



Level 3 Certificate MATHEMATICAL STUDIES 1350/2B

Paper 2B Critical path and risk analysis

Mark scheme

June 2024

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 Examiner.

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.

No student should be disadvantaged on the basis of their gender identity and/or how they refer to the gender identity of others in their exam responses.

A consistent use of 'they/them' as a singular and pronouns beyond 'she/her' or 'he/him' will be credited in exam responses in line with existing mark scheme criteria.

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

Copyright information

AQA retains the copyright on all its publications. However, registered schools/colleges for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to schools/colleges to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Copyright © 2024 AQA and its licensors. All rights reserved.

Glossary for Mark Schemes

Mathematical Studies examinations are marked in such a way as to award positive achievement wherever possible. Thus, for Mathematical Studies papers, marks are awarded under various categories.

If a student uses a method which is not explicitly covered by the mark scheme the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt.

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 for correct working following a mistake in an earlier step.
SC	Special case. Marks awarded for a common misinterpretation which has some mathematical worth.
M dep	A method mark dependent on a previous method mark being awarded.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
oe	Or equivalent. Accept answers that are equivalent. eg accept 0.5 as well as $\frac{1}{2}$
[a, b]	Accept values between a and b inclusive.
[a, b)	Accept values $a \leq \text{value} < b$
3.14 ...	Accept answers which begin 3.14 eg 3.14, 3.142, 3.1416
Use of brackets	It is not necessary to see the bracketed work to award the marks.

Examiners should consistently apply the following principles

Diagrams

Diagrams that have working on them should be treated like normal responses. If a diagram has been written on but the correct response is within the answer space, the work within the answer space should be marked. Working on diagrams that contradicts work within the answer space is not to be considered as choice but as working, and is not, therefore, penalised.

Responses which appear to come from incorrect methods

Whenever there is doubt as to whether a student has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the student. In cases where there is no doubt that the answer has come from incorrect working then the student should be penalised.

Questions which ask students to show working

Instructions on marking will be given but usually marks are not awarded to students who show no working.

Questions which do not ask students to show working

As a general principle, a correct response is awarded full marks.

Misread or miscopy

Students often copy values from a question incorrectly. If the examiner thinks that the student has made a genuine misread, then only the accuracy marks (A or B marks), up to a maximum of 2 marks are penalised. The method marks can still be awarded.

Further work

Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.

Choice

When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded but any incorrect answer or method would result in marks being lost.

Work not replaced

Erased or crossed out work that is still legible should be marked.

Work replaced

Erased or crossed out work that has been replaced is not awarded marks.

Premature approximation

Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

Continental notation

Accept a comma used instead of a decimal point (for example, in measurements or currency), provided that it is clear to the examiner that the student intended it to be a decimal point.

Q	Answer	Mark	Comments
1 (a)	Nine hundred thousand	B1	

Q	Answer	Mark	Comments
1 (b)	<p>Any two valid improvements eg</p> <p>Include a vertical / y axis or put percentages / values / scale on vertical / y axis</p> <p>Include (horizontal) grid lines or use graph paper</p> <p>Represent streaming services consistently on the two graphs, eg consistently combine Google and YouTube into a single bar</p> <p>Do not show bars that represent 0% or combine services with low proportions into an 'other' bar</p> <p>Move the 'Streaming service' title (to be on the horizontal axis) or move the 'Proportion' title (to the left-hand side)</p> <p>Define 'Daily active users' or 'Weekly active users' more precisely</p> <p>Give units for average age</p> <p>Define average age (to be about the user, not the streaming service)</p> <p>Move 'Average age' so it doesn't look like the graph's title</p> <p>Give all average ages to one decimal place or nearest integer or in years and months</p> <p>Remove the average ages or show on a separate graph</p> <p>Show all percentages outside of the bars</p> <p>Show (small) percentages to one or more decimal places</p> <p>Show (small) percentages more accurately</p>	E2	<p>E1 for one valid improvement ignore any additional but non-contradictory suggestions</p> <p>SC1 two or more valid errors identified instead of improvements</p>

Additional guidance is on the next page

		Additional Guidance	
1 (b) cont'd	For E2 do not accept repeated improvements eg include a vertical axis on graph 1 and include a vertical axis on graph 2		E1
	One correct error and one improvement		E1 only
	Add grid lines		E1
	Grid lines		E0
	Include vertical grid lines		E0
	Include horizontal grid lines on graph 2		E0
	Vertical axis		E0
	Label the axes		E0
	Include a horizontal axis		E0
	Include an axis		E0
	Make the y-axis bigger / more accurate / smaller increments		E0
	Larger scale		E0
	Explain what BBC stands for		E0
	Use a different type of chart		E0
	Split graph 2 into two graphs: one for daily active users, another for weekly active users		E0
	Arrange the services in graph 1 in order of average age		E0
	Use colour		E0
	Move the key outside the graph		E0
	Add a bar to graph 1 for average age		E0
	Use actual values not percentages		E0

Q	Answer	Mark	Comments	
1 (c)	Any valid reason eg There is no explanation for 27% There is no label for 27% It is not clear what the 2%+ relates to Some percentages are given as a range It is not clear how the final percentages (eg 16.5%, 6.75% or 3.75%) are calculated The percentages do not add up to 100% 55% is repeated It is not always clear whether the percentages are kept or passed on Some of the terms (eg public performance) are not defined	E1	E1 for one valid reason	
	Additional Guidance			
	Using percentages of percentages is confusing		E1	
	Too much information shown		E0	
	Too many arrows		E0	
	The arrows don't join up		E0	
	Some arrows / percentages not labelled		E0	
	It is not clear who the 3.75% goes to		E0	
	It is not clear what the percentages are allocated to		E0	
	Percentages are unclear		E0	
	Some percentages are in boxes but others are not		E0	
	Some of the terms (eg MCPS) are abbreviated		E0	

Q	Answer	Mark	Comments
1 (d)	Alternative method 1		
	$5 \div 14$ or 0.35(7...) or 0.36 or $20 \div 47$ or 0.42(5...) or 0.426 or 0.43	M1	oe percentage or fraction
	$0.35(7...)$ or 0.36 and $0.42(5...)$ or 0.426 or 0.43 and Greater proportion in the sports club (of daily users of BBC Sounds than in the UK as a whole)	A1	oe percentage or fractions with common denominator
	Alternative method 2		
	$20 \div 5 (\times 14)$ or 4 or 56	M1	
	56 and 47 and Greater proportion in the sports club (of daily users of BBC Sounds than in the UK as a whole)	A1	
	Alternative method 3		
	$20 \div 5 (\times 9)$ or 4 or 36 or $27 \div 4$ or 6.75	M1	
	36 or 6.75 and Greater proportion in the sports club (of daily users of BBC Sounds than in the UK as a whole)	A1	oe, eg $5 : 9 = 20 : 36$ (and $20 : 27$) or $20 : 27 = 5 : 6.75$ (and $5 : 9$)

The mark scheme for Question 1 (d) continues on the next page

Q	Answer	Mark	Comments
1 (d) cont'd	Alternative method 4		
	27 ÷ 9 (× 5) or 3 or 15 or 20 ÷ 3 or 6.6(...) or 6.7	M1	
	15 or 6.6(...) or 6.7 and Greater proportion in the sports club (of daily users of BBC Sounds than in the UK as a whole)	A1	oe, eg 20 : 27 = 6.7 : 9 (and 5 : 9) eg 5 : 9 = 15 : 27 (and 20 : 27)
	Alternative method 5		
	20 ÷ 5 or 4 or 27 ÷ 9 or 3	M1	
	4 and 3 and Greater proportion in the sports club (of daily users of BBC Sounds than in the UK as a whole)	A1	
	Alternative method 6		
	5 ÷ 9 or 0.55(...) or 0.56 or 20 ÷ 27 or 0.74(...)	M1	
0.55(...) or 0.56 and 0.74(...) and Greater proportion in the sports club (of daily users of BBC Sounds than in the UK as a whole)	A1	oe percentage	

The mark scheme for Question 1 (d) continues on the next page

Q	Answer	Mark	Comments
1 (d) cont'd	Alternative method 7		
	9 ÷ 5 or 1.8 or 27 ÷ 20 or 1.35	M1	oe, eg 80% higher
	1.8 and 1.35 and Greater proportion in the sports club (of daily users of BBC Sounds than in the UK as a whole)		oe, eg 35% higher
	1.8 and 1.35 and Greater proportion in the sports club (of daily users of BBC Sounds than in the UK as a whole)	A1	oe percentage
	Additional Guidance		
	Scaling up or down ratios from either side is acceptable		
	Reciprocal methods are acceptable		
	Greater at the sports club		A1
	More at the sports club		A1
	More listeners in the sports club		A0
More people at the sports club		A0	

Q	Answer	Mark	Comments
1 (e)	The Recorder		
	30% or 30–34% and 27% or 2.50 or 2.496 and 2.24(64) or 2.25 and True	B1	
	Waxing Lyrical		
	Alternative method 1		
	25 ÷ 44 or 0.568(...) or 0.57	M1	oe
	4 ÷ 7 or 0.571(...) or 0.57	M1	oe
	0.568(...) or 0.57 and 0.571(...) or 0.57 and True	A1	oe
	Alternative method 2		
	44 ÷ 25 or 1.76	M1	oe
	7 ÷ 4 or 1.75 or their 1.76 × 4 or 7.04	M1	oe
	1.76 and 1.75 and True or 7.04 and True	A1	oe

The mark scheme for Question 1 (e) continues on the next page

Q	Answer	Mark	Comments
1 (e) cont'd	Alternative method 3		
	44 ÷ 7 or 6.28(57...) or 6.29	M1	oe
	25 ÷ 4 or 6.25	M1	oe
	6.28(57...) or 6.29 and 6.25 and True	A1	oe
	Alternative method 4		
	4 ÷ 25 or 0.16	M1	oe
	their 0.16 × 44 or 7.04	M1	oe
	7.04 and True	A1	oe
	Alternative method 5		
	44 ÷ 7 or 6.28(57...) or 6.29	M1	oe
	their 6.28(57...) × 4 or 25.(14...)	M1	oe
	25.(14...) and True	A1	oe
	Alternative method 6		
	25 ÷ 4 or 6.25	M1	oe
	44 ÷ their 6.25 or 7.04 or 7 × their 6.25 or 43.75	M1	oe
	7.04 or 43.75 and True	A1	oe

The mark scheme for Question 1 (e) continues on the next page

Q	Answer	Mark	Comments
1 (e) cont'd	Alternative method 7		
	7 ÷ 44 or 0.159(...) or 0.16	M1	oe
	their 0.159(...) × 25 or 3.97(...) or 3.98	M1	oe
	3.97(...) or 3.98 and True	A1	oe
	Alternative method 8		
	44 ÷ 100 × 22.6 or 9.9(44) or 25 ÷ 100 × 22.6 or 5.65 or 5.7	M1	oe 22.6 can be any value if used consistently
	their 9.9(44) ÷ 7 or 1.42(...) and their 5.65 ÷ 4 or 1.41(...) or their 5.65 ÷ 4 × 7 or 9.88(75) or 9.89 or 9.9	M1	oe
	1.42(...) and 1.41(...) or 9.9(44) and 9.88(75) or 9.89 or 9.9 and True	A1	oe
	Additional Guidance		
	Accept roughly correct for true		

Q	Answer	Mark	Comments	
1 (f)	No or cannot tell and Valid reason eg You cannot add together the daily active user percentages as some consumers may use more than one streaming service We cannot tell because we don't know if daily active users only use one streaming service Graph 1 does not show all streaming services (only leading streaming services)	B1	oe	
	Additional Guidance			
	The weekly active users add up to 137% showing that some consumers use more than one platform		B1	
	The weekly active users add up to 137%		B0	
	The percentages add up to 224%		B0	
	The website's claim is correct		B0	

Q	Answer	Mark	Comments
2 (a)	Alternative method 1 (calculating the VAT)		
	9.99 ÷ 1.2 or 8.32(5)	M1	oe accept 8.33 with correct working seen
	9.99 – their 8.32(5) or their 8.32(5) × 0.2 or 1.66(5)	M1dep	9.99 ÷ 6 scores M1 M1 oe accept 1.67 with correct working seen
	1.66(5) and No	A1	accept 1.67 with correct working seen
	Alternative method 2 (showing the stated VAT is 20% of the subscription price)		
	9.99 – 1.67 or 8.32	M1	
	their 8.32 × 0.2 or 1.66(4) or their 8.32 × 1.2 or 9.98(4) or 1.67 ÷ 8.32 = 0.2(0...)	M1dep	oe oe
	1.66(4) and No or 9.98(4) and No or 0.2(0...) and No	A1	
	Alternative method 3 (assuming the VAT is £2 and finding the subscription price)		
	2 ÷ 20 or 0.1	M1	
	their 0.1 × 120 or 12	M1dep	
	12 and No	A1	with M1 M1 scored

The mark scheme for Question 2 (a) continues on the next page

Q	Answer	Mark	Comments
2 (a) cont'd	Alternative method 4 (showing the stated VAT is 20% of the subscription price)		
	1.67 ÷ 0.2 or 8.35 or 9.99 ÷ 1.2 or 8.32(5)	M1	oe accept 8.33 with correct working seen
	their 8.35 + 1.67 or 10.02 or their 8.32(5) + 1.67 or 9.99(5) or their 8.32(5) + 2 or 10.32(5) or 9.99 – 1.67 or 8.32 or 9.99 – 8.32(5) or 1.66(5)	M1dep	oe accept 10.00 with correct working seen accept 10.33 with correct working seen
	10.02 or 9.99(5) or 10.32(5) or 8.32(5) or 1.66(5) and No	A1	accept 10.00 with correct working seen accept 10.33 with correct working seen accept 8.32 or 8.33 with correct working accept 1.66 or 1.67 with correct working

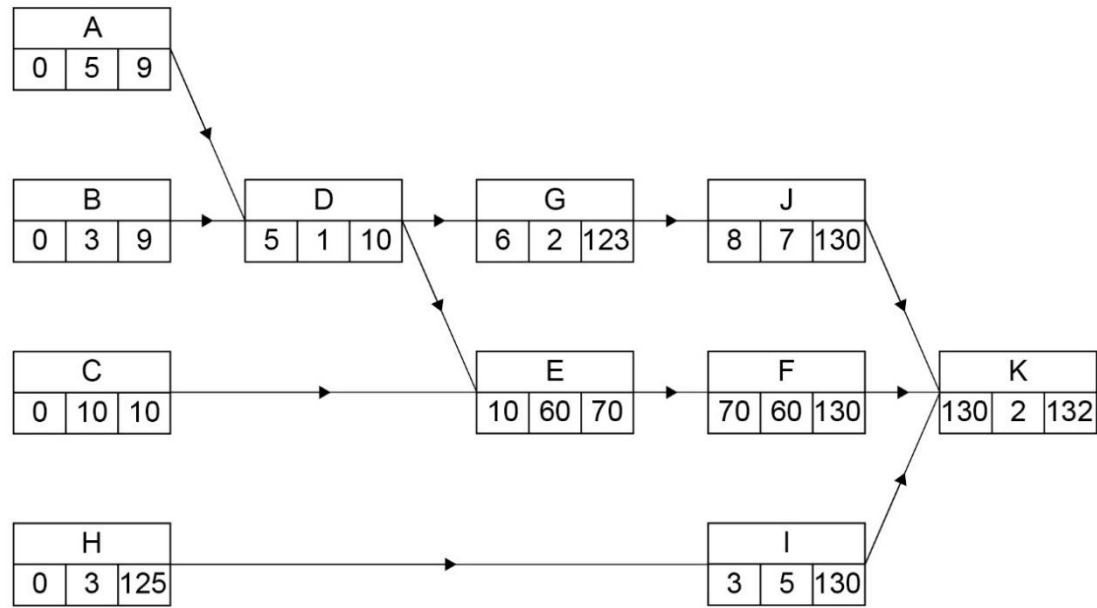
Q	Answer	Mark	Comments	
2 (b)	Two valid mistakes eg 22.6 million is 22 600 000 or 22.6 million is not 226 000 000 16.5% is 0.165 or 16.5% is not 0.0165 The yearly subscription revenue is £8.32 or The yearly subscription revenue is not £9.99 after VAT or Molly should have used the subscription revenue before VAT or Molly did not take into account VAT	E2	E1 for one valid mistake oe ignore any additional but non-contradictory suggestions accept 226 000 000 is wrong accept 0.0165 is wrong do not allow 'she has not included VAT'	
	Additional Guidance			
	Accept values in millions			
	For E2 do not accept repeated mistakes			
	Condone, eg, '226 million is wrong it should be 2 260 000'			
	Condone, eg, '0.0165 is wrong it should be 0.00165'			

Q	Answer	Mark	Comments
3	<p>Any valid comparisons of 2012 to 2022 supported with correct differences or proportions</p> <p>eg</p> <p>Entries for GCSE French decreased by 24 017 or 15.6(...) % or 15.7%</p> <p>and</p> <p>Entries for GCSE Spanish increased by 40 239 or 55.4(...) %</p>	E2	<p>allow rounding to 2sf</p> <p>E1 for any valid comparison of 2012 to 2022 not supported by both correct differences or proportions</p> <p>entries for GCSE French changed from 153 436 to 129 419</p> <p>or</p> <p>entries for GCSE Spanish changed from 72 606 to 112 845</p> <p>or</p> <p>E1 for correct proportion or difference clearly identified with correct subject with no decision or incorrect decision</p> <p>eg</p> <p>entries for GCSE French is/changed by 15.6(...) %</p> <p>entries for GCSE French increased by 15.6(...) %</p>
	<p>Any valid comparison of students that were male supported by correct proportion(s)</p> <p>eg</p> <p>The proportion of students that were male entered for GCSE Spanish and GCSE French are both around 43%</p> <p>or</p> <p>The proportion of students that were male entered for GCSE Spanish was 42.6% which was lower than the 42.8% entered for GCSE French</p> <p>or</p> <p>The proportion of students that were male entered for GCSE Spanish was 42.6% which was similar to the 42.8% entered for GCSE French</p>	E2	<p>oe decimals</p> <p>allow rounding to 2sf</p> <p>E1 for correct proportion without comparison</p> <p>eg</p> <p>42.6% of students entered for GCSE Spanish were male</p> <p>or</p> <p>42.8% of students entered for GCSE French were male</p> <p>E1 for correct comparison using two correct ratios</p> <p>eg</p> <p>The ratio of male to female was 1 : 1.3(47...) for GCSE Spanish and 1 : 1.3(37...) for GCSE French meaning the proportion of males entering GCSE Spanish was lower/similar than for GCSE French</p>

Q	Answer	Mark	Comments
4 (a)	$\frac{82}{146}$ or $\frac{41}{73}$ or 0.56(...) or 56.(...)%	B1	oe decimal, fraction or percentage
	Additional Guidance		
	Ignore any attempt to simplify or convert a correct fraction		

Q	Answer	Mark	Comments
4 (b)	Alternative method 1		
	12.4 ÷ 106 × 250 or 29.2(...)	M1	oe
	their 29.2(...) × $\frac{146}{250}$	M1	oe
	17 million	A1	accept number in millions written out accept [16.8, 17.52] million with working seen
	Alternative method 2		
	or 12.4 ÷ (106 ÷ 250 × 100) or 12.4 ÷ 42(.4) or 0.29(2...) or 0.295	M1	oe
	or their 0.29(2...) × (146 ÷ 250 × 100) or their 0.29(2...) × 58(.4)	M1	oe
	17 million	A1	accept number in millions written out accept [16.8, 17.52] million with working seen
	Alternative method 3		
	$\frac{64 + 82}{64 + 42} \times 12.4$ or $\frac{146}{106} \times 12.4$	M2	oe M1 for $\frac{64 + 82}{64 + 42}$ or $\frac{146}{106}$ or 12.4 ÷ 106 or 146 × 12.4
	17 million	A1	accept number in millions written out accept [16.8, 17.52] million with working seen
	Additional Guidance		
	Do not accept 17 without millions suffix		

Q	Answer	Mark	Comments	
4 (c)	Any reasonable statement eg The rate in the population may be different than the rate in the sample The sample was (relatively/too) small compared to the size of the number of households in the UK The survey data may be out of date and not representative of the current population There may be survey bias, eg if it was completed online	E1	allow people may not know if they have full fibre broadband and so the sample may be inaccurate	
	Additional Guidance			
	Some households may have more than one laptop		E0	
	The numbers have been rounded		E0	
	The sample was (relatively) small		E0	
The survey may not be representative	E0			

Q	Answer	Mark	Comments	
5 (a)	Three additional activities drawn and correctly linked to their predecessors	B1		
	C and D the only immediate predecessors of E	M1		
	Activity network correct with all durations correct	A1	all boxes A to K linked correctly	
	Forward pass fully correct	B2	B1 one error or correct for activities D and E	
	Backward pass fully correct	B2	B1 one error or correct for activities E, F, G, I, J, K ft their forward pass	
	Additional Guidance			
	A cumulative error counts as one error			
	Incorrect but identical latest finish times of J, F and I count as one error			
	Missing zero start times on A, B, C and H can be awarded up to B1 M1 A1 B1 B2			
	Mark the latest finish time for K as part of the forward pass			
 <p>The diagram shows the following activity boxes and their dependencies:</p> <ul style="list-style-type: none"> Activity A: [0 5 9]. It is the starting activity. Activity B: [0 3 9]. It follows A. Activity C: [0 10 10]. It follows A. Activity D: [5 1 10]. It follows B. Activity E: [10 60 70]. It follows C and D. Activity F: [70 60 130]. It follows E. Activity G: [6 2 123]. It follows D. Activity H: [0 3 125]. It follows A. Activity I: [3 5 130]. It follows H. Activity J: [8 7 130]. It follows G. Activity K: [130 2 132]. It follows F, I, and J. 				

Q	Answer	Mark	Comments
5 (b)	CEFK	B1ft	ft their critical path which must start at A, B, C or H and finish at K, or correct

Q	Answer	Mark	Comments
5 (c)(i)	2 hours 12 minutes	B1ft	implied by correct answer ft their latest finish time for K
	1:30 – their 2 hours 12 minutes or 1:30 – their 132 minutes	M1	oe must be their latest finish time for K
	C and 11:18 (am)	A1ft	ft their latest finish time for K accept activity
	Additional Guidance		
	correct answer implies B1 M1 A1		

Q	Answer	Mark	Comments
5 (c) (ii)	No and Any correct statement eg A, B and D only take a total of 9 minutes and so can be completed before C	B1	oe
	Additional Guidance		
	No and A, B and D only take a total of 9 minutes so there is 1 minute float	B1	
	No and A, B and D take less time than C	B1	
	No and A and B only take a total of 8 minutes so there is 1 minute float	B1	
	No and D has a float of 4 minutes, so the additional 3 minutes will not cause a delay	B1	
	No and $5 + 3 + 1 = 9$, so 1 minute spare	B1	
	No and B has 6 minutes of float and so the 5 minutes that activity A takes will not cause a delay	B1	
	No and because there is float time	B0	
	No and A and B both must be completed by 9 minutes and both have float	B0	
No and because A and B only take 8 minutes and activity C takes 10	B0		

Q	Answer	Mark	Comments
6 (a)	$\frac{80}{120} \times \frac{40}{119}$ or $\frac{40}{120} \times \frac{80}{119}$ or $\frac{3200}{14280}$	M1	oe decimal, fraction or percentage
	$\frac{6400}{14280}$ or $\frac{160}{357}$ or 0.448(...) or 44.8(...) %	A1	oe decimal, fraction or percentage accept 0.45 or 45% with working seen
	Additional Guidance		
	Decimal or percentage must be accurate to 3 significant figures for M1		

Q	Answer	Mark	Comments
6 (b)	Alternative method 1		
	180 – 50 + 8 or 138	M1	
	138 ÷ 3 or 46	M1	
	84 and 38	A1	SC1 for any two integers that sum to 122
	Alternative method 2		
	Sets up two equations	M1	eg $a + 8 + b + 50 = 180$ and $a + 8 = 2(8 + b)$
	Eliminates one variable	M1	eg $2(8 + b) + b + 50 = 180$
	84 and 38	A1	SC1 for any two integers that sum to 122
	Additional Guidance		
84 or 38 implies M1 M1			

Q	Answer	Mark	Comments
6 (c)	$\frac{8 + \text{their } 38}{180}$ or $\frac{46}{180}$	M1	oe decimal, fraction or percentage
	their $\frac{46}{180} \times \frac{40}{120}$	M1	oe decimal, fraction or percentage
	$\frac{1840}{21600}$ or $\frac{23}{270}$ or 0.085(1...) or 0.0852 or 8.5(1)% or 8.52%	A1ft	ft their 6 (b)
	Additional Guidance		
	Decimal or percentage must be accurate to 3 significant figures for M1 marks		

	Answer	Mark	Comments
7 (a)	Alternative method 1		
	30 + 31 + 30 + 31 or 122 and 18 × 7 or 126	M1	condone total days September to December as 112 or 120 or 124
	126 and 122 and No	A1	SC1 16 or 17 or 17.3 (weeks) and 18 (weeks) and No SC1 126 and 112 and No
	Alternative method 2		
	(30 + 31 + 30 + 31) ÷ 18 or 122 ÷ 18 or 6.7(7...)	M1	condone total days September to December as 112 or 120 or 124 condone [6.666..., 6.8888...]
	6.7(7...) and 7 and No or 6.8 and 7 and No	A1	SC1 16 or 17 or 17.3 (weeks) and 18 (weeks) and No SC1 126 and 112 and No
	Alternative method 3		
	(30 + 31 + 30 + 31) ÷ 7 or 122 ÷ 7 or 17.4(...)	M1	condone total days September to December as 112 or 120 or 124 condone [17.14..., 17.71...] from [120, 124]
	17.4(...) and 18 and No	A1	SC1 16 or 17 or 17.3 (weeks) and 18 (weeks) and No SC1 126 and 112 and No

The mark scheme for Question 7 (a) continues on the next page

	Answer	Mark	Comments
7 (a) cont'd	Alternative method 4		
	(18 weeks after 1 September is) 4 or 5 January	M1	allow one error in counting on 18 weeks from 1 September if end date is at least 1 January allow early January or not enough time with evidence of counting on 18 weeks seen
	4 or 5 January and No	A1	allow early January or not enough time with evidence of counting on 18 weeks seen SC1 16 or 17 or 17.3 (weeks) and 18 (weeks) and No SC1 126 and 112 and No
	Alternative method 5		
	$18 \times 7 \div 30.5$ or 4.1(3...)	M1	condone $18 \times 7 \div 28$ or 4.5 condone $18 \times 7 \div 30$ or 4.2 condone $18 \times 7 \div 31$ or 4.06(...) or 4.1
	4.1(3...) and 4 and No	A1	allow early January or not enough time for 4 SC1 16 or 17 or 17.3 (weeks) and 18 (weeks) and No SC1 126 and 112 and No
	Additional Guidance		
	States No and 4 months is less than 18 weeks (without working)		M0 A0
	States No and 126 days is over 4 months (without working)		M0 A0
	$126 \div 4 = 31.5$ which is more days than there are in any month and No		M1 A1
For SC1, the 16 weeks comes from 4 months of 4 weeks			
For SC1, the 17 or 17.3 weeks comes from 4 months being a third of a year			

Q	Answer	Mark	Comments
7 (b)	Alternative method 1		
	5 – 4 or 1	M1	may be seen on Gantt chart
	19	A1	
	Alternative method 2		
	$5 \times 2 - 5 - 4$ or 1	M1	may be seen on Gantt chart
	19	A1	

Q	Answer	Mark	Comments
8 (a)	1 – 0.98 or 0.02	M1	oe fraction, decimal or percentage
	(5 ÷ 7 × 105 + 2 ÷ 7 × 140) × their 0.02 or 2.3	M2	oe M1 5 ÷ 7 × 105 + 2 ÷ 7 × 140 or 75 + 40 or 115 or 5 ÷ 7 × 105 × their 0.02 or 1.5 or 2 ÷ 7 × 140 × their 0.02 or 0.8 or (5 × 105 + 2 × 140) × their 0.02 or or (525 + 280) × their 0.02 or 16.1
	2.30	A1	correct money notation
	Additional Guidance		
	If they have multiplied by, eg, 52 (to find yearly costs) and not recovered, can score up to M1 M1 A0		
	Costs may be given in pence for M marks		
	Accept $\frac{104}{365}$ and $\frac{261}{365}$ for 2 ÷ 7 and 5 ÷ 7 with rounded values		
	Accept $\frac{105}{365}$ and $\frac{260}{365}$ for 2 ÷ 7 and 5 ÷ 7 with rounded values		
	Accept $\frac{104}{366}$ and $\frac{262}{366}$ for 2 ÷ 7 and 5 ÷ 7 with rounded values		
	Accept $\frac{105}{366}$ and $\frac{261}{366}$ for 2 ÷ 7 and 5 ÷ 7 with rounded values		
Accept $\frac{106}{366}$ and $\frac{260}{366}$ for 2 ÷ 7 and 5 ÷ 7 with rounded values			

Q	Answer	Mark	Comments
8 (b)	Alternative method 1		
	0.9×0.3 or 0.27 or $(1 - 0.9) \times 0.3$ or 0.03	M1	
	their 0.27×190 or 51.3 or their 0.03×250 or 7.5	M1	
	$(\text{their } 51.3 + \text{their } 7.5) \times (1 - 0.95)$ or 2.94 or 2.95	M1	
	2.94 or 2.95 and 11 or 90.94 or 90.95	A1	additional costs total expected cost
	Recommends silver	E1ft	ft their expected costs if both are stated
	Alternative method 2		
	0.9×190 or 171 or $(1 - 0.9) \times 250$ or 25 or $0.9 \times 190 + (1 - 0.9) \times 250$ or 196	M1	
	$(\text{their } 171 + \text{their } 25) \times (1 - 0.95) \times 0.3$ or 2.94	M2	M1 $(1 - 0.95) \times 0.3$ or 0.015 or $(1 - 0.95) \times (\text{their } 171 + \text{their } 25)$ or 9.8 or $(\text{their } 171 + \text{their } 25) \times 0.3$ or 58.8
	2.94 and 11 or 90.94 or 90.95	A1	additional costs total expected cost
	Recommends silver	E1ft	ft their expected costs if both are stated

The mark scheme for Question 8 (b) continues on the next page

Q	Answer	Mark	Comments
8 (b) cont'd	Alternative method 3		
	$(1 - 0.95) \times 0.3 \times 0.9 \times 190$ or 2.565 or 2.57 or $(1 - 0.95) \times 0.3 \times (1 - 0.9) \times 250$ or 0.375 or 0.38	M2	M1 $(1 - 0.95) \times 0.3$ or 0.015 or $(1 - 0.95) \times 0.9$ or 0.045 or 0.3×0.9 or 0.27 or $(1 - 0.95) \times 0.3$ or 0.015 or $(1 - 0.95) \times (1 - 0.9)$ or 0.005 or $0.3 \times (1 - 0.9)$ or 0.03
	$(1 - 0.95) \times 0.3 \times 0.9 \times 190 + (1 - 0.95) \times 0.3 \times (1 - 0.9) \times 250$ or their 2.565 + their 0.375 or 2.94		M1
	2.94 or 2.95 and 11 or 90.94 or 90.95	A1	additional costs total expected cost
	Recommends silver	E1ft	ft their expected costs if both are stated
	Additional Guidance		
	Expected costs must be calculated from probabilities		

Q	Answer	Mark	Comments
8 (c)	Any valid reason eg He doesn't want to risk having to pay to be towed He doesn't want the hassle of having to arrange his car to be towed He may expect to need to be towed more than once a year The expected cost of not having breakdown cover is less than the cost of both silver and gold He may realise he is covered elsewhere The gold cover may have additional benefits	E1	oe
	Additional Guidance		
	He may want to go with gold because he is concerned his van may become more likely to break down because of a fault		E1
	He may feel that the chances of needing to be towed are too low to be worth covering		E1
	He may find cheaper insurance with a different company		E1
	Gold covers more things		E1
	He may want to go with gold instead in case he breaks down less than 2 miles from his house		E1
	(He thinks) his probability of breaking down may be lower / higher / different		E0
	Silver is cheaper		E0
	He cannot afford to buy the gold insurance		E0

Q	Answer	Mark	Comments
8 (d)	Decrease	B1	