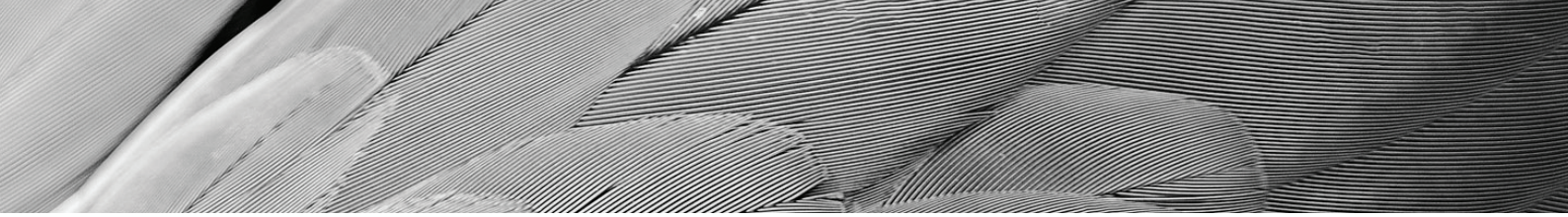

SET X

Level 3 Certificate
MATHEMATICAL STUDIES

Paper 2C

Mark scheme

OXFORD

Glossary

The marking scheme is given to indicate roughly where marks are likely to be awarded. The scheme does not necessarily reflect the precise allocation of marks that would be used by AQA Examining teams.

M	Method marks: awarded for evidence of a correct method which could lead to a correct answer.
A	Accuracy marks: awarded for a correct answer that follows from a correct method. To get these marks a correct method must be explicitly or implicitly shown; a correct answer alone gets no marks.
B	Marks that are awarded independently of any method.
ft	Follow through: marks awarded for an answer that uses correct working following a mistake in an earlier step.

Mark scheme Paper 2C

Question	Answer	Mark
1 (a)	No label on the vertical axis.	B1
	Different intervals mean the bars have misleading relative heights.	B1
1 (b)	Assume a maximum salary, for example £120 000.	M1
	Use a histogram.	M1
	Heights in proportions 5, 3, 1 (with above assumption).	A1 A1
2 (a)	He repays £1200 so he is correct to say he pays £200 interest.	B1
2 (b)	The crucial point is that he does not borrow the full £1000 for the two years.	M1
	So, after one year at 10%, he can consider that he is paying back £500 as well as the interest of £100.	M1
	However, in the second year he would then be paying interest of £100 on a loan of only £500, i.e. 20% interest.	A1
3 (a)	The multiple for English resits is $\frac{100\,239}{20\,544} \approx 4.88$. It is perfectly reasonable to say this 'is five times'.	M1 A1
	The multiple for maths resits is $\frac{110\,811}{27\,579} \approx 4.02$. This is *not* 'six times'.	M1 A1
3 (b)	The fine will take resources away from schools and potentially reduce the likelihood of success with the next cohort of students. However, the money raised by the fine could improve the chances of students resitting at FE colleges.	M1 A1
3 (c)	Individually (both for a student and for a school/college), extra well-targeted effort will improve results **relative** to other students and schools/colleges.	M1 A1
	However, the results of the entire cohort of students are effectively fixed by this cohort's results at key stage 2.	M1 A1
4 (a)	There will be fixed costs (e.g. of cabling) for any capacity of solar panel system.	M1 A1
4 (b)	$m = 1.5$, $c = 1500$	M1 A1 A1
4 (c)	A line through (0, 2000) and (3000, 4250).	M1 A1
	The 'break-even' point is where the two lines cross.	M1
	For capacities of less than 667 Watts the solar panels are cheaper to install.	M1 A1
5 (a)	Graph drawn.	M1 A1
	Point at $x = 2050$ considered.	M1
	1680 million (Can also be obtained by algebra)	A1
5 (b)	$e^{50x} = \frac{811}{230}$	M1
	$50x = \ln\left(\frac{811}{230}\right)$	A1
	$x = 0.0252$	A1
	$230e^{100x} = 2860$ (3sf)	M1
	2860 million (The UN forecast is 2300 million. This assumes some reduction in fertility rates.)	A1

<table>
<tr><td>6 (a)</td><td>Graph A shows none of the volatility of the price.</td><td>B1</td></tr>
<tr><td rowspan="2">6 (b)</td><td>The scale on the x-axis is not uniform.</td><td>B1</td></tr>
<tr><td>The y-axis has a false zero.</td><td>B1</td></tr>
<tr><td>6 (c) (i)</td><td>The graph is (roughly) symmetrical about a single minimum point.</td><td>B1</td></tr>
<tr><td rowspan="3">6 (c) (ii)</td><td>$a = 719$, $b \approx 5$ (for example)</td><td>M1 A1 A1</td></tr>
<tr><td>
<table>
<tr><th>Date</th><th>Data (£)</th><th>Model (£)</th><th>Difference (£)</th></tr>
<tr><td>24th</td><td>740</td><td>739</td><td>–1</td></tr>
<tr><td>25th</td><td>722</td><td>724</td><td>2</td></tr>
<tr><td>26th</td><td>719</td><td>719</td><td>0</td></tr>
<tr><td>27th</td><td>726</td><td>724</td><td>–2</td></tr>
<tr><td>28th</td><td>739</td><td>739</td><td>0</td></tr>
</table>
</td><td></td></tr>
<tr><td>Table or other clear presentation.</td><td>B1</td></tr>
<tr><td rowspan="4">7 (a)</td><td>His speed increases to a maximum of $\frac{20}{1.61} \approx 12.4\,\text{ms}^{-1}$.</td><td>M1 A1</td></tr>
<tr><td>It then reduces slightly to $\frac{20}{1.67} \approx 12.0\,\text{ms}^{-1}$.</td><td>B1</td></tr>
<tr><td>After the first 20 m, his speed changes very little.</td><td>B1</td></tr>
<tr><td>(His average speed for the entire race is $\frac{100}{9.63} \approx 10.4\,\text{ms}^{-1}$.)</td><td></td></tr>
<tr><td>7 (b) (i)</td><td>$0\,\text{ms}^{-1}$</td><td>B1</td></tr>
<tr><td rowspan="2">7 (b) (ii)</td><td>Drawing a tangent line</td><td>M1 A1</td></tr>
<tr><td>$6\,\text{ms}^{-1}$ to $7\,\text{ms}^{-1}$</td><td>A1</td></tr>
<tr><td rowspan="7">7 (c)</td><td>METHOD 1</td><td></td></tr>
<tr><td>Plot a graph of velocity against time.</td><td>M1 A1</td></tr>
<tr><td>Recognise a straight line (at least near $t = 1$).
Find the gradient.</td><td>M1 A1</td></tr>
<tr><td>Answer with units, e.g. 8 m/s/s or $8\,\text{ms}^{-2}$.</td><td>A1</td></tr>
<tr><td>METHOD 2</td><td></td></tr>
<tr><td>Use the graph to obtain two velocities, e.g. at $t = 0.5$ and $t = 1.5$.</td><td>M1 A1 A1</td></tr>
<tr><td>Use of $\frac{\text{Change in velocity}}{\text{Change in time}}$ e.g. $\frac{10 - 2}{1} = 8$ m/s/s.</td><td>M1 A1</td></tr>
<tr><td>(More precise analysis gives a maximum acceleration of 9.5 m/s/s.)</td><td></td></tr>
</table>