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# FUNCTIONAL SKILLS CERTIFICATE

# FUNCTIONAL MATHEMATICS

## 4368

Level 2

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**Mark scheme**

November 2018

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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.

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## **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**.

<b>Representing</b>	Making sense of the situations and representing them. A learner can:
<b>Ra</b>	Understand routine and non-routine problems in familiar and unfamiliar contexts and situations.
<b>Rb</b>	Identify the situation or problems and identify the mathematical methods needed to solve them.
<b>Rc</b>	Choose from a range of mathematics to find solutions.
<b>Analysing</b>	Processing and using the mathematics. A learner can:
<b>Aa</b>	Apply a range of mathematics to find solutions.
<b>Ab</b>	Use appropriate checking procedures and evaluate their effectiveness at each stage.
<b>Interpreting</b>	Interpreting and communicating the results of the analysis. A learner can:
<b>Ia</b>	Interpret and communicate solutions to multistage practical problems in familiar and unfamiliar contexts and situations.
<b>Ib</b>	Draw conclusions and provide mathematical justifications.

To facilitate marking, the following categories are used:

<b>M</b>	Method marks are awarded for a correct method which could lead to a correct answer.
<b>A</b>	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>B</b>	Marks awarded independent of method.
<b>ft</b>	Follow through marks. Marks awarded following a mistake in an earlier step.
<b>SC</b>	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
<b>oe</b>	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$

Question	Answer	Mark	Comments
1(a)	$15 \div 3 (+) 12 \div 3 (+) 12 \div 3 (+) 9 \div 3$ or $5 (+) 4 (+) 4 (+) 3$ or $(15 + 12 + 12 + 9) \div 3$ or $48 \div 3$ or 16	M1 Ra	allow one error or omission
	$12 \div 3 (+) 12 \div 3 (+) 12 \div 3$ or $4 (+) 4 (+) 4$ or 12 or $(12 + 12 + 12) \div 3$ or $36 \div 3$ or 12	M1 Rb	M2 $(5 + 4 + 4 + 3 + 4 + 4 + 4) \div 3$ or $84 \div 3$ or 28
	their $16 \div 4 (+)$ their $12 \div 4$ or their $4 (+)$ their 3 or their $28 \div 4$	M1 Rc	
	7	A1 Aa	must see method
	<b>Additional Guidance</b>		
7 supported by any M1 scored scores full marks 3 (+) 4 (+) 6 (= 13) with no additional working scores M0A0 3 (+) 4 (+) 6 (= 13) with $12 \div 4$ , $16 \div 4$ and $24 \div 4$ oe seen scores M3A0 isw allow working and answer in table			

Question	Answer	Mark	Comments
<b>1(b)</b>	<b>Alternative method 1</b>		
	$17 \times 16 + 2$ or 274 or $19 \times 16 + 12$ or 316 or $16 \times 16 + 13$ or 269 or $20 \times 16 + 5$ or 325 or $18 \times 16 + 4$ or 292 or $17 \times 16 + 1$ or 273 or $18 \times 16 + 11$ or 299	M1 Ra	$7767.9$ g  $8958.6$ g  $7626.15$ g  $9213.75$ g  $8278.2$  $7739.55$  $8476.65$
	their 274 + their 316 + their 269 + their 325 or 1184 or their 292 + their 273 + their 299 or 864	M1 Rb	$33\,566.4$  $24\,494.4$
	their $1184 \div 4$ or their $1184 \div 16 \div 4$ or their $864 \div 3$ or their $846 \div 16 \div 3$	M1 Aa	$33\,566.4 \div 4$  $24\,494.4 \div 3$
	296 and 288 and yes or 18.5 and 18 and yes	A2 lb lb	A1 296 and 288 or 18.5 and 18 or $8391.6$ and $8164.8$ or A1ft correct decision for their values must score M0M1M1

Question	Answer	Mark	Comments
<b>1(b)</b>	<b>Alternative method 2</b>		
	$17 + 2 \div 16$ or 17.125 or $19 + 12 \div 16$ or 19.75 or $16 + 13 \div 16$ or 16.8125 or $20 + 5 \div 16$ or 20.3125 or $18 + 4 \div 16$ or 18.25 or $17 + 1 \div 16$ or 17.0625 or $18 + 11 \div 16$ or 18.6875	M1 Ra	
	their 17.125 + their 19.75 + their 16.8125 + their 20.3125 or 74 or their 18.25 + their 17.0625 + their 18.6875 or 54	M1 Rb	
	their $74 \div 4$ or 18.5 or their $54 \div 3$ or 18	M1 Aa	
	18.5 and 18 and yes	A2 lb lb	A1 18.5 and 18 or A1ft correct decision for their values must score M0M1M1

Question	Answer	Mark	Comments
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<b>1(b)</b>	<b>Alternative method 3</b>		
	17 + 19 + 16 + 20 or 72 and 2 + 12 + 13 + 5 or 32 or 18 + 17 + 18 or 53 and 4 + 1 + 11 or 16	M1 <i>Ra</i>	
	their 72 + (their 32 ÷ 16) or 74 or their 53 + (their 16 ÷ 16) or 54	M1 <i>Rb</i>	
	their 74 ÷ 4 or 18.5 or their 54 ÷ 3 or 18	M1 <i>Aa</i>	
	18.5 and 18 and yes	A2 <i>lb</i> <i>lb</i>	A1 18.5 and 18 or A1ft correct decision for their values must score M1M0M1

Question	Answer	Mark	Comments
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<b>1(b)</b>	<b>Alternative method 4</b>		
	17 + 19 + 16 + 20 or 72 and 2 + 12 + 13 + 5 or 32 or 18 + 17 + 18 or 53 and 4 + 1 + 11 or 16	M1 <i>Ra</i>	
	their 72 ÷ 4 or 18 or their 32 ÷ 4 or 8 or their 53 ÷ 3 or 17.66 ... or 17.67 or their 16 ÷ 3 or 5.33 ...	M1 <i>Rb</i>	
	their 18 lb + their 8 oz or their 17 lb + their 0.66 × 16 + 5.33 or their 17 lb + their 0.66 + 5.33 ÷ 16	M1 <i>Aa</i>	
	18 lb 8 oz and 18 (lb) and yes	A2 <i>lb</i> <i>lb</i>	A1 18 lb 8 oz and 18 or A1ft correct decision for their values must score M0M1M1

		<b>Additional Guidance</b>
<b>1(b)</b>	<b>Conversions</b>	
	Can be	
	from lb and oz → oz	e.g, 17 lb 2 oz → 274 oz
	from lb and oz → lb	e.g. 17 lb 2 oz → 17.125 lb
	from lb and oz → g	e.g. 288 oz → 8164.8 g
	One correct conversion only scores first M1	
	No conversions or incorrect conversions can score M0M1M1A1ft	
	<b>Example</b>	
	17 lb 2 oz → 17.2	18 lb 4 oz → 18.4
	19 lb 12 oz → 19.12	17 lb 1 oz → 17.1
	16 lb 13 oz → 16.13	18 lb 11 oz → 18.11
	20 lb 5 oz → 20.5	M0
	17.2 + 19.12 + 16.13 + 20.5 = 72.95	
	18.4 + 17.1 + 18.11 = 53.61	M1
	72.95 ÷ 4 = 18.2375	
53.61 ÷ 3 = 17.87	M1	
Yes	A1ft	
<b>Incorrect order of operations</b>		
Example.		
274 + 316 + 269 + 325 ÷ 4 = 940.25		
292 + 273 + 299 ÷ 3 = 664.7	Allow M1M0M1	
Yes	A0ft	

Question	Answer	Mark	Comments
<b>1(c)</b>	<b>Alternative method 1</b>		
	20 × 16 (+ 3) or 323 or 320	M1 <i>Ra</i>	
	their 320 × 28.35 or 9072 or 3 × 28.35 or 85.05 or their 323 × 28.35 or 9157(.05)	M1 <i>Rb</i>	
	their 9157(.05) ÷ 1000 or 9 × 1000 (+ 120) or 9000 or 9120	M1 <i>Aa</i>	
	9.15 (...) or 9.2 and 9.12 and no or 9 kg 157(.05) g and no or 9157(.05) and 9120 and no	A2 <i>lb</i> <i>lb</i>	A1 9.15 (...) or 9.2 and 9.12 or 9 kg 157(.05) g or 9157(.05) and 9120 or A1ft correct decision for their value(s) must score M3

Question	Answer	Mark	Comments
1(c)	<b>Alternative method 2</b>		
	$20 \times 16 (+ 3)$ or 323 or 320	M1 <i>Ra</i>	
	$9 \times 1000 (+ 120)$ or 9000 or 9120	M1 <i>Rb</i>	
	their $9120 \div 28.35$ or 321.6 or 321.7 or 322	M1 <i>Aa</i>	allow $9000 \div 28.35$ or [317.46, 317.5] or $120 \div 28.35$ or [4.2, 4.233]
	321(.6...) or 321.7 or 322 and 323 and no	A2 <i>lb</i> <i>lb</i>	A1 321(.6...) or 321.7 or 322 and 323 or A1ft correct decision for their values must score M1

Question	Answer	Mark	Comments
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<b>1(c)</b>	<b>Alternative method 3</b>		
	9 × 1000 (+ 120) or 9000 or 9120	M1 <i>Ra</i>	
	their 9120 ÷ 28.35 or [321.6, 321.7] or 322	M1 <i>Rb</i>	allow 9000 ÷ 28.35 or [317.46, 317.5] or 120 ÷ 28.35 or [4.2, 4.233]
	their 322 ÷ 16 or 20 lb [1.6, 1.7] oz or 20 lb 2 oz	M1 <i>Aa</i>	
	20 lb [1.6, 1.7] oz or 20 lb 2 oz and no	A2 <i>lb</i> <i>lb</i>	A1 20 lb [1.6, 1.7] oz or 20 lb 2 oz or A1ft correct decision for their values must score M1

<b>1(c)</b>	<b>Additional Guidance</b>		
	To score any A marks weights must be in an equivalent form, ie		
	9120 (g)	9157(.05)	
	9.12 (kg)	9.157	
	9 kg 120 g	9 kg 157 g	(9 kg 120 g given in question)
	322 oz	323 oz	
	20 lb 2 oz	20 lb 3 oz	(20 lb 3 oz given in question)
Heavier by 37(.05) g oe implies M3A2			

Question	Answer	Mark	Comments	
<b>2(a)</b>	$2977.11 \div 10$ or $297.71(1)$	M1 <i>Ra</i>	allow 297.70 or 298	
	$2977.11 - 9 \times$ their 298 or 295.11	M1 <i>Aa</i>	their 298 must be their 297.711 rounded to the nearest £	
	£295.11	A1 <i>la</i>	must see £ symbol SC2 £304.11 or £304.10 SC1 304.11 or 304.10	
	<b>Additional Guidance</b>			

Question	Answer	Mark	Comments
<b>2(b)</b>	<b>Alternative method 1</b>		
	(Old home Heath →) 1495.44 and (New home Mossett →) 1315.45	B1 <i>Ra</i>	
	their $1495.44 \div 100 \times 25$ or 373.86 or their $1315.45 \div 100 \times 25$ or 328.86(25)	M1 <i>Rb</i>	M2 their $1495.44 \div 100 \times 75$ or 1121.58 or their $1315.45 \div 100 \times 75$ or 986.58(75) or 986.59
	their $1495.44 - \text{their } 373.86$ or 1121.58 or their $1315.45 - \text{their } 328.86(25)$ or 986.58(75) or 986.59	M1 <i>Aa</i>	
	their $1121.58 - \text{their } 986.58(75)$	M1 <i>Aa</i>	
	134.99(25) or 135 and Yes	A2 <i>lb</i> <i>lb</i>	A1 134.99(25) or 135 A1ft correct conclusion for their value must score at least B0M1M1M1

Question	Answer	Mark	Comments
2(b)	<b>Alternative method 2</b>		
	(Old home Heath →) 1495.44 and (New home Mossett →) 1315.45	B1 <i>Ra</i>	
	their 1495.44 – their 1315.45 or 179.99	M1 <i>Rb</i>	
	their 179.99 ÷ 100 × 25 or 44.99(75) or 45	M1 <i>Aa</i>	M2 their 179.99 ÷ 100 × 75 or 134.99(25) or 135
	their 179.99 – their 44.99(75)	M1 <i>Aa</i>	
	134.99(25) or 135 and Yes	A2 <i>lb</i> <i>lb</i>	A1 134.99(25) or 135 A1ft correct conclusion for their value must score at least B0M1M1M1

<b>Additional Guidance</b>			
2(b)	<b>2nd M1</b> → their 1495.44 can be 1308.51 and their 1315.45 can be 1479.89		
	<b>Example 1 (Alt 1)</b>		
	(Heath →) 1495.44 (Mossett →) 1479.89		B0
	0.75 × 1495.44 = 1121.58 0.75 × 1479.89 = 1109.9175		M2
	1121.58 – 1109.92 = 11.66		M1
	No		A1ft
	<b>Example 2 (Alt 1)</b>		
	(Heath →) 1495.44 (Mossett →) 1479.89		B0
	0.25 × 1495.44 = 373.86 0.25 × 1479.89 = 369.9725		M1
	1495.44 – 373.86 = 1121.58 1479.89 – 369.9725 = 1109.9175		M1
No		A0ft	

Question	Answer	Mark	Comments
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<b>Alternative method 1</b>			
<b>2(c)</b>	$38\,320\,000 \div 100 \times 8$ or $3\,065\,600$	M1 <i>Ra</i>	for estimate allow 8% → 10%
	their $3\,065\,600 \div 52$ or $58\,953.8(\dots)$	M1 <i>Aa</i>	and/or $38\,320\,000 \rightarrow 38\,000\,000$ or $38\,320\,000 \rightarrow 38\,300\,000$ or $38\,320\,000 \rightarrow 40\,000\,000$ and/or 52 → 50 or 48 and/or their $3\,065\,600$ rounded to nearest £1 000 000 £100 000 £10 000 or £1000
	(£)60 000 or (£)59 000 or (£)58 950	A1ft <i>la</i>	ft M1M0 their value rounded to nearest £10 000 or nearest £1000 or nearest £100 or nearest £50 SC1 40 000 000, 38 000 000 or 38 300 000 seen

Question	Answer	Mark	Comments
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<b>2(c)</b>	<b>Alternative method 2</b>		
	$38\,320\,000 \div 52$ or $736\,923.(...)$	M1 <i>Ra</i>	for estimate allow 8% → 10% and/or $38\,320\,000 \rightarrow 38\,000\,000$ or $38\,320\,000 \rightarrow 38\,300\,000$ or $38\,320\,000 \rightarrow 40\,000\,000$ and/or 52 → 50 or 48 and/or their $736\,923.(...)$ rounded to nearest £100 000 £10 000 or £1000
	their $736\,923.(...) \div 100 \times 8$ or $58\,953.(8...)$	M1 <i>Aa</i>	
$(£)60\,000$ or $(£)59\,000$ or $(£)58\,950$	A1ft <i>la</i>	ft M1M0 their value rounded to nearest £10 000 or nearest £1000 or nearest £100 or nearest £50 SC1 40 000 000, 38 000 000 or 38 300 000 seen	

<b>2(c)</b>	<b>Additional Guidance</b>
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Award part marks for		rounding (at any stage)
		calculating 8% (or 10%) of original or rounded value
		dividing by 52 (or 50 or 48)
To obtain full marks the final answer must be rounded appropriately		
Eg 1	$38\,000\,000 \div 100 \times 8$ or 3 040 000 $3\,000\,000 \div 52$ or 57 692(.307...) 57 700	M1 M1 A1
Eg 2	$38\,300\,000 \div 100 \times 8$ or 3 064 000 $3\,064\,000 \div 52$ or 58 923.076 ... £60 000	M1 M1 A1
Eg 3	$40\,000\,000 \div 100 \times 8$ or 3 200 000 $3\,200\,000 \div 50$ 64 000	M1 M1 A1
Eg 4	$40\,000\,000 \div 100 \times 10$ or 4 000 000 $4\,000\,000 \div 50$ 80 000	M1 M1 A1
Eg 5	$40\,000\,000 \div 100 \times 10$ or 4 000 000 $4\,000\,000 \div 52$ or 76 923.(...) 77 000 or 76 900	M1 M1 A1
Eg 6	$38\,320\,000 \div 100 \times 8$ or 3 065 600  3 000 000 or 3 100 000 or 3 070 000 or 3 066 000	M1 M0 A1ft
Eg 7	$38\,320\,000 \div 100 \times 10$ or 3 832 000  4 000 000 or 3 800 000 or 3 830 000	M1 M0 A1ft
Eg 8	$40\,000\,000 \times 0.08$ or 3 200 000  3 000 000 or 3 200 000	M1 M0 A1ft
<b>SC1</b> Award if 40 000 000, 38 000 000 or 38 300 000 seen with no (or an incorrect) attempt to work out 8% or the weekly amount.		

Question	Answer	Mark	Comments
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<b>2(d)</b>	$1504.44 \div 9 \times 7$ or $1504.44 \times \frac{7}{9}$ or $7 \div 9$ or 0.7777(7 ...) and $1504.44 \times$ their 0.7777(7 ...)	M1 <i>Ra</i>	
	1170.12	A1 <i>Aa</i>	
<b>2(d) check</b>	reverse calculation, eg $1170.12 \div 7 \times 9 = 1504.44$ or alternative method, e.g. $1504.44 \times 7 = 10\,531.08$ and $10\,531.08 \div 9 = 1170.12$ or estimate, e.g. $1500 \times 0.8 = 1200$	B1 <i>Ab</i>	allow as reverse of $1504.44 \div 9 \times 7$  allow as alternative to $1504.44 \div 9 = 167.16$ and $167.16 \times 7 = 1170.12$
<b>2(d)</b>	<b>Additional Guidance</b>		
	<b>fw</b> allow M1A0 for 1170.12 seen followed by $1504.44 - 1170.12$ or 334.42		
<b>2(e)</b>	3	B1 <i>Aa</i>	

Question	Answer	Mark	Comments
3(a)	$60 \div 15 \times 6.49$ or $4 \times 6.49$	M1 Rc	
	25.96	A1 Aa	
3(a) check	reverse calculation, eg their $25.96 \div 6.49 \times 15 = 60$ or estimate, eg $60 \div 15 \times 6.50 = 26$	B1 Ab	allow $60 \div 20 \times 6.50 = 19.5$
3(a)	<b>Additional Guidance</b>		
	not showing $60 \div 15 = 4$ can score M1A1B0 or M1A0B0 unless recovered in check		

3(b)	at least one boot of the correct size drawn on grid	B1 la	
	at least six boots of the same size drawn on grid	B1 la	the boots do not need to be the correct size
	all 10 boots of correct size drawn with spare space clearly shown	B1 la	
	<b>Additional Guidance</b>		
	If answer grid is attempted mark answer grid and ignore practise grid Only mark practise grid if there is no attempt in the answer grid <b>Examples</b> 10 half size boots → B0B1B0 < 6 correct size boots → B1B0B0 6 to 10 boots of correct size → B1B1B0		

Question	Answer	Mark	Comments	
<b>3(c)</b>	<b>Alternative method 1</b> (making 150 cards)			
	150 ÷ 10 × 2 or 15 × 2 or 150 ÷ 5 or 30	M1 Ra	number of sheets of paper	
	their 30 × 0.75 or (£)22.5(0)	M1 Ra	their 30 can be 15 or 150 or 225 cost of paper	
	15 × 1.4(0) or (£)21	M1 Rb	cost of felt	
	their 22.5(0) + their 21 + 43.5(0) + 16.5(0) or 103.5(0)	M1 Aa	total cost must be 4 values and include 43.5 and 16.5	
	1.2(0) × 150 or 180	M1 Rc	total income can be in £ or p	
	their 103.5 × 0.65 and their 180 – their 103.5	(their 180 – their 103.5) ÷ their 103.5 or their 180 ÷ their 103.5	M1 Aa	their 103.5 can be from less than 4 individual costs
	(£)67(.275) and (£)76.5(0) and yes or 73.9(%) or 74(%) and yes or [1.739, 1.74] and 1.65 and yes	A2 lb lb	A1 (£)67(.275) and (£)76.5(0) or 73.9(%) or 74(%) or [1.739, 1.74] and 1.65 or A1ft correct conclusion for their values must score at least MOMOMOM1M1M1	

Question	Answer	Mark	Comments
<b>3(c)</b>	<b>Alternative method 2 (making one card)</b>		
	10 ÷ 2 or 5	M1 Ra	
	75 ÷ their 5 or 15(p)	M1 Ra	cost of paper
	1.4(0) ÷ (150 ÷ 15) or 1.4(0) ÷ 10 or 14(p)	M1 Rb	cost of felt
	43.5(0) ÷ 150 or 29(p) and 16.5(0) ÷ 150 or 11(p)	M1 Aa	cost of one blank card and other costs per card
	their 15 + their 14 + their 29 + their 11 or 69(p)	M1 Rc	total cost of one card must be 4 values
	their 69 × 0.65 and 120 – their 69	(120 – their 69) ÷ their 69 or 120 ÷ their 69 M1 Aa	their 69 can be from less than 4 individual costs
44.85(p) and 51(p) and yes or 73.9(%) or 74(%) and yes or [1.739, 1.74] and 1.65 and yes	A2 lb lb	A1 44.85(p) and 51(p) or 73.9(%) or 74(%) or [1.739, 1.74] and 1.65 or A1ft correct conclusion for their values must score at least MOMOMOM1M1M1	

Question	Answer	Mark	Comments
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<b>3(c)</b>	<b>Alternative method 3</b> (making one card)		
	$150 \div 10 \times 2$ or $15 \times 2$ or $150 \div 5$ or 30		M1 <i>Ra</i> number of sheets of paper
	their $30 \times 0.75$ or (£)22.5(0)		M1 <i>Ra</i> their 30 can be 15 or 150 cost of paper
	$15 \times 1.4(0)$ or (£)21		M1 <i>Rb</i> cost of felt
	their 22.5(0) + their 21 + 43.5(0) + 16.5(0) or 103.5(0)		M1 <i>Aa</i> total cost of 150 cards must be 4 values and include 43.5 and 16.5
	their $103.5 \div 150$ or 0.69		M1 <i>Rc</i> total cost of one card can be in £ or p
	their $69 \times 0.65$ and $120 - \text{their } 0.69$	(120 – their 69) $\div$ their 69 or $120 \div \text{their } 69$	M1 <i>Aa</i> their 69 can be from less than 4 individual costs
	44.85(p) and 51(p) and yes or 73.9(%) or 74(%) and yes or [1.739, 1.74] and 1.65 and yes		A1 44.85(p) and 51(p) or 73.9(%) or 74(%) or [1.739, 1.74] and 1.65 or A1ft correct conclusion for their values must score at least M0M0M0M1M1M1

<b>3(c)</b>	<b>Additional Guidance</b>
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	<p><b>Alt method 1</b>                      cost of 150 sheets of paper → 11.25                      total cost → 92.25 or 193.50                      profit → 87.75</p>	<p>M0M1                      M0M1M1M1                      M0M1M1M1M1</p>
	<p><b>Example 1</b>  <math>1.40 \times 15 = 21</math>  <math>21 + 43.5 = 64.5</math>  <math>1.20 \times 150 = 180</math>  <math>180 - 64.5 = 115.5</math>                      and  <math>64.5 \div 100 \times 65 = 41.925</math>                      Yes</p>	<p>M1                      M0                      M1                        M1                      A1ft</p>
	<p><b>Example 2</b>  <math>21 + 11.25 + 43.50 + 16.50 = 92.25</math>  <math>150 \times 120 \div 100 = 180</math>  <math>0.65 \times 92.25</math> or <math>(180 - 92.25) \div 92.25</math>                      and  <math>180 - 92.25</math>  <math>59.9625</math> and <math>87.75</math> or <math>95\%</math>                      and yes and yes</p>	<p>M3                      M1                        M1                      A1ft</p>
	<p><b>Example 3</b>  <math>21 + 11.25 + 43.50 + 16.50 = 92.25</math>  <math>150 \times 120 \div 100 = 180</math>  <math>0.65 \times 180</math>                      and  <math>180 - 92.25</math>  <math>117</math> and <math>87.75</math> and yes</p>	<p>M3                      M1                        M0                      A0</p>
	<p><b>Example 4</b>  <math>21 + 11.25 + 43.50 + 16.50 = 92.25</math>  <math>150 \times 120 \div 100 = 180</math>  <math>0.65 \times 0.62</math>                      and  <math>1.2 - 0.62</math>  <math>0.4(\dots)</math> and <math>0.58</math> and yes</p>	<p>M3                      M1                        M1                      A1ft</p>
	<p><b>Example 5</b>  <math>0.75 + 1.40 + 43.50 + 16.50 (= 62.15)</math>  <math>150 \times 120 = 1800</math>  <math>0.65 \times 62.15 = 40.4</math>                      and  <math>1800 - 62.15 = 1737.85</math>                      Yes</p>	<p>M0M0M0M1                      M1 (bod method in p)                        M0 (mixed units)                      A0ft (mixed units)</p>

3(c)	<b>Example 6</b>
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£103.50		M4
$£103.50 \div 150 = £0.69$	or $150 \times 1.2 = 180$	M1
$1.65 \times £0.69 = £1.14$	or $1.65 \times £103.5$	M1
$(£1.20 > £1.14$ and yes	or $(£180 >) £170.78$ and yes	A2
Explanation		
Let S = selling price (180) and C = cost price (152.21)		
Profit = S – C		
S – C > 0.65C		
S > 1.65C		
<b>Example 7</b>		
$21 + 11.25 + 43.50 + 16.50 = 92.25$		M3
$150 \times 1.2 = 180$		M1
$1.65 \times 92.25 = 152.21$		M1
$180 > 152.21$ and yes		A1ft

Question	Answer	Mark	Comments	
4(a)	$38 \times 3 + 25$ or $114 + 25$ or 139	M1 <i>Ra</i>		
	their 139 + 5	M1 <i>Aa</i>	M2 $38 \times 3 + 25 + 5$ or their $114 + 25 + 5$	
	(£)144	A1 <i>Aa</i>		
	<b>Additional Guidance</b>			
	<b>Misread examples</b> $38 \times 2 + 25 + 5 = 106$ $38 \times 4 + 25 + 5 = 182$ $38 \times 3 + 5 = 119$			M2A0 M2A0 M0M1A0

Question	Answer	Mark	Comments	
<b>4(b)</b>	<b>Alternative method 1</b>			
	80 ÷ 50 or 1.6 (h) or 96 min or 1 h 36 min	M1 <i>Ra</i>		
	their 1 h 36 min + 45 min or 2 h 21 min	A1 <i>Rb</i>		
	10 00 – their 2h 21 min	M1 <i>Rc</i>		
	(0)7 39 (am)	A1 <i>Aa</i>	allow (0)7 40 (am) if full method seen	
	<b>Alternative method 2</b>			
	80 ÷ 50 or 1.6 (h) or 96 min or 1 h 36 min	M1 <i>Ra</i>		
	10 00 – 45 min or 9 15	10 00 – their 1 h 36 min or 8 24	A1 <i>Rb</i>	
	their 9 15 – their 1 h 36 min	their 8.24 – 45 min	M1 <i>Rc</i>	
	(0)7 39 (am)	A1 <i>Aa</i>	allow (0)7 40 (am) if full method seen	
	<b>Additional Guidance</b>			
	<b>1st M1 – examples of equivalent methods</b> 60 ÷ 50 × 80 → 96 min                      M1 50 ÷ 5 or 10 and 60 ÷ 5 or 12 80 ÷ 10 × 12 → 96 min                      M1 <b>Decimal times can score M3 A0, for example</b> 10.00 – 0.75 – 1.6 = 7.65			

Question	Answer	Mark	Comments
<b>4(c)</b>	one additional activity seen with start (and finish) time correct for their length of activity	B1 <i>Aa</i>	start time must be at least 10 minutes after finish time of previous activity e.g. Christmas theatre 10.00 → 10.40 Treasure hunt 10.50 → 11.30
	at least two additional activities seen with start (and finish) times correct for their lengths of activities must be in correct chronological order	B1ft <i>la</i>	all start times must be at least 10 minutes after finish times of previous activities e.g. Christmas theatre 10.00 → 10.40 Treasure hunt 10.50 → 11.30 Snow tubing 11.40 → 12.20
	at least two additional activities seen with start (and finish) times correct for their lengths of activities leading to the correct time for Lunch or correct time for Elves must be in correct chronological order	B1ft <i>la</i>	all start times must be at least 10 minutes after finish times of previous activities e.g. Christmas theatre 10.00 → 10.40 Treasure hunt 10.50 → 11.30 Snow tubing 11.40 → 12.20 Lunch 12.30 → 13.20
	clearly communicated, correct and complete plan	B2ft <i>la</i>	this must include 5 additional activities clearly named correct start (and finish times) for each of their activities ≥10 minute gaps between start times and the finish times of their previous activity activities must be in chronological order and be of correct length B1ft clearly communicated plan with one or two errors or omissions plans can be written in a list or a table

		<b>Additional Guidance</b>		
<b>4(c)</b>		Snow tubing	40 min	
		Reindeer	30 min	
		Ice skating	50 min	
		Sleigh ride	20 min	
		Winter crafts	30 min	
		Treasure hunt	40 min	
		Allow times given using 12-hour or 24-hour clock		
		Correct finish times and 10-minute gaps are implied by correct start times of following activities		
		Award B3 for correct plan up to lunch or correct plan after lunch		
		Each given activity not included counts as 1 error		
		4 additional activities can score B4 max		
		3 additional activities can score B3 max		
		1 or 2 additional activities can score B2 max		
	Count activities given after 16.40 or before 10.00 as one error			
	Count repeated activities as one activity only			
	No additional activities given or no times given scores B0			
	Times and activities given not directly connected can score B3 max			
	Otherwise 'correct' plans with 2 or less 10 minute gaps score as follows			
	5 (or more) additional activities with otherwise correct times and lengths → B3 max			
	4 additional activities with otherwise correct times and lengths → B2 max			
	3 additional activities with otherwise correct times and lengths → B1 max			
		<b>Example 1</b>		<b>Example 2</b>
	10.00	<i>Christmas theatre</i>	10.40	10.00 <i>Christmas theatre</i> 10.40
	10.50	Treasure hunt	11.30	10.50    Ice skating    11.40
	11.40	Snow tubing	12.20	11.50    Reindeer    12.20
	12.30	<i>Lunch</i>	<i>13.20</i>	12.30 <i>Dinner</i> 13.20
	13.30	<i>Mrs Christmas</i>	14.10	13.30 <i>Mrs Christmas</i> 14.10
	14.20	Sleigh ride	14.40	14.20    Sleigh ride    14.40
	14.50	Reindeer	15.20	14.50    Winter crafts    15.20
	15.30	Winter crafts	16.00	15.30    Treasure hunt <u>16.10</u>
	16.10	<i>Elves</i>	16.40	<u>16.10</u> <i>Elves</i> 16.40
	B1B1B1ftB2ft			B1B1B1B1ft

Question	Answer	Mark	Comments
<b>4(d)</b>	correct combinations or total costs for one possible combination that sleeps 20 people	M1 <i>Ra</i>	possible combinations 5 × 'sleep 4' or 5 × 378 or 1890 4 × 'sleeps 5' or 4 × 439 or (£)1756
	correct combinations or total costs for two, three or four possible combinations that sleep 20 people	M1 <i>Aa</i>	2 × 'sleeps 5' + 1 × 'sleeps 6' + 1 × 'sleeps 4') or 2 × 439 + 495 + 378 or 1751 2 × 'sleeps 6' + 2 × 'sleeps 4' or 2 × 495 + 2 × 378 or 1746
	2 × 'sleeps 6' and 2 × 'sleeps 4' and 1746	A2 <i>la</i> <i>la</i>	A1 their cheapest option from any three or four correct combinations or any three or four correct total costs or 2 × 'sleeps 6' and 2 × 'sleeps 4' or 1746
	<b>Additional Guidance</b>		
	Award M2A2 only if the correct combination with correct total cost is chosen The correct combination <b>seen</b> and correct total cost seen scores M2A2 The correct combination seen or correct total cost seen scores M2A1 If no clear choice is made with zero or one incorrect combination and/or value award M2A1 max If more than one incorrect combination and/or value is given award M0A0 unless a clear choice (sleeping 20) is made		