PRACTICE PAPER

AQA Qualifications

LEVEL 3 Certificate
Mathematical Studies

Mark scheme

Paper 2C
1350/2C

Version 1.0

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

Principal Examiners have prepared these mark schemes for practice papers. These mark schemes have not, therefore, been through the normal process of standardising that would take place for live papers.

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Glossary for Mark Schemes

Examinations are marked in such a way as to award positive achievement wherever possible. Thus, for mathematics 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	mark is for method
dM	mark is dependent on one or more M marks and is for method
A	mark is dependent on M or m marks and is for accuracy
B	mark is independent of M or m marks and is for method and accuracy
E	mark is for explanation
ft	follow through from previous incorrect result
CAO	correct answer only
CSO	correct solution only
AWFW	anything which falls within
AWRT	anything which rounds to
ACF	any correct form
AG	answer given
SC	special case
OE	or equivalent
A2,1	2 or 1 (or 0) accuracy marks
PI	possibly implied
SCA	substantially correct approach
c	candidate
sf	significant figure(s)
dp	decimal place(s)

Q	Answer	Mark	Comments
1 (a)	25	B1	
1 (b)	***Error*** Question 1 is repeated in the 3rd column/3rd column has been mislabelled or Mode is in the same column as 'student'/some will assume 'mode' is a name of a student in the class	E1	oe statement
	Improvements Arrange list in alphabetical or numerical order/ list in ascending/descending order Remove 'Mode' from the last row/change 'Mode' to 'Modal mark' Use 'mean' instead of mode if he wants to analyse the overall performance of these four students Remove the repeated Question 1 heading and replace with Question 2 Move "Student" to a new column to the left of the names Add total possible mark for each question Add total possible mark in 'Total mark' heading	E3	oe statements E1 for each valid improvement Ignore any incorrect suggestions

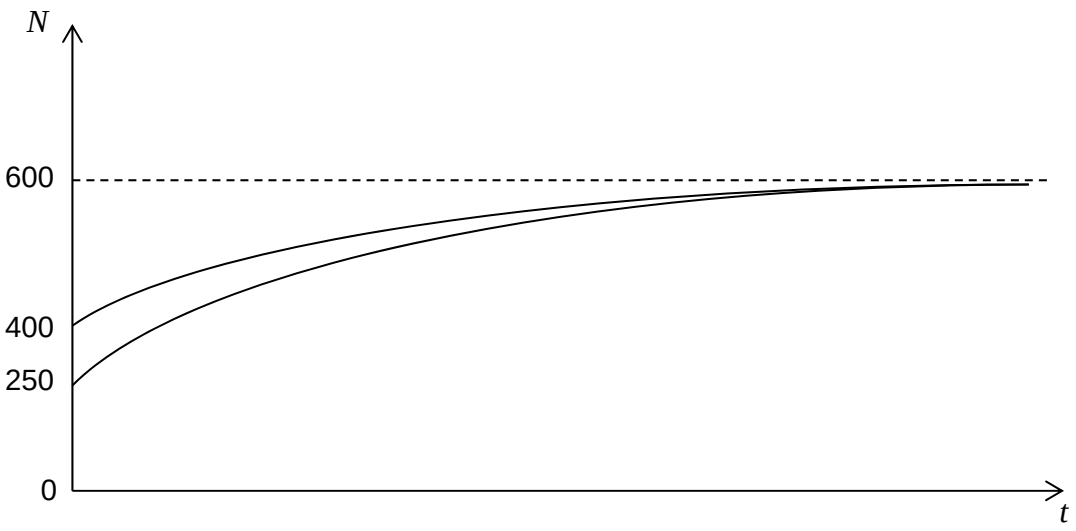
Q	Answer	Mark	Comments
1 (c)	***Richard's statement*** Cannot possibly use this as the maximum mark for Question 1 is not known or the maximum mark could be anything from 3 to 6 or Assuming the maximum mark for question 1 is three or four, the statement is correct	E1	oe statement
	Din's statement (64 + 72 + 40 + 68 + 64) ÷ 5 or 308 ÷ 5	M1	Working out the mean
	61.6(%) or 62(%)	A1	
	Din is wrong/ His statement is incorrect/It should be 61.6(%) or 62(%) or Din is right in that it is 60(%) to the nearest 10(%)/to 1 sf	E1ft	oe correct statement ft correct statement for their mean if M1A0 scored

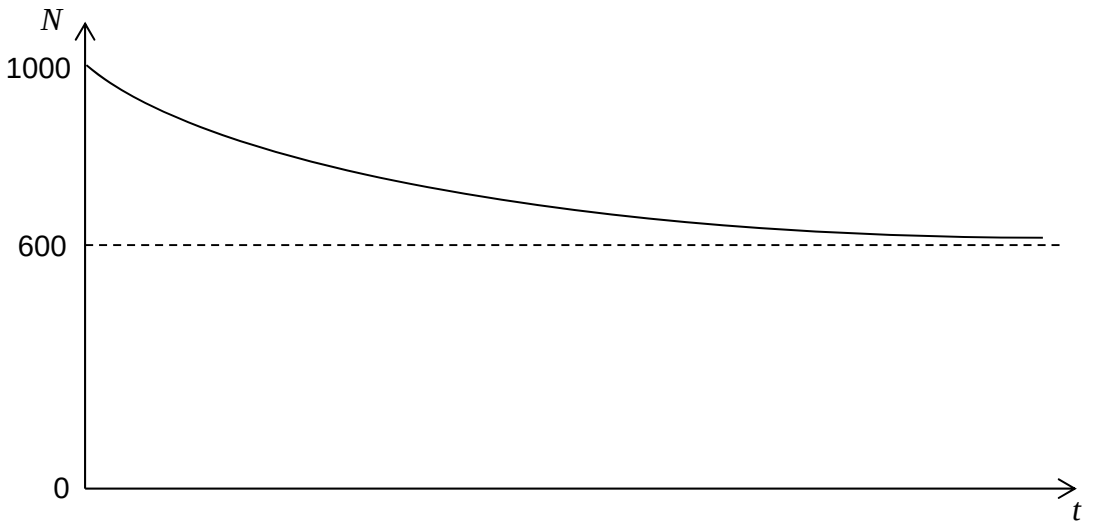
Q	Answer	Mark	Comments
2 (a)	There are no keys to indicate the meanings of abbreviations used (eg Q1/Q4/DTV/ISDN etc) Some data is only for adults/has no data shown for teenagers The number of active 4G mobile subscriptions for 2014 is shown as >6 million (Q1 2014), but this is a range of values/no definite number is shown Some data does not represent the whole year/some is only shown up to May 2014 The data for the percentage of premises covered by outdoor 4G in 2013 is missing The two columns are for 2013 and 2014, but in the data some is showing 2012 and 2013/the previous year's figure The percentages of the market shares of fixed broadband providers in the UK in 2014 do not total 100/the percentages of the market shares of fixed line providers in the UK in 2013 do not total 100 The method of calculation of availability of superfast broadband appears to have changed between 2013 and 2014	E3	oe examples E1 for each correct example up to E3 Ignore incorrect examples

Q	Answer	Mark	Comments
2 (b)	It should be 31.4 (instead of 31.24)/24 minutes = 0.4 hours not 0.24 hours Christopher should divide by 365 (instead of 355) The final answer should 1.03… hours (instead of 1.06) The data was only for one month in 2013, so you can't use it for the whole of the year	E3	oe statements E1 for each correct statement up to E3 Ignore incorrect statements

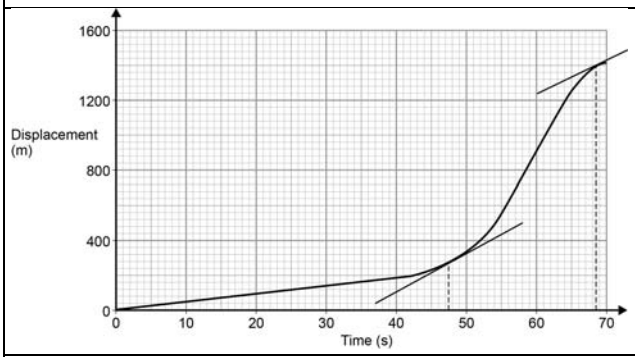
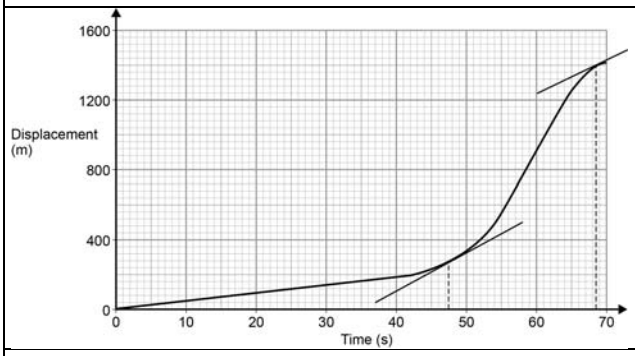
Q	Answer	Mark	Comments
2 (c)	***Rasheed's claim***		
	$\frac{3}{5}$ × 3.9 or 2.34 (m) or $\frac{8}{5}$ × 3.9 or 6.24 (million) or 6.1 ÷ 3.9 or 1.56… or (6.1 – 3.9) ÷ 3.9 or 2.2 ÷ 3.9 or 0.56…	M1	
	6.24 (million) and No or 1.56… and No	A1	Correct evaluation of the number of connections needed for the scale factor given or of the actual scale factor
	Francoise's claim		
	33 200 000 × 0.379 or 12 582 800 or 33 400 000 × 0.376 or 12 558 400 or 24 400	M1	Allow digits 125828 or 125584
	24 400 and Yes	A1	
	Eugene's claim		
	It is not possible to check/tell/confirm Eugene's statement as the data does not cover an entire year of 2014. or He might be right if the declining trend follows throughout the year or The decline might have happened during the rest of 2013	E1	oe statement

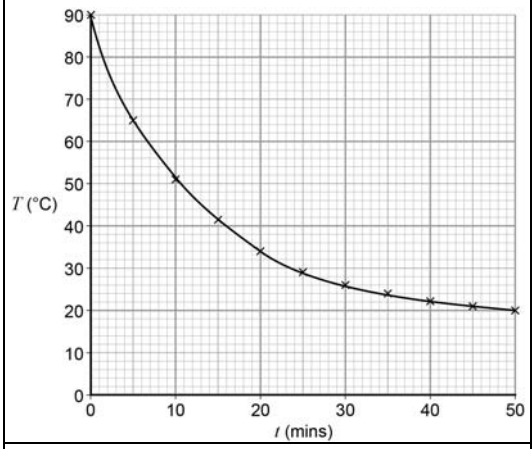
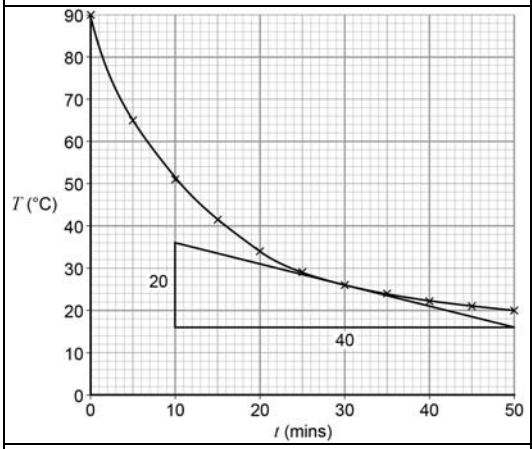
Q	Answer	Mark	Comments
3(a)	Fixed Charge = £3.60 Charge per mile = £2.40	B2	B1 one correct amount or both amounts correct, but with one or both zeros missing
3(b)	**Alternative Method 1 – Based on a Graphical Method**		
	$C = 3.2D + 0.8$	B1	Can be implied by a correctly drawn graph
	Graph of their $C = 3.2D + 0.8$ drawn correctly	B1	Must be a linear equation
	Graph of their $C = 3.2D + 0.8$ drawn correctly	B1	Must be a linear equation
	More than 3.5 miles	B1ft	ft their graphs
	Alternative Method 2		
	$C = 3.2D + 0.8$	B1	
	$2.4D + 3.6 = 3.2D + 0.8$	M1	Allow any inequality sign for these two marks
	$2.8 = 0.8D$	M1	
	More than 3.5 miles	A1ft	ft their starting equation
	Additional Guidence		
	Trial and improvement methods gain full credit if they reach a correct conclusion, but otherwise score zero		

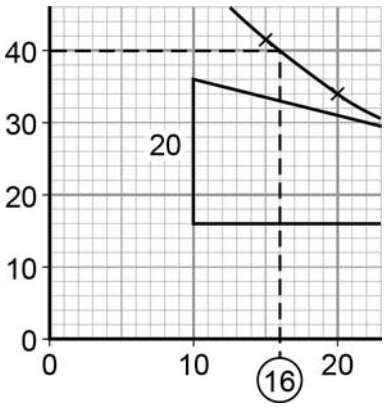
Q	Answer	Mark	Comments
4(a)(i)	Increases approaching a limit of 600	B1	Correct statement.
4(aii)			
	Starts at 400 on the vertical axis	B1	
	Correct shape	B1	
4(bi)	$N = 600 + 400e^0$ or $600 + 400$	M1	
	1000	A1	

Q	Answer	Mark	Comments
4(bii)			
	Starts at 1000 on the vertical axis	B1	Appropriate statement
	Correct shape	B1	
	Asymptote at 600	B1	
4(c)	There is only enough food or space to support a population of 600 rabbits	B1	oe appropriate statement
5(a)	[7.2, 7.3]	B1	
5(b)	$7.25 = 2.05 \times 5 - 25b$ or $8.5 = 2.05 \times 10 - 100b$	M1	Forms equation for b using one pair of points
	$b = \frac{10.25 - \text{their}7.25}{25}$ or $b = \frac{20.5 - \text{their}8.5}{100}$	M1	Solves equation
	0.12	A1ft	ft their answer to 5(a) if used

Q	Answer	Mark	Comments
5(c)	2.05 × 5 – their 0.12 × 25 or 2.05 × 10 – their 0.12 × 100	M1	Substitutes other x value into equation for y
	7.25 or 8.5	A1ft	ft their answers to 5(a) and 5(b)
	Yes or very close	B1ft	Correct decision for their value with M1 scored
6(a)	$\frac{1400}{70}$	M1	
	20 ms^{-1}	A1	Correct average speed including units
	Additional Guidance		
	Accept m/s or metres per second		

Q	Answer	Mark	Comments
6(b)	**Alternative Method 1**		
		M1	Tangents to graph drawn
	48 and 69	M1	Two times obtained from the graph
	their 69 – their 48 or 21	M1	
	$\frac{21}{70} \times 100$ or 30%	M1	
	30% and The claim is not correct	A1ft	ft their answer to 6(a)
	Alternative Method 2		
		M1	Tangents to graph drawn
	48 and 69	M1	Two times obtained from the graph
	Their 69 – their 48 or 21	M1	
	70 × 0.2 or 14	M1	
	21 and 14 and The claim is not correct	A1ft	ft their answer to 6(a)
	Additional Guidance		
	Accept their tangents and their readings if intention is clear		

Q	Answer	Mark	Comments
7(a)	(90 =) 20 + ae^0	M1	
	a = 70	A1	
	20 + their70$e^{-0.08\times30}$	M1	
	26.4°	A1ft	ft their value of a with M1A0M1 scored
7(b)		M1	Graph with correct shape
	Accurate graph	A1	
		M1 M1	Tangent drawn on graph Values identified to find gradient
	0.5°C/min	A1	Correct gradient Accept [0.4, 0.6]
	Additional Guidance		
	Accept calculus methods if seen		

Q	Answer	Mark	Comments
7(c)	Selects suitable value for lowest drinkable temperature, $T = 40$	M1	
	 Correct time for their lowest value	A1	Correct corresponding time for their lowest value eg 50°C - 11 mins 45°C - 13 mins 40°C - 16 mins 35°C - 19 mins 30°C - 24 mins