p>			

Q	Answer	Mark	Comment	
2(a)	<b>Alternative Method 1</b>			
	150 × 1.25 or 187.5(0) or 80 × 3.6(0) or 288 or 35 × 4.5(0) or 157.5(0)	M1 Ra	cost from one or more components	
	their 187.5(0) + their 288 + their 157.5(0) or 633	M1 Rb	total cost from 3 components	
	150 × 1.8(0) or 270 and 30 × 5.2(0) or 156 and 20 × 6 or 120	M1 Aa	income at normal prices implied by 546	
	6 – 0.6 × 6 or 0.4 × 6 or 2.4(0)	M1 Aa	reduced price of kettles	
	(80 – 30) × 5.2(0) ÷ 2 or 130 and (35 – 20) × their 2.4(0) or 36	M1 Ra	income at reduced prices 166 implies M2 184 implies M1	
	their 270 + their 156 + their 120 + their 130 + their 36 or their 546 + their 166 or 712	M1 Rb	total income from 5 components	
	their 712 – their 633	their 633 + 75 or 708	M1 Rc	their 712 must be from at least 3 components
	79 and Yes	708 and 712 and Yes	A2 lb lb	A1 79 or 708 and 712 A1ft correct decision based on their value must score 2 <sup>nd</sup> M1, 6 <sup>th</sup> M1 and 7 <sup>th</sup> M1
	<b>Additional Guidance</b>			
633 → M2	712 → M4	730 → M3	97 and Yes → M6A1ft	



Q	Answer	Mark	Comment	
2(a)	<b>Alternative Method 2</b>			
	1.8(0) – 1.25 or 0.55	M1 Ra	profit per mug	
	their 0.55 × 150 or 82.5(0)	M1 Rb	profit on mugs	
	6 – 0.6 × 6 or 0.4 × 6 or 2.4(0)	M1 Aa	reduced price of kettles	
	(80 – 30) × 5.2(0) ÷ 2 or 130 and (35 – 20) × their 2.4(0) or 36	M1 Aa	income at reduced prices	
	80 × 3.6(0) – 30 × 5.2(0) – their 130 or 288 – 156 – their 130 or 2	M1 Ra	loss on saucepans	
	35 × 4.5(0) – 20 × 6 – their 36 or 157.5(0) – 120 – their 36 or 1.5(0)	M1 Rb	loss on kettles	
	their 82.5(0) – their 2 – their 1.5(0)	M1 Rc	total profit	
	79 and Yes	A2 Ib Ib	A1 79 A1ft correct decision based on their value must score 2 <sup>nd</sup> M1, 6 <sup>th</sup> M1 and 7 <sup>th</sup> M1	
	<b>Additional Guidance</b>			
82.5 → M2	2 → M1	1.5(0) → M2	19.5(0) → M1	97 and Yes → M6A1ft
	2 and 1.5(0) → M4			

Q	Answer	Mark	Comment
2(b)	Tom works for between 1 and 4 hours inclusive before 1 pm	B1 <i>Ra</i>	do not award if Tom appears on same row more than once
	Ali works for exactly 3 hours and Wes works for exactly 4 hours	B1 <i>Rb</i>	do not award if Ali or Wes appear on same row more than once
	all 5 work with nobody doing 5 or more consecutive hours	B1 <i>la</i>	do not award if rota is incomplete
	all 5 work and 3 different people at each hour	B1 <i>la</i>	do not award if rota is incomplete
	<b>Additional Guidance</b>		
Tom in more than once in the same row can score a maximum of B0B1B1B0 only Ali or Wes in more than once in the same row can score a maximum of B1B0B1B0 only Tom <b>and</b> Ali or Wes in more than once in the same row can score a maximum of B0B0B1B0 only			
3(a)	<b>Alternative Method 1</b>		
	(6 × 3) + (2 × 4) or 18 + 8 or 26	M1 <i>Ra</i>	
	(their 18 + their 8) × 1500 or 39 000	M1 <i>Rb</i>	
	their 39 000 ÷ 60 ÷ 60 or 650 ÷ 60 or 10.8(3 ...)	M1 <i>Rc</i>	
	10 hours 50 minutes	A1 <i>Aa</i>	

Q	Answer	Mark	Comment
<b>3(a)</b>	<b>Alternative Method 2</b>		
	(6 × 3) and (2 × 4) or 18 and 8	M1 Ra	26 implies M1
	their 18 × 1500 or 27 000 and their 8 × 1500 or 12 000	M1 Rb	
	their 27 000 ÷ 60 ÷ 60 or 450 ÷ 60 or 7.5 and their 12 000 ÷ 60 ÷ 60 or 200 ÷ 60 or 3.3(3 ...)	M1 Rc	
	10 hours 50 minutes	A1 Aa	
	<b>Additional Guidance</b>		
	10.8(3 ...) → M3	7.5 & 3.3(3 ...) → M3	650 → M2

Q	Answer	Mark	Comment	
3(b)	<b>Alternative Method 1</b>			
	1500 × 11 or 16500	M1 Ra	or 1500 × 0.11 or 165	
	(1500 – their 1140) × 0.9 or their 360 × 0.9 or 324	(1500 – their 1140) × 50 or their 360 × 50 or 18 000	M1 Rb	(1500 – their 1140) × 0.9 or their 360 × 0.9 or 324  (1500 – their 1140) × 0.5(0) or their 360 × 0.5(0) or 180
	their 324 × 50 or 16 200	their 18 000 × 0.9 or 16 200	M1 Aa	their 324 × 0.5(0) or 162  or their 180 × 0.9 or 162
	16 500 and 16 200 and No or 165 and 162 and No		A2 lb	A1 16 500 and 16 200 or 165 and 162 or A1ft correct decision for their values must score all three M marks
3(b)	<b>Alternative Method 2</b>			
	1500 × 11 or 16500	M1 Ra	or 1500 × 0.11 or 165	
	(1500 – their 1140) × 0.9 or their 360 × 0.9 or 324	M1 Rb		
	their 16 500 ÷ their 324	M1 Aa	or their 165 ÷ their 324	
	50.9 ... or 51 and No or 0.509... or 0.51 and No	A2 lb	A1 50.9 ... or 51 or 0.509 ... or 0.51 or A1ft correct decision for their value must score all three M marks	

Q	Answer	Mark	Comment
3(b)	<b>Alternative Method 3</b>		
	1500 × 11 or 16500	M1 Ra	or 1500 × 0.11 or 165
	(1500 – their 1140) × 0.9 or their 360 × 0.9 or 324	M1 Rb	
	their 16 500 ÷ 50 or 330	M1 Aa	or their 165 ÷ 0.5(0) or 330
	324 and 330 and No	A2 lb	A1 324 and 330 or A1ft correct decision for their values must score all three M marks
3(b)	<b>Alternative Method 4</b>		
	1500 × 11 or 16 500	M1 Ra	or 1500 × 0.11 or 165
	(1500 – their 1140) × 50 or 18 000	M1 Rb	or (1500 – their 1140) × 0.5(0) or 180
	their 16 500 ÷ their 18 000 (× 100)	M1 Aa	or their 165 ÷ their 180 (× 100)
	91.6(6 ...) or 91.67 or 91.7 and No	A2 lb	A1 91.6(6 ...) or 91.67 or 91.7 and No or A1ft correct decision for their values must score all three M marks

Q	Answer	Mark	Comment
3(c)	$12 \times 4 + 13 \times 8 + 14 \times 16 + 15 \times 12 + 16 \times 7 + 17 \times 2 + 18 \times 1 = 720$ or $48 + 104 + 224 + 180 + 112 + 34 + 18 = 720$	B2 lb	B1 Allow up to three errors or omissions
	<b>Additional Guidance</b>		
	Working may be next to table Omitting '= 720' is an omission		
3(d)	<b>Alternative Method 1</b>		
	720 ÷ 50 or 14.4	450 ÷ 50 or 9	M1 Rb
	their 14.4 × 450	their 9 × 720	M1 Aa
	6480 and Yes		A2 lb A1 6480 or A1ft correct decision for their value must score M2 decision should be yes if their 6480 = [6450, 6550]
3(d)	<b>Alternative Method 2</b>		
	720 ÷ 50 or 14.4		M1 Rb
	6500 ÷ their 14.4		M1 Aa
	451 or 451.3 ... or 451.4 and Yes		A2 lb A1 451 or 451.3 ... or 451.4 or A1ft correct decision for their values must score M2 decision should be yes if their 451.3 = [447.9, 454.9]

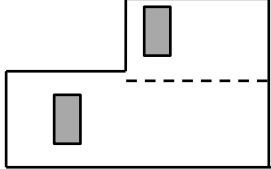
Q	Answer	Mark	Comment
<b>3(d)</b>	<b>Alternative Method 3</b>		
	their $720 \div 50$ or 14.4	M1 Rb	
	6500 $\div$ 450 or 14.44(4 ...)	M1 Aa	
	14.44(4 ...) and 14.4 and Yes	A2 lb	A1 14.44(4 ...) and 14.4 or A1ft correct decision for their values must score M2 decision should be yes if their $14.44(4 \dots) = [14.3, 14.6]$
<b>3(d)</b>	<b>Alternative Method 4</b>		
	$450 \div 50$ or 9	M1 Rb	
	6500 $\div$ their 9	M1 Aa	
	722.(2 ...) and Yes	A2 lb	A1 722.(2 ...) or A1ft correct decision for their values must score M2 decision should be yes if their $722.(2 \dots) = [716.6, 727.7]$

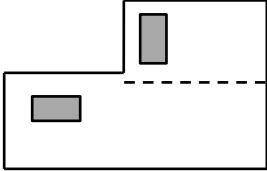
Q	Answer	Mark	Comment
<b>3(d)</b>	<b>Alternative Method 5</b>		
	450 ÷ 50 or 9	M1 Rb	
	6500 ÷ 720 or 9.02(7 ...) or 9.028 or 9.03	M1 Aa	
	9 and 9.02(7 ...) or 9.028 or 9.03 and Yes	A2 lb	A1 9 and 9.02(7 ...) or 9.028 or 9.03 or A1ft correct decision for their values must score M2 decision should be yes if their 9.02(7 ...) = [8.958, 9.097]

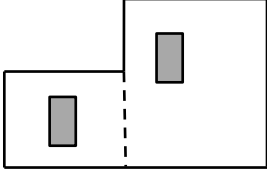



Q	Answer	Mark	Comment
4(a)	530 + 120 or 650	M1 Ra	530 × 10 or 5300 and 120 × 10 or 1200 or 530 × 11 or 5830 and 120 × 11 or 1320
	7100 ÷ their 650 or their 650 × 10 = 6500 or their 650 × 11 = 7150	M1 Rc	their 650 can be 410 their 650 cannot be 530 or 120 their 5300 + their 1200 or 6500 or their 5830 + their 1320 or 7150
	10.9 ... or 11	A1 Aa	SC1 17.3 ...
4(a) Check	reverse calculation 7100 ÷ 10.9 ... = 650 and 650 – 120 = 530 or 7100 ÷ 11 = 645. (45) (allow 650) And 645.(45) – 530 = 125.(45) or 650 – 530 = 120 or alternative method	B1ft Ab	or 7150 ÷ 11 = 650 or 6500 ÷ 10 = 650 and 650 – 120 = 530 ft their values
4(a)	<b>Additional Guidance</b> <b>Holistic marking</b> Award marks for 4(a) if working seen in space for check Award marks for check if seen in space for 4(a) Treat contradictory work in both spaces as choice <b>Note</b> that 650 × 11 = 7150 (oe) on its own is only a valid check if it is an alternative method. To score as a reverse method it also needs 650 – 530 = 120 (oe)		

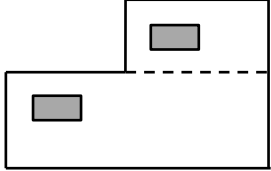
Q	Answer	Mark	Comment
4(b)	$16 \times 250 \div 1000 = 4$ (kW) or $16 \times 250 = 4000$ watts = 4 kilowatts or (4 kW =) 4000 w and $4000 \div 250 = 16$ or $250 \times 16 = 4000$ or $250 \times 4 = 1$ kW and $4 \times 4 = 16$	B1 <i>lb</i>	or $250 \div 1000 = 0.25$ (kW) and $4 \div 0.25 = 16$ or $16 \times 0.25 = 4$
	<b>Additional Guidance</b>		
	Award only if a clear connection between watts and kilowatts is seen This could either be through correct use of 1000 or correct use of units		
4(c)	$0.5 \times 10.3 + 4.5$ or $5.15 + 4.5$ or 9.65	M1 <i>Ra</i>	Step 1
	their $9.65 \times 4 \times 0.35$ or 13.51	M1 <i>Rc</i>	Step 2
	31 x their 13.51	M1 <i>Aa</i>	Step 3 allow 30 x their 13.51 or 405.3
	418.(81) or 419 and Yes	A2 <i>lb</i>	A1 418.(81) or 419 A1ft Correct conclusion from their value Must score at least two M marks

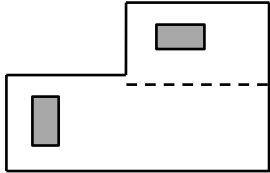
Q	Answer	Mark	Comment
<b>4(d)</b>	<b>Alternative Method 1</b>		
	For the arrangement of panels shown Can score a maximum of M3A2		
	6.8 ÷ 1.082 or 6.28 ... or 6 or 3.7 ÷ 1.575 or 2.34 ... or 2 or 4.6 ÷ 1.082 or 4.25 ... or 4	M1 Ra	allow clear indication of correct integer values on diagram
	6.8 ÷ 1.082 or 6.28 ... or 6 and 3.7 ÷ 1.575 or 2.34 ... or 2 and 4.6 ÷ 1.082 or 4.25 ... or 4	M1 Aa	
	their 6 × their 2	M1 Aa	must use integers allow correct integer answer
	6 × 2 + 4 = 16 and Yes	A2 /a /b	A1 6 × 2 + 4 = 16 A1ft correct conclusion from their values must score M3
	<b>Additional Guidance</b>		
See extra sheet for possible arrangements that do <b>not</b> give 16 panels Correct bottom section only → M1M0M1A0 <b>Contradiction between the diagram and working lines</b> → mark working lines			

Q	Answer	Mark	Comment
<b>4(d)</b>	<b>Alternative Method 2</b>		
	For the arrangement of panels shown Can score a maximum of M3A2		
	6.8 ÷ 1.575 or 4.31 ... or 4 or 3.7 ÷ 1.082 or 3.41 ... or 3 or 4.6 ÷ 1.082 or 4.25 ... or 4	M1 Ra	allow clear indication of correct integer values on diagram
	6.8 ÷ 1.575 or 4.31 ... or 4 and 3.7 ÷ 1.082 or 3.41 ... or 3 and 4.6 ÷ 1.082 or 4.25 ... or 4	M1 Aa	
	their 4 × their 3	M1 Aa	must use integers allow correct integer answer
	4 × 3 + 4 = 16 and Yes	A2 /a /b	A1 6 × 2 + 4 = 16 A1ft correct conclusion from their values must score M3
	<b>Additional Guidance</b>		
See extra sheet for possible arrangements that do <b>not</b> give 16 panels Correct bottom section only → M1M0M1A0 <b>Contradiction between the diagram and working lines</b> → mark working lines			

Q	Answer	Mark	Comment
4(d)	<b>Alternative Method 3</b>		
	For the arrangement of panels shown Can score a maximum of M3A2		
	2.2 ÷ 1.082 or 2.03 ... or 2 or 3.7 ÷ 1.575 or 2.34 ... or 2 or 4.6 ÷ 1.082 or 4.25 ... or 4 or 5 ÷ 1.575 or 3.17 ... or 3	M1 Ra	allow clear indication of correct integer values on diagram
	2.2 ÷ 1.082 or 2.03 ... or 2 and 3.7 ÷ 1.575 or 2.34 ... or 2 and 4.6 ÷ 1.082 or 4.25 ... or 4 and 5 ÷ 1.575 or 3.17 ... or 3	M1 Aa	
	their 2 × their 2 or their 4 × their 3	M1 Aa	must use integers allow correct integer answer
	2 × 2 + 4 × 3 = 16 and Yes	A2 Ia Ib	A1 2 × 2 + 4 × 3 = 16 A1ft correct conclusion from their values must score M3
	<b>Additional Guidance</b>		
	See extra sheet for possible arrangements that do <b>not</b> give 16 panels Any one correct section only → M1M0M1A0 <b>Contradiction between the diagram and working lines</b> → mark working lines		

Q	Answer	Mark	Comment
4(d)	<b>Alternative Method 4</b>		
	For the arrangement of panels shown Can score a maximum of M3A2		
	6.8 ÷ 1.082 or 6.28 ... or 6 or 5 ÷ 1.575 or 3.27 ... or 3 or 2.2 ÷ 1.082 or 2.03 ... or 2	M1 Ra	allow clear indication of correct integer values on diagram
	6.8 ÷ 1.082 or 6.28 ... or 6 and 5 ÷ 1.575 or 3.27 ... or 3 and 2.2 ÷ 1.082 or 2.03 ... or 2	M1 Aa	
	their 6 × their 3	M1 Aa	must use integers allow correct integer answer
	6 × 3 – 2 = 16 and Yes	A2 /a /b	A1 6 × 3 – 2 = 16 A1ft correct conclusion from their values must score M3
	<b>Additional Guidance</b>		
See extra sheet for possible arrangements that do <b>not</b> give 16 panels Correct large rectangle only → M1M0M1A0 <b>Contradiction between the diagram and working lines</b> → mark working lines			

Q	Answer	Mark	Comment
4(d)	<b>Alternative Method 5</b>		
	For the arrangement of panels shown Can score a maximum of M3A1		
	6.8 ÷ 1.575 or 4.31 ... or 4 or 3.7 ÷ 1.082 or 3.41 ... or 3 or 4.6 ÷ 1.575 or 2.92 ... or 2	M1 Ra	allow clear indication of correct integer values on diagram
	6.8 ÷ 1.575 or 4.31 ... or 4 and 3.7 ÷ 1.082 or 3.41 ... or 3 and 4.6 ÷ their 1.575 or 2.92 ... or 2	M1 Aa	
	their 4 × their 3	M1 Aa	must use integers allow correct integer answer
	4 × 3 + 2 = 14 and No	A1 la	
	<b>Additional Guidance</b>		
See extra sheet for other possible arrangements that can score M1M1M1A1 max Correct bottom section only → M1M0M1A0 <b>Contradiction between the diagram and working lines</b> → mark working lines			

Q	Answer	Mark	Comment
4(d)	<b>Alternative Method 6</b>		
	For the arrangement of panels shown Can score a maximum of M3A1		
	6.8 ÷ 1.082 or 6.28 ... or 6 or 3.7 ÷ 1.575 or 2.349 ... or 2 or 4.6 ÷ 1.575 or 2.92 ... or 2	M1 Ra	allow clear indication of correct integer values on diagram
	6.8 ÷ 1.082 or 6.28 ... or 6 and 3.7 ÷ 1.575 or 2.349 ... or 2 and 4.6 ÷ 1.575 or 2.92 ... or 2	M1 Aa	
	their 6 × their 2 (+ their 2)	M1 Aa	must be integers allow correct integer answer
	6 × 2 + 2 = 14 and No	A2 la	
	<b>Additional Guidance</b>		
See extra sheet for other possible arrangements that can score M1M1M1A1 max Correct bottom section only → M1M0M1A0 <b>Contradiction between the diagram and working lines</b> → mark working lines			



Q	Answer	Mark	Comment
4(e)	<b>Alternative Method 1</b>		
	(P =) $0.1768 \times (6502 - 3463)$ or (P =) $0.1768 \times 3039$ or 537.29(52)	M1 Ra	3039 can be 9965
	£537.30	A1 lb	must see £ symbol
	<b>Alternative Method 2</b>		
	(P =) $0.1768 \times 6502$ $- 0.1768 \times \text{their } 3463$ or (P =) their 1149.55(36) $- \text{their } [612.25, 612,26]$ or 537.29(52)	M1 Ra	allow their 1149.55(36) $+ \text{their } [612.25, 612,26]$
	£537.30	A1 /	must see £ symbol
	<b>Additional Guidance</b>		
	Need <b>both</b> £ symbol <b>and</b> rounded to 537.30 for M1A1 Condone £537.30p		