



Level 3 Certificate MATHEMATICAL STUDIES 1350/2B

Paper 2B Critical Path and Risk Analysis

Mark scheme

June 2025

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.

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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)	$\frac{2}{5}$	B1	

Q	Answer	Mark	Comments
1 (b)	6 m 23 s – 2 m 18 s or 4 m 5 s or 383 – 138 or 245(s) or 6.38(3...) – 2.3 or 4.08(3...) or 6 m 23 s – 3 m 44 s or 2 m 39 s or 383 – 224 or 159(s) or 6.38(3...) – 3.73(3...) or 2.65	M1	oe range for Europe or Africa
	4 m 5 s and 2 m 39 s and No or 245(s) and 159(s) and No or 4.08 (m) and 2.65 (m) and No	A1	oe must compare consistent units
	Additional Guidance		
	Condone other representation of time for method and accuracy eg 4:05 or 4.05 or 405		
	Ignore further working for comparison eg doubling the range for Africa		
	No may be implied eg Jaydon is wrong		
	6.23 – 2.18 = 4.05 and 6.23 – 3.44 = 2.79 and No		M1 A0
	623 – 218 = 405 and 623 – 344 = 279 and No		M1 A0

Q	Answer	Mark	Comments
1 (c)	Valid explanation eg He has included the 2026 eclipse (2 m 18 s) twice or He has only worked out the median/ used the times for North America (2 m 18 s and 2 m 36 s) or He did not include 2027 eclipse (in Europe, 6 m 23 s) or He found the value between the first and second value from the three values or He worked out the mean for North America (2 m 18 s and 2 m 36 s)	B1	oe
	2 m 36 s	B1	correct median must be clearly stated or on the answer line
	Additional Guidance		
	He should have just found the median of 2 m 18 s, 2 m 36 s, 6 m 23 s and correct median is 2 m 36 s	B0 B1	
	He worked out the mean (not the median)	B0	
	He found the median/mean of 2 m 18 s and 2 m 36 s (not all three values)	B1	

Q	Answer	Mark	Comments
2 (a)	Alternative method 1: broadcasting as a proportion of total revenue		
	294 ÷ 731 or 0.4(0...) or 74 ÷ 190 or 0.38(9...) or 0.39	M1	condone reciprocals
	0.4(0...) and 0.38(9..) or 0.39 and yes or 2.48(6...) or 2.49 or 2.5 and 2.56(7...) or 2.57 or 2.6 and yes	A2	oe percentages A1 0.4(0...) and 0.38(9...) or 0.39 or 2.48(6...) or 2.49 or 2.5 and 2.56(7...) or 2.57 or 2.6
	Alternative method 2: recalculating AFC Ajax proportion		
	294 ÷ 731 (× 190)	M1	calculating AFC Ajax broadcast revenue based on Manchester City proportion
	76.(4...) (€million) and yes	A2	A1 76.(4...) (€million)
	Alternative method 3: recalculating Manchester City proportion		
	74 ÷ 190 (× 731)	M1	calculating Manchester City broadcast revenue based on AFC Ajax proportion
	284.7(0...) or 285 (€million) and yes	A2	A1 284.7(0...) or 285 (€million)

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

Q	Answer	Mark	Comments
2 (a) cont'd	Alternative method 4: Scale factor of broadcast compared to scale factor of totals		
	294 ÷ 74 or 3.9(7....) or 731 ÷ 190 or 3.8(4...)	M1	condone reciprocals
	3.9(7...) or 4 and 3.8(4...) and yes or 0.25(1...) or 0.3 and 0.25(9...) or 0.3 and yes	A2	A1 3.9(7...) or 4 and 3.8(4...) or 0.25(1...) or 0.3 and 0.25(9...) or 0.3
	Additional Guidance		
	Other comparable proportions may be used eg 294 ÷ 437 = 0.67 and 74 ÷ 116 = 0.64 and yes		
	Conclusion should support statement		
	Allow rounding or truncation if method seen		
	Comparison of non-broadcast revenue		M0 A0

Q	Answer	Mark	Comments
2 (b)	Alternative method 1		
	AC Milan	B1	
	$104 \div 33$ or 3.1(51..) or 3.2 or $133 \div 33$ or 4.(03)	M1	
	3.1(51..) or 3.2 and 4.(03)	A1	matchday unit value of 1 implied by these values SC2 Real Madrid and 3.3(40...) and 3.5(16...)
	Alternative method 2		
	AC Milan	B1	
	33×3 or 99 or 33×4 or 132	M1	
	99 and 132	A1	SC2 Real Madrid and 273 and 364
	Alternative method 3		
	AC Milan	B1	
	$270 \div 8$ or $(104 + 133 + 33) \div 8$ or 33.75 or 33.8 or 34	M1	
	[101, 102] and [135,136] and [33.75,34] or [3.05, 3.09] and [3.9, 3.95] and [0.97, 0.98]	A1	SC2 Real Madrid and 268.125 and 357.5 and 89.375 or Real Madrid and 267.75 and 357 and 89.25

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

	Answer	Mark	Comments
2 (b) cont'd	Alternative method 4		
	AC Milan	B1	
	$104 \div 3$ or $34.(6\dots)$ or $133 \div 4$ or $33.(25)$	M1	
	$34.(6\dots)$ and $33.(25)$	A1	SC2 Real Madrid and $101.(3\dots)$ and 80
	Alternative method 5		
	AC Milan	B1	
	$104 - 2 \times (133-104)$ or $104 - 2 \times 29$	M1	
	46 with M1 scored	A1	SC2 Real Madrid and $304 - 2 \times (320-304) = 288$
	Alternative method 6		
	AC Milan	B1	
	$104 \div 270$ or $0.38(5\dots)$ or 0.39 or $133 \div 270$ or $0.49(\dots)$ or $33 \div 270$ or $0.12(\dots)$	M1	
	$[3.16, 3.2]$ and $[4, 4.11]$ and 1 or $0.38(5\dots)$ or 0.39 and 0.375 and $0.49(\dots)$ and 0.5 and $0.12(\dots)$ and 0.125	A1	SC2 Real Madrid and $[3.38, 3.52]$ and $[3.2, 3.4]$ or Real Madrid and $0.44(5\dots)$ or 0.45 and $0.42(5\dots)$ or 0.43 and $0.12(7\dots)$ or 0.13 and 0.375 and 0.5 and 0.125

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

2 (b) cont'd	Additional Guidance	
	Allow any equivalent method eg $\frac{4}{3} \times 104 = 138.7$ and $\frac{1}{3} \times 104 = 34.7$	

Q	Answer	Mark	Comments
2 (c)	three values added in domains [303.5, 304.5) + [319.5, 320.5) + [90.5, 91.5) that give answer in range [713.5, 714.5)	B1	
	Additional Guidance		
	Final answer not required but if seen must be correct or shown as 714		
	303.5 + 319.5 + 90.5		B1
	304.5 + 319.5 + 90.5		B0
	303.4 + 320 + 91		B0

Q	Answer	Mark	Comments
2 (d)	$270 \div 1.16$ or 233 or 232.(7...)	M1	oe
	$144 \div 0.94$ or 153.(19...) or 153.2	M1	oe
	80 with M2 scored	A1	condone values stated in millions
	Additional Guidance		
	153 from incorrect method eg $144 \times 1.06 = 152.64 = 153$		M0
	153 and 233 and 80 with no incorrect method		M1 M1 A1

Q	Answer	Mark	Comments	
2 (e)	Any two valid criticisms from distinct categories Shape Pyramid / 3D Does not start at zero Shape is above and below the horizontal axis Shape does not align with scale Shapes start from different points Axis label No <i>y</i> -axis label No <i>x</i> -axis label Angle of labels No units eg currency or millions Scale / Gridlines Gridlines only every 50 units Negatives signs are on the gridlines The gaps on the y-scale are too large The vertical axis only extends to 50 (so the 49 label is outside the graph area)	B2	B1 one valid criticism allow improvements to imply criticism two criticisms may be in one response ignore any extra criticisms	
	Additional Guidance			
	-25 is too close to -50 on the scale (Shape category)		B1	
	Should have used rectangles (Shape category)		B1	
	More gridlines (Gridlines category)		B1	
	Should extend the vertical axis beyond 50 (Scale / Gridlines category)		B1	
	Inaccurate		B0	
	No vertical gridlines		B0	
	No gridlines		B0	

Q	Answer	Mark	Comments
2 (f) (i)	$(49 + 21 + 13 + 9 - 24 - 25 - 69 - 369) \div 8$ or $(-) 395 \div 8$	M1	
	– 49.375 with M1 scored or loss of 49.375 with M1 scored	A1	allow rounding or truncating SC1 $- 400 \div 8 = -50$ or $(-)49.3(75)$ or $(-)49.38$ or $(-)49.4$ without working
	Additional Guidance		
	Ignore units		
	Calculating the median or other measures does not support the statement		
	$49 + 21 + 13 + 9 - 24 - 25 - 69 - 369 \div 8$		M0 unless recovered
	SC1 awarded for rounding $(-)395$ to $(-)400$ prior to division		
	The mean is $(-)49$ without working		M0 A0

Q	Answer	Mark	Comments
2 (f) (ii)	One valid reason eg The data is old / only from one year/season The clubs are not representative of current European champions The clubs are not representative of champions from other European leagues Only used a small sample of clubs PSG's loss has skewed the mean average / PSG is an outlier The median average is a loss of €7.5m Without PSG the mean loss is only €3.7 m Data affected by Covid	B1	
	Additional Guidance		
	The majority of clubs do not make a loss of more than €50m		B1
	Half of the clubs made a profit		B0
	Only represents clubs who win their league		B0
	There was an outlier		B0
	None of the clubs are close to losing the mean amount		B0

Q	Answer	Mark	Comments
3 (a)	Forward pass fully correct	B2	B1 correct for activities B, C, D and E or one error
	Backward pass fully correct	B2ft	B1 correct for activities B, E, F, G, H and I or one error
	Additional Guidance		
	A cumulative error counts as one error		
	Incorrect but identical earliest start or latest finish times of B, C and D or latest finish times of F and G count as one error		
	<pre> graph LR A["A 0 2 2"] --> B["B 2 7 12"] A --> C["C 2 5 12"] A --> D["D 2 10 12"] B --> E["E 12 1 13"] C --> E D --> E E --> F["F 13 17 30"] F --> G["G 9 12 30"] F --> H["H 30 1 31"] G --> H H --> I["I 31 9 40"] </pre>		

Q	Answer	Mark	Comments
3 (b)	ADEFHI	B1ft	ft their critical path or correct
	Additional Guidance		
	Critical path must start at A and finish at I		
	All activities on the critical path must be critical		
	All activities on the critical path must have a latest finish time which is identical to its immediate successor's earliest start time		

Q	Answer	Mark	Comments
3 (c)	At least 3 activities plotted correctly	M1	ignore floats
	A critical path plotted correctly	A1ft	ft their activity network critical path must have no floats
	At least 2 floats of correct duration plotted	M1dep	dep on first M1
	All non-critical activities and floats plotted correctly	A1ft	ft their activity network
	Additional Guidance		
	ft their activity network throughout or correct		
	Accept tasks drawn elsewhere on the diagram if labelled unambiguously		
	The diagram is a Gantt chart on a grid. The horizontal axis represents 'Time (months)' from 0 to 50, with major grid lines every 10 units and minor grid lines every 1 unit. The vertical axis represents 'Activity' with labels A through I. The activities are plotted as horizontal bars: Activity A (0-2), Activity B (0-10), Activity C (0-7), Activity D (0-12), Activity E (12-13), Activity F (12-30), Activity G (10-21, with a dashed line from 21 to 30), Activity H (30-31), and Activity I (31-40). The critical path is A-B-F-I, which has a total duration of 40 months.		

Q	Answer	Mark	Comments
4 (a)	$1 - 0.7$ or 0.3	M1	
	their 0.3×0.4	M1	oe
	0.12	A1	oe fraction, decimal or percentage SC2 12 (people)
	Additional Guidance		
	Working may be seen on the tree diagram		

Q	Answer	Mark	Comments
4 (b)	Alternative method 1: find probability for planning to ski first		
	0.4×2 or 0.8	M1	
	$0.7 \times \text{their } 0.8 + \text{their } 0.12$ or $0.7 \times \text{their } 0.8 + \text{their } 0.3 \times 0.4$ or their $0.56 + \text{their } 0.12$ or 0.68	M1	oe ft their 0.12 from question 4 (a) or correct their 0.56 is their total probability of a guest with skiing experience planning to ski
	their 0.68×6500	M1	
	4420	A1ft	ft their 0.12 from question 4 (a) or correct
	Alternative method 2: find expected values separately		
	0.4×2 or 0.8	M1	if seen on the tree diagram must be in the correct place
	$0.7 \times \text{their } 0.8 \times 6500$ or 3640 or their 0.56×6500 or 3640 or their 0.12×6500 or 780 or their $0.3 \times 0.4 \times 6500$ or 780	M1	oe their 0.56 is their total probability of a guest with skiing experience planning to ski ft their 0.12 from question 4 (a) or correct
	their $3640 + \text{their } 780$	M1	their sum must be less than 6500
	4420	A1ft	ft their 0.12 from question 4 (a) or correct
	Additional Guidance		
	Working may be seen on the tree diagram		
	For M marks, all probabilities used or calculated must be between 0 and 1		

Q	Answer	Mark	Comments
5	Network of at least six activities with A, B, C, D, E and F correctly linked to their predecessors	B1	times or durations do not need to be included
	D and E only immediate predecessors correctly linked to G or F and G only immediate predecessors correctly linked to H	B1	times or durations do not need to be included
	All durations correct and All earliest start times correct and All latest finish times correct	B2	allow up to 2 errors identical start times on D, E and F counts as one error identical latest finish times on D and E counts as one error identical latest finish times on F and G counts as one error links between activities do not need to be included B1 all durations correct or all earliest start times correct or all latest finish times correct or durations and earliest start times and latest finish times correct on at least six activities
	Activity network fully correct See diagram below for a possible network	B1	implies B5 all activities A to H correctly linked, including times and durations correct
	Additional Guidance <pre> graph LR A["A 0 1 1"] --> B["B 1 2 3"] B --> C["C 3 3 6"] C --> D["D 6 2 8"] C --> E["E 6 1 8"] D --> G["G 8 4 12"] E --> G F["F 6 4 12"] --> H["H 12 2 14"] G --> H </pre>		

Q	Answer	Mark	Comments
6 (a)	$\frac{7}{(0+)1+8+7+2+4+3+5}$ or $\frac{7}{30}$	M1	
	$\frac{7}{\text{their } 30} \times \frac{6}{\text{their } 30 - 1}$	M1dep	
	$\frac{7}{145}$ or 0.048(...)	A1	oe fraction, decimal or percentage
	Additional Guidance		
	Ignore incorrect simplification or conversion to a decimal or percentage from a correct fraction		

Q	Answer	Mark	Comments
6 (b)	$(0+)8+3+5$ or 16	M1	must not be from the sum of the values in the skills set (2 + 3 + 4 + 7)
	270 ÷ their 30 × their 16 or or 9 × their 16	M1dep	ft their denominator of 30 from question 6 (a) or correct
	144	A1	

Q	Answer	Mark	Comments
7 (a)	Alternative method 1 – working out expected gallons used		
	$4.80 - 0.55$ or 4.25	M1	cost per gallon for Gold/Diamond plan
	$12 \times \text{their } 4.25$ or 51	M1	Diamond plan estimated cost
	5×50 or 250 or $5 \times 50 + 90$ or 340 or $5 \times 50 + 10$ or 260	M1	miles being driven on days 1–5 miles being driven on days 1–6 if the weather is good miles being driven on days 1–6 if the weather is bad
	$1 - 0.6$ or 0.4	M1	probability of bad weather
	0.6×90 or 54 or their 0.4×10 or 4 or $0.6 \times \text{their } 340$ or 204 or their $0.4 \times \text{their } 260$ or 104	M1	estimated additional good weather miles estimated additional bad weather miles estimated good weather miles estimated bad weather miles
	their $204 + \text{their } 104$ or 308 or their $250 + \text{their } 54 + \text{their } 4$ or 308	M1	estimated miles being driven
	their $308 \div 30$ or $12 - (12 \times 30 - \text{their } 308) \div 30$ or $12 - 1.73(3\dots)$ or $10.26(6\dots)$ or 10.27 or 10.3	M1	estimated gallons of fuel used their 308 is their total estimated miles driven must be from correct working, eg not from $124 \div 12$
	their $10.26(6\dots) \times 4.8$ or $[49, 50]$	M1dep	Silver plan estimated cost dep on 7th M1
	their $10.26(6\dots) \times \text{their } 4.25 + 9$ or $[52, 53]$	M1 dep	Gold plan estimated cost dep on 7th M1
	$[49, 50]$ and $[52, 53]$ and 51	A1	

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

Q	Answer	Mark	Comments
7 (a) cont'd	Alternative method 2 – working out expected cost per mile		
	$4.80 - 0.55$ or 4.25	M1	cost per gallon for Gold/Diamond plan
	$12 \times \text{their } 4.25$ or 51	M1	Diamond plan estimated cost
	5×50 or 250 or $5 \times 50 + 90$ or 340 or $5 \times 50 + 10$ or 260	M1	miles being driven on days 1–5 miles being driven on days 1–6 if the weather is good miles being driven on days 1–6 if the weather is bad
	$1 - 0.6$ or 0.4	M1	probability of bad weather
	0.6×90 or 54 or their 0.4×10 or 4 or $0.6 \times \text{their } 340$ or 204 or their $0.4 \times \text{their } 260$ or 104	M1	estimated additional good weather miles estimated additional bad weather miles estimated good weather miles estimated bad weather miles
	their $204 + \text{their } 104$ or 308 or their $250 + \text{their } 54 + \text{their } 4$ or 308	M1	estimated miles being driven
	$4.8 \div 30$ or 0.16 or their $4.25 \div 30$ or $0.14(1\dots)$	M1	cost per mile for Silver cost per mile for Gold
	their $0.16 \times \text{their } 308$ or $[49, 50]$	M1dep	Silver plan estimated cost their 308 is their total estimated miles driven dep on 7th M1
	their $0.14(1\dots) \times \text{their } 308 + 9$ or $[52, 53]$	M1dep	Gold plan estimated cost their 308 is their total estimated miles driven dep on 7th M1
	$[49, 50]$ and $[52, 53]$ and 51	A1	

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

Q	Answer	Mark	Comments
7 (a) cont'd	Alternative method 3 – working out expected costs for each types of weather		
	$4.80 - 0.55$ or 4.25	M1	cost per gallon for Gold/Diamond plan
	$12 \times \text{their } 4.25$ or 51	M1	Diamond plan estimated cost
	5×50 or 250 or $5 \times 50 + 90$ or 340 or $5 \times 50 + 10$ or 260	M1	miles being driven on days 1–5 miles being driven on days 1–6 if the weather is good miles being driven on days 1–6 if the weather is bad
	$1 - 0.6$ or 0.4	M1	probability of bad weather
	their $340 \div 30$ or $11.3(3\dots)$ or their $260 \div 30$ or 8.7 or $8.6(6\dots)$	M1	estimated gallons of fuel used if good weather estimated gallons of fuel used if bad weather
	their $11.3(3\dots) \times 4.8 \times 0.6$ or $[32.5, 33]$ or their $8.6(6\dots) \times 4.8 \times 0.4$ or $[16.5, 17]$ or their $11.3(3\dots) \times \text{their } 4.25 \times 0.6$ or $[28.8, 29]$ or their $8.6(6\dots) \times \text{their } 4.25 \times 0.4$ or $[14.6, 15]$	M2	M1 $11.3(3\dots) \times 4.8$ or 54.4 or $11.3(3\dots) \times \text{their } 4.25$ or $48.1(6\dots)$ or 48.2 or $11.3(3\dots) \times 0.6$ or 6.8 or $8.6(6\dots) \times 4.8$ or 41.6 or $8.6(6\dots) \times \text{their } 4.25$ or $36.8(33\dots)$ or $8.6(6\dots) \times 0.4$ or $3.4(66\dots)$ or 3.5 or 4.8×0.4 or 1.92 or 4.8×0.6 or 2.88 or their 4.25×0.4 or 1.82 or their 4.25×0.6 or 2.73
	their $[32.5, 33] + [16.5, 17]$ or $[49, 50]$	M1dep	estimated Silver cost dep on M2
	their $[28.8, 29] + \text{their } [14.6, 15] + 9$ or $[52, 53]$	M1dep	estimated Gold cost dep on M2
	$[49, 50]$ and $[52, 53]$ and 51	A1	

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

Q	Answer	Mark	Comments
7 (a) cont'd	Alternative method 4 – comparing addition cost to petrol being \$4.25		
	4.80 – 0.55 or 4.25	M1	cost per gallon for Gold/Diamond plan
	5 × 50 or 250 or 5 × 50 + 90 or 340 or 5 × 50 + 10 or 260	M1	miles being driven on days 1–5 miles being driven on days 1–6 if the weather is good miles being driven on days 1–6 if the weather is bad
	1 – 0.6 or 0.4	M1	probability of bad weather
	0.6 × 90 or 54 or their 0.4 × 10 or 4 or 0.6 × their 340 or 204 or their 0.4 × their 260 or 104	M1	estimated additional good weather miles estimated additional bad weather miles estimated good weather miles estimated bad weather miles
	their 204 + their 104 or 308 or their 250 + their 54 + their 4 or 308	M1	estimated miles being driven
	their 308 ÷ 30 or 10.26(6...) or 10.27 or 10.3	M1	estimated gallons of fuel used their 308 is their total estimated miles driven must be from correct working, eg not from 124 ÷ 12
	their 10.26(6...) × 0.55 or [5, 6]	M1dep	Silver plan estimated additional cost of purchasing from local petrol station dep on 6th M1
	12 – their 10.26(6...) or 1.73(3...) or 1.7	M1dep	dep on 6th M1
	their 1.73(3...) × their 4.25 or [7, 8]	M1	Diamond plan estimated additional cost of paying for remaining petrol
	[5, 6] and 9 and [7, 8]	A1	

Additional guidance is on the next page

7 (a) cont'd	Additional Guidance
	Other valid methods may be seen, eg The additional cost of Gold and Diamond compared to Silver is [£3.33, £3.36] and [£1.56, £1.76]

Q	Answer	Mark	Comments
7 (b)	Alternative method 1 – based on overall expected costs		
	$(1 - 0.25) \times \text{their } [49, 50]$ or $[36.75, 37.50]$ or $0.25 \times \text{their } [52, 53] \text{ or } [13, 13.25]$	M1	expected cost (not running late) expected cost (running late)
	$(1 - 0.25) \times \text{their } [49, 50] + 0.25 \times \text{their } [52, 53]$ or $[49.75, 50.75]$	M1	expected cost of taking out Silver plan
	$[49.75, 50.75]$ and 51 or $[0.25, 1.25]$ and No	A1ft	ft their expected values from 7 (a) 51 may be seen in working for 7 (a)
	Alternative method 2 – based on comparing addition cost to petrol being \$4.25		
	$(1 - 0.25) \times \text{their } [5, 6]$ or $[3.75, 4.5]$ or $0.25 \times 9 \text{ or } 2.25$	M1	expected cost (not running late) expected cost (running late)
	their $[3.75, 4.5] + \text{their } 2.25$ or $[6, 6.75]$	M1	expected cost of taking out Silver plan
	$[6, 6.75]$ and $[7, 8]$ or $[0.25, 2]$ and No	A1ft	ft their expected values from 7 (a)
	Additional Guidance		
	Other valid methods may be seen using values from 7 (a), eg Based on a 25% chance of paying the premium of Gold over Silver, you can expect to pay $0.25 \times [\text{£}3.33, \text{£}3.36] = [\text{£}0.83, \text{£}0.84]$. This is less than the premium of Diamond over Silver which is $[\text{£}1.56, \text{£}1.76]$. Therefore, No.		