

# Functional Mathematics

## Level 1

4367

Mark scheme with additional guidance

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4367

June 2015

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V1 Final Mark Scheme

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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.

- 1.1**                      Candidates interpret results and solutions.
- 1.2**                      Candidates draw conclusions in light of situations.
- 1.3**                      Candidates consider the appropriateness and accuracy of results and conclusions.
- 1.4**                      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	Comments
1(a)	60 seen or implied	B1 Ra	Implied by opening times totalling 20 hours
	80 – their 60 or 20	M1 Rc	Implied by opening times totalling their 20 hours Their 60 must be from an attempt at number of hours Monday to Friday
	Two closing times correct for their 20 Hours. Must have pm or be in 24 hour clock	A1ft Aa	ft B0 M1
Q	<b>Additional guidance</b>		
1(a)	<p>If the answer boxes are blank check working for possible marks.</p> <p>Accept times given in the 12-hour clock, with pm, or in the 24-hour clock.</p> <p>Ignore punctuation in either format; eg accept 5 pm or 5.00 pm or 5,00 pm or 5:00 pm or 1700 or 17.00 or 17,00 or 17:00</p> <p>The correct times without pm imply B1M1 (eg answers 5 and 8)</p> <p>The correct times with am imply B1M0 (eg answers 5 am and 8 am)</p> <p>Examples of correct times for full marks are:</p> <p>5 pm and 8 pm (either order)      1700 and 2000</p> <p>6 pm and 7 pm (either order)      1800 and 1900</p> <p>6.30 pm and 6.30 pm                  1830 and 1830</p> <p>If they miscalculate the length of time the shop is open on the other days they can still score M1A1ft: eg</p> <p>10 × 5 = 50 with answers 11.30 pm and 11.30 pm      B0M1A1ft</p> <p>Condone answers past midnight if necessary to complete the hours: eg</p> <p>10 × 5 = 50 with answers 7 pm and 4 am                  B0M1A1ft</p>		

Q	Answer	Mark	Comments
1(b)	<b>Alternative method 1</b>		
	3 + 11 + 10 + 10 + 4 + 10 or 48	M1 <i>Rb</i>	Allow one error or omission
	their 48 ÷ 3	M1 <i>Aa</i>	
	16	A1 <i>Aa</i>	SC2 19
<b>Check</b>	Reverse calculation or alternate way of summing values	B1 <i>Ab</i>	
1(b)	<b>Alternative method 2</b>		
	10 ÷ 3 or 3.3̇ or 11 ÷ 3 or 3.6̇ or 4 ÷ 3 or 1.3̇	M1 <i>Rb</i>	
	1 + their 3.3̇ + their 3.3̇ + their 3.6̇ + their 1.3̇ + their 3.3̇	M1 <i>Aa</i>	Allow one error or omission
	16	A1 <i>Aa</i>	SC2 19
<b>Check</b>	Reverse calculation or alternate way of summing values	B1 <i>Ab</i>	
1(b)	<b>Alternative method 3</b>		
	1 + 3 + 3 + 3 + 1 + 3 or 14 <b>and</b> 2(m) + 1(m) + 1(m) + 1(m) + 1(m) or 6	M1 <i>Rb</i>	full pieces and part pieces
	their 14 + their 6 ÷ 3 or their 14 + their 2	M1 <i>Aa</i>	
	16	A1 <i>Aa</i>	SC2 19
<b>Check</b>	Reverse calculation or alternate way of summing values	B1 <i>Ab</i>	

<b>1(b)</b>	<b>Alternative method 4</b>		
	Marks in 3's on diagram for at least one side of floor	M1 <i>Rb</i>	For 10 and 11 allow 3 divisions and a bit left over, or divided into 4
	Correctly marks all sides of floor in 3's and attempts to count/total the number of pieces	M1 <i>Aa</i>	
	16	A1 <i>Aa</i>	SC2 19
<b>Check</b>	Reverse calculation or alternate way of summing values	B1 <i>Ab</i>	
<b>Q</b>	<b>Additional guidance</b>		
<b>1(b)</b>	<p>The SC2 comes from <math>1 + 4 + 4 + 4 + 2 + 4 = 19</math>, which is the number of packs required for each section (no cutting to size).</p> <p>For M1, accept:</p> <p><math>3\frac{1}{2}</math> or '3 and a bit' or any amount more than 3 and up to 4 for the number of lengths needed for 10 m or 11 m</p> <p><math>1\frac{1}{2}</math> or '1 and a bit' or any amount more than 1 and up to 2 for the number of lengths needed for 4 m</p> <p>For alt 1 and 2 one method mark is for dividing any length (except 3) by 3 and the other method mark is for adding either the original totals or their divided totals. So add then divide, or divide then add. In each method allow one error or omission.</p> <p>If the correct answer is given in the checking section, and not contradicted in the main section, award M1M1A1 for the main section. The checking mark may still be awarded if alternative methods are given or a reverse calculation is seen. Any one reverse or alt calc is acceptable.</p>		

Q	Answer	Mark	Comments
1(c)	<b>Alternative method 1</b>		
	A combination of fridges seen that holds exactly 400 bottles	M1 <i>Rb</i>	4 B or 2 A + 1 B
	Attempts to calculate cost for their chosen fridges	M1 <i>Rb</i>	Bottles may not equal 400 for this mark Correct method seen or correct cost Must be more than one fridge
	Attempts to calculate total cost of three display units	M1 <i>Rc</i>	Correct method seen or correct cost
	Attempts to calculate total cost of their fridges and display units	M1 <i>Rc</i>	Correct method seen or correct cost At least one of each
	Fridges: 2 A and 1 B (£710) <b>and</b> Display units: 1 X + 2 Y (£1800) or Fridges: 2 A and 1 B (£710) <b>and</b> Display units: 2 X + 1 Y (£2100) or Fridges: 4 B (£760) <b>and</b> Display units: 1 X + 2 Y (£1800) or Fridges: 4 B (£760) <b>and</b> Display units: 2 X + 1 Y (£2100)	A1 <i>/</i>	Clearly communicated and selected correct combination of fridges and display units  Monetary values alone are not clear communication.
	Total cost (£)2510 or (£)2810 or (£) 2560 or (£)2860	A1 <i>Aa</i>	



Q	Answer	Mark	Comments
1(c)	<b>Alternative method 2</b>		
	A combination of fridges seen that holds 400 bottles	M1 <i>Rb</i>	4 B or 2 A + 1 B
	Attempts to calculate cost for their chosen fridges	M1 <i>Rb</i>	Bottles may not equal 400 for this mark Correct method seen or correct cost Must be more than one fridge
	Attempt at difference between £2500 to £3000 and total cost of their fridges	M1 <i>Rc</i>	
	Attempt to make up the difference with display units	M1 <i>Rc</i>	
	Fridges: 2 A and 1 B (£710) <b>and</b> Display units: 1 X + 2 Y (£1800) or Fridges: 2 A and 1 B (£710) <b>and</b> Display units: 2 X + 1 Y (£2100) or Fridges: 4 B (£760) <b>and</b> Display units: 1 X + 2 Y (£1800) or Fridges: 4 B (£760) <b>and</b> Display units: 2 X + 1 Y (£2100)	A1 <i>I</i>	Clearly communicated and selected correct combination of fridges and display units.  Monetary values alone are not clear communication.
	Total cost (£)2510 or (£)2810 or (£)2560 or (£)2860	A1 <i>Aa</i>	

Q	Additional Guidance
1(c)	The following attracts the first two marks: 2A and 1B indicated and (£)710.

4B indicated and (£)760 Indication can be by the numerical values.

For the third mark, the following are the correct methods and totals for three display units (mark can be awarded for method):

3X:  $3 \times 800$  (£)2400

2X and 1Y:  $2 \times 800 + 500$  (£)2100

1X and 2Y:  $800 + 2 \times 500$  (£)1800

3Y:  $3 \times 500$  (£)1500

The following table gives the possible fully correct answers

Fridge A	Fridge B	Unit X	Unit Y	Total cost
2	1	1	2	(£)2510
2	1	2	1	(£)2810
0	4	1	2	(£)2560
0	4	2	1	(£)2860

For the first A mark the student must say how many of A, B, X and Y they are choosing (they can omit A if choosing 4B).

If a student works with price only they can get a maximum of M4A0A1

One of the correct total amounts, without working, gets 4 marks (M0M1M1M1A0A1)

Q	Answer	Mark	Comments
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2(a)	<b>Alternative method 1</b>		
	48 ÷ 8 or 6 (teachers)	M1 Rc	
	48 + 6 = 54 <b>and</b> Yes or 49 + 7 = 56 <b>and</b> too many	A2 //	A1 48 + 6 = 54 or A1ft Correct conclusion for their values
	<b>Alternative method 2</b>		
	55 – 48 or 7 (spaces left)	M1 Rc	48 leaves max 7 spaces for staff (need 6)
	Need 6 (teachers), got 7 (spaces) <b>and</b> Yes	A2 //	A1 Need 6 (teachers), got 7 (spaces) or A1ft Correct conclusion for their values
	<b>Alternative method 3</b>		
	55 ÷ 9 or 6.(...)	M1 Rc	
55 ÷ 9 <b>and</b> 6 × 8 = 48 <b>and</b> Yes	A2 //	A1 55 ÷ 9 <b>and</b> 6 × 8 = 48 or A1ft Correct conclusion for their values	

Q	Additional Guidance
2(a)	In alt 1 after 54 seen allow statement that 1 more student would need an extra member of staff so 48 is max

Q	Answer	Mark	Comments
2(b)	<b>Alternative method 1</b>		
	3 free staff members or pay for 2 staff members	B1 <i>Ra</i>	May be implied by using 2 × 280 or 560
	36 × 250 or 9000 or their 2 × 280 or 560	M1 <i>Rb</i>	
	36 × 250 + their 2 × 280 or or their 9000 + their 560 or 9560	M1 <i>Rc</i>	their 9000 and their 560 must be from use of correct costs
	their 9560 ÷ 100 × 90 or 8604	M1 <i>Aa</i>	their 9560 must be from cost of students <b>and</b> staff (at least one of each)
	their 8604 ÷ 36	M1 <i>Aa</i>	or 36 × 230 or 8280 their 8604 must come from total for students <b>and</b> staff (at least one of each)
	(£)239 <b>and</b> No or (£)8604 and (£)8280 <b>and</b> No	A2 <i>//</i>	A1 (£)239 <b>or</b> (£)8604 and (£)8280 or A1ft Correct conclusion from their values if either the final M1 is awarded for their 8604 ÷ 36 or they compare their 8604 and their 8280
	<b>Alternative method 2</b>		
	3 free staff members or pay for 2 staff members	B1 <i>Ra</i>	May be implied by using 2 × 280 or 560
	250 ÷ 100 × 90 or 225 or 280 ÷ 100 × 90 or 252	M1 <i>Rb</i>	
	36 × their 225 or their 2 × their 252	M1 <i>Rc</i>	
	36 × their 225 + their 2 × their 252 or 8604	M1 <i>Aa</i>	

	their 8604 ÷ 36	M1 Aa	or 36 × 230 or 8280 their 8604 must come from total for students <b>and</b> staff (at least one of each)
	(£)239 <b>and</b> No or (£)8604 and (£)8280 <b>and</b> No	A2 //	A1 (£)239 <b>or</b> (£)8604 and (£)8280 or A1ft Correct conclusion from their values if either the final M1 is awarded for their 8604 ÷ 36 or they compare their 8604 and their 8280

<b>Q</b>	<b>Additional Guidance</b>
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<b>2(b)</b>	<p>The following values imply the corresponding number of marks:</p> <p>9000                    M1</p> <p>560                      B1M1</p> <p>9560                    B1M1M1</p> <p>956                      B1M1M1</p> <p>8604                    B1M1M1M1</p> <p>239                      B1M1M1M1M1A1 (could get A1)</p> <p>If they pay for all 5 members of staff:</p> <p>9000                    M1</p> <p>1400                    B0M1</p> <p>10 400                B0M1M1</p> <p>1040                    B0M1M1</p> <p>9360                    B0M1M1M1</p> <p>260                      B0M1M1M1M1A0 (could get A1ft)</p> <p>If they use Friday to Monday costs:</p> <p>6480                    M0</p> <p>400                      B1M0</p> <p>6880                    B1M0M0</p> <p>688                      B1M0M0</p> <p>6192                    B1M0M0M1</p> <p>172                      B1M0M0M1M1A0 (could get A1ft)</p> <p>If they use Friday to Monday costs and pay for all 5 members of staff:</p> <p>6480 or 1000        M0</p> <p>7480                    B0M0M0</p> <p>748                      B0M0M0</p> <p>6732                    B0M0M0M1</p> <p>187                      B0M0M0M1M1A0 (could get A1ft)</p> <p>If they think the costs are per night, the maximum marks are B1M0M0M1M1A0A1ft</p>
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	<p>Beware –they can compare their total of 8604 with <math>36 \times 230 = 8280</math> (the cost we said they had to pay). So do not assume <math>36 \times 230</math> is incorrect work for first M1</p> <p>The A1ft must be following from comparing like with like.</p> <p>So to compare with £230 they must have a total cost for the students and staff (with or without any percentage found/ deducted) and have divided that by 36. ie they must have been awarded the last M1 for the work on the LHS of the mark scheme.</p> <p>Alternatively they can multiply the given 230 by 36 and then again must compare with their total cost for staff and students (with or without any percentage found/ deducted)</p>
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<b>2(c)</b>	<p><b>Comparing totals or averages</b></p> <p>Totals 81 <b>and</b> 71 <b>and</b> Harry or Harry because he scores 10 more or Means 8.1 <b>and</b> 7.1 <b>and</b> Harry or Medians 8.5 <b>and</b> 7 <b>and</b> Harry</p>	<p>B2 <i>Aa,l</i></p>	<p>B1 for 81 <b>and</b> 71 or 8.1 <b>and</b> 7.1 or one correct value and correct ft decision or B1 for modes Harry 9 <b>and</b> Maya 6 &amp; 7 <b>and</b> correct decision</p>
	<p>Comparing using second average from mean and median or totals and median</p> <p><b>Comparing number of high scores (9,10)</b></p> <p>Harry scores 9 or more with half/ 5 of his arrows but Maya only scores 9 or more with 2 arrows</p> <p><b>or comparing range</b></p> <p>Ranges 4 <b>and</b> 5 and Harry is more consistent</p>	<p>B2 <i>l,l</i></p>	<p>B1 for incomplete statement eg Harry gets high scores more often or B1 for Harry because he scores more 10's or B1 for ranges 4 <b>and</b> 5 or one correct value and correct ft decision</p>

<b>Q</b>	<b>Additional guidance</b>
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<b>2(c)</b>	<p>Full marks can be obtained by comparing, for Harry and Maya, totals and medians or means and medians, but <b>not</b> totals and means.</p> <p>If they treat each pair of scores as a competition, Harry wins 6, 1 is drawn and Maya wins 3. This can be used as a valid comparison for B2</p> <p>If they give a difference of 10 between the total scores this is equivalent to giving 81 and 71</p>
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Q	Answer	Mark	Comments
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3(a)	1040 g	B1 Ra	
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Q	Additional Guidance
3(a)	Automarked

3(b)	70p chosen	B1 Rb	Or 0.7
	120 × their 70 or 8400 or 120 × their 0.7	M1 Aa	their 70p must be a cost from the table
	£84	A1ft Aa	ft B0M1 Must show correct money notation with £ sign Allow 8400p
3(b) Check	Any reverse or alt calculation eg $84 \div 0.7 = 120$	B1 Ab	

Q	Additional Guidance
3(b)	Digits 84(00) implies B1 85p → £102    B0M1A1 80p → £96    B0M1A1 75p → £90    B0M1A1 65p → £78    B0M1A1  If they split the 120 and use two different costs they cannot score any marks except the checking mark

Q	Answer	Mark	Comments
3(c)	<b>Alternative method 1</b>		
	120 × 2.5(0) or 300	M1 <i>Rb</i>	
	30 × 120 or (£)36	M1 <i>Ra</i>	
	4.8(0) + 50 + their 36 (+ their 84) or 174.8(0) or 90.8(0)	M1 <i>Aa</i>	
	their 300 – their 174.8(0) or their 300 – their 90.8(0)	M1 <i>Aa</i>	their 174.8(0) or 90.8(0) must be from an attempt at adding at least the 3 values in the table
	125.2(0) and No or 24.8(0) less and No	A2ft / /	ft their 84 from (b) A1 125.2(0) or 24.8(0) A1ft Correct ft decision for their value if 3 <sup>rd</sup> and 4 <sup>th</sup> method marks awarded
	<b>Alternative method 2</b>		
	2.5(0) – 0.3(0) or 2.2(0)	M1 <i>Rb</i>	
	their 2.2(0) × 120 or 264	M1 <i>Ra</i>	
	4.8(0) + 50 (+ their 84) or 54.8(0) or 138.8(0)	M1 <i>Aa</i>	
	their 264 – their 138.8(0) or their 264 – their 54.8(0)	M1 <i>Aa</i>	
	125.2(0) and No or 24.8(0) less and No	A2ft / /	ft their 84 from (b) A1 125.2(0) or 24.8(0) A1ft Correct ft decision for their value if 3 <sup>rd</sup> and 4 <sup>th</sup> method marks awarded



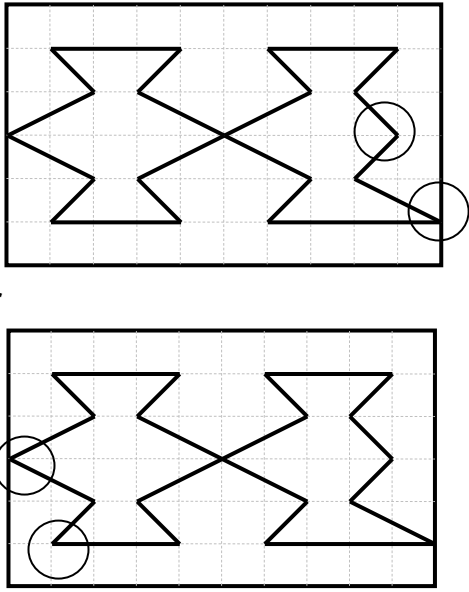
Q	Additional Guidance
<b>3(c)</b>	<p>If the student ignores the cost of the 120 boxes they can score 5 marks for (£)209.2(0) and Yes</p> <p>The following may follow through from 3(b):</p> <p>If they use £8.40 they can score all 6 marks for (£)200.8(0) and Yes</p> <p>If they use £840 they can score all 6 marks for a loss of (£)630.8(0) or –(£)630.8(0) and No</p> <p>If they use £8400 they can score all 6 marks for a loss of (£)8109.8(0) or –(£)8109.8(0) and No</p> <p>Note that (£)174.8(0) or (£)90.8(0) implies the second and third M marks but not the first M1</p> <p>Use of one cupcake (30p) gives total costs of (£)55.10 or (£)139.10 if 84 is included. Either of these values implies the 3<sup>rd</sup> M1</p>

Q	Answer	Mark	Comments
3(d)	<b>Alternative method 1</b>		
	900 ÷ 100 or 9 or 480 ÷ 100 or 4.(...) or 700 ÷ 100 or 7 or 600 ÷ 100 or 6	M1 Ra	or one full row of 9, 4, 7 or 6 boxes drawn on the diagram
	their 9 × their 4 or 36	M1 Rc	their 4 must be rounded down or 36 boxes drawn for Tray A
	their 7 × their 6 or 42	M1 Aa	or 42 boxes drawn for Tray B
	36 <b>and</b> 42 <b>and</b> B	A2 / /	A1 36 <b>and</b> 42 A1ft Correct ft decision for their 36 <b>and</b> their 42 SC2 42 <b>and</b> 43.2 and A from area ÷ area method
	<b>Alternative method 2</b>		
	900 ÷ 100 or 9 or 480 ÷ 100 or 4.(...) or 700 ÷ 100 or 7 or 600 ÷ 100 or 6	M1 Ra	or one full row of 9, 4, 7 or 6 boxes drawn on the diagram
	their 9 × their 4 or 36	M1 Rc	their 4 must be rounded down or 36 boxes drawn for Tray A
	their 36 ÷ their 7 or 5.(1....) or their 36 ÷ their 6 or 6	M1 Aa	or only needs 6 by 5(.1....)for tray B
	5(.1....) <b>and</b> 6 <b>and</b> B or 7 <b>and</b> 6 <b>and</b> B	A2 / /	A1 5(.1....) <b>and</b> 6 or 7 <b>and</b> 6 A1ft Correct ft decision for their values SC2 42 <b>and</b> 43.2 and A from area ÷ area method

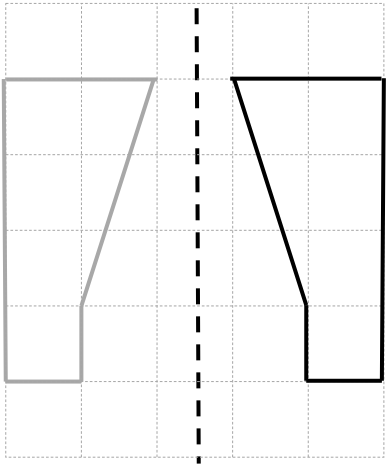
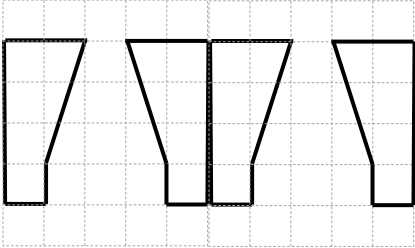
Q	Answer	Mark	Comments
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<b>3(d)</b>	<b>Alternative method 3</b>		
	900 ÷ 100 or 9 or 480 ÷ 100 or 4.(...) or 700 ÷ 100 or 7 600 ÷ 100 or 6	M1 Ra	or one full row of 9, 4, 7 or 6 boxes drawn on the diagram
	their 7 × their 6 or 42	M1 Rc	or 42 boxes drawn for Tray B
	their 42 ÷ their 4 or 10.5 or their 42 ÷ their 9 or 4.6(..)	M1 Aa	their 4 must be rounded down
	10.5 <b>and</b> 9 <b>and</b> B or 4.6(..) <b>and</b> 4.(...) <b>and</b> B	A2 / /	A1 10.5 <b>and</b> 9 or 4.6(..) <b>and</b> 4.(...) A1ft Correct ft decision for their values SC2 42 <b>and</b> 43.2 and A from area ÷ area method

Q	Additional Guidance
<b>3(d)</b>	Their 9 etc must be from division by 100. If they draw the correct number of boxes for a row/column allow one miscount by one box eg for Tray A, 9 boxes drawn down the rectangle and 4 across but 8 × 4 calculated. To score SC2 all calculations and the decision must be correct; ie $(900 \times 480) \div (100 \times 100) = 43.2$ and $(700 \times 600) \div (100 \times 100) = 42$ and A

Q	Answer	Mark	Comments
4(a)		B2 Aa 1	B1 for one correct and one incorrect or missing or B1 for 3 circles with both correct errors identified but one incorrect error circled

Q	Additional Guidance
4(a)	Accept the different section marked on both shapes, which could give four circles. Accept any clear indication of an error; e.g. a cross. Accept one error drawn on one shape and the other error drawn on the other shape.

Q	Answer	Mark	Comments
4(b)		<p>B2 Ra Aa</p>	<p>First part of pattern correct. B1 for at least 3 lines reflected correctly</p>
		<p>B1ft /</p>	<p>ft their shape repeated</p> <p>SC1 If no marks are gained for either diagram award one mark for their first pattern reflected rather than repeated to form the second half of the pattern.</p>

Q	Additional Guidance
4(b)	<p>The first two marks can be gained from a drawing on any of the three grids. Mark the bottom grid first and award B3 for a fully correct drawing. If the first (LHS) part of the pattern is incorrect check the middle diagram to try to award the first B2</p> <p>If both diagrams are blank check the diagram in the question part.</p> <p>Condone missing vertical lines at the far left or far right of the pattern or where the two middle shapes meet on the last diagram.</p>

Q	Answer	Mark	Comments
4(c)	$150 \times 90$ or 13 500	M1 <i>Rc</i>	
	their $13\,500 \div 2$ or 6750	M1 <i>Aa</i>	6750 implies M2
	$13\,500 + 6750 = 20\,250$	A1 <i>/</i>	

Q	Additional Guidance
4(c)	Note that $13\,500 + 6750 = 20\,250$ gets all three marks – the initial multiplications do not have to be seen.

Q	Answer	Mark	Comments
4(d)	<b>Alternative method 1</b>		
	20250 ÷ 2 or 10125 seen	M1 <i>Ra</i>	
	10125 ÷ 160 or 63(. 2 ...) or 63(.3)	M1 <i>Rc</i>	
	63(. 2 ...) or 63(.3) or 64 <b>and</b> Yes	A2 <i>l</i>	A1 63(. 2 ...) or 63(.3) or 64 <b>or</b> A1ft Correct conclusion from their value if M2 awarded
	<b>Alternative method 2</b>		
	60 × 2 or 120	M1 <i>Ra</i>	20250 ÷ 2 or 10125
	their 120 × 160 or 19 200	M1 <i>Rc</i>	or 60 × 160 or 9600
	19200 <b>and</b> 20250 <b>and</b> Yes or 19 200 <b>and</b> she is 1050 strands short or 10125 <b>and</b> 9600 <b>and</b> Yes	A2 <i>l</i>	A1 19 200 <b>and</b> 20 250 or A1 10125 <b>and</b> 9600 or A1ft Correct conclusion from their values if M2 awarded

Q	Answer	Mark	Comments
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4(d)	<b>Alternative method 3</b>		
	20 250 $\div$ 160 or 126(.56..)	M1 Ra	
	their 126(.56..) $\div$ 2 or their 126(.56..) $\div$ 60 or 60 $\times$ 2	M1 Rc	
	63(. 2 ... ) or 63(.3) or 64 <b>and</b> Yes or 2.1 and 2 (colours) <b>and</b> Yes or 120 <b>and</b> 126(..) <b>and</b> Yes	A2 //	A1 63(. 2 ... ) or 63(.3) or 64 or A1 2.1 and 2 (colours) or A1 120 and 126(...) or A1ft Correct conclusion from their values if M2 awarded

Q	Additional Guidance
4(d)	Alt 2: For A2 they must indicate that there are 19200 strands but she needs 20250 For the A1ft they must score both method marks.

4(e)	their 64 $\times$ 2 or 128 or 20250 $\div$ 160 = 127 or 20250 $\div$ 160 = 126	B1 Ra	ft their 4(d) rounded up or down to nearest integer
	their 128 $\times$ (£)1.62 or (£)207.36 <b>or</b> (£)14.50 $\times$ 1.5 or (£)21.75	M1 Aa	
	their (£)207.36 + their (£)21.75	M1 Aa	their 21.75 must be from an attempt at 14.5 $\times$ 1.5
	(£)229.11 <b>and</b> Yes	A2ft //	ft their (d) rounded up to nearest integer A1ft (£)229.11 or A1ft Correct conclusion from their total for wool and canvas with at least one method mark gained



Q	Additional Guidance
4(e)	<p>For the B mark they must use an integer value for the number of packs. This can be truncated or rounded up from their answer to 4(d).</p> <p>For the first accuracy mark, for the number of packs they must use the correct value of 64 or their answer to 4(d) rounded up. This means that a student who truncates to 63 in 4(d) must use 64 here. This does not apply to the second accuracy mark. If they use the fully correct decimal from 4(d), the total cost in 4(e) is £226.78, from which they can score B0M1M1A0A1ft with 'Yes'.</p> <p>In the 2<sup>nd</sup> M mark, 'their (£)21.75' must come from a correct method to find 21.75</p> <p>If they do not have a number of packs in (d) they may choose a number to work with in (e). This can gain a maximum B0M1M1A0A1ft</p>