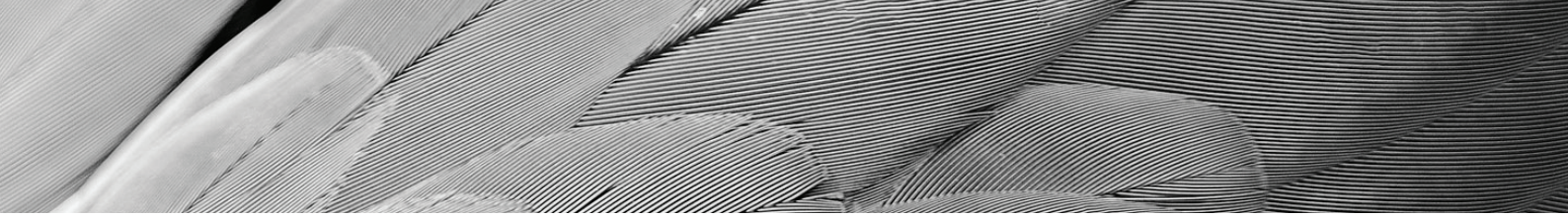

SET X

Level 3 Certificate
MATHEMATICAL STUDIES

Paper 1

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 1

<table>
<tr><th>Question</th><th>Answer</th><th>Mark</th></tr>
<tr><td>1 (a)</td><td>Because of rounding to the nearest thousand.</td><td>B1</td></tr>
<tr><td rowspan="2">1 (b) (i)</td><td>Sample size too small.</td><td>B1</td></tr>
<tr><td>Sample not taken in proportion to group size.</td><td>B1</td></tr>
<tr><td rowspan="3">1 (b) (ii)</td><td>Use given sample size (at least 20).</td><td>B1</td></tr>
<tr><td>Use a stratified sample.</td><td>B1</td></tr>
<tr><td>Calculate sample size $\times \frac{19\,054}{30\,513}$ etc.</td><td>M1 A1</td></tr>
<tr><td>2 (a)</td><td>Shoe sizes.</td><td>B1</td></tr>
<tr><td>2 (b) (i)</td><td>One possibility is to design a (very simple) questionnaire to be used with people leaving a local shoe shop.</td><td>M1 A1</td></tr>
<tr><td>2 (b) (ii)</td><td>Ask local shop(s) for the data you need or use the internet for the Office for National Statistics, shoe manufacturers, …</td><td>B1 B1</td></tr>
<tr><td rowspan="6">3</td><td>
<table>
<tr><td>End of year</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>Amount in account (£)</td><td>1530</td><td>1560.06</td><td>1091.81</td><td>613.65</td><td>125.92</td></tr>
</table>
</td><td></td></tr>
<tr><td>Clear table set up.</td><td>M1</td></tr>
<tr><td>Amounts in Years 1 and 2.</td><td>A1</td></tr>
<tr><td>Interest and withdrawal in Year 3.</td><td>M1 A1</td></tr>
<tr><td>Completion of table.</td><td>A1</td></tr>
<tr><td>Total amount withdrawn =
£500 + £500 + £500 + £128.44 = £1628.44</td><td>M1 A1</td></tr>
<tr><td rowspan="3">4</td><td>Assumptions should include:
• Typical lengths of golf shots
• Length of route that could be taken by someone playing golf shots.</td><td>
B1
B1</td></tr>
<tr><td>Other possibilities for assumptions (Allow any 2)
• Lost golf balls can be replaced from approximately where they were lost
• The surroundings will often prevent long drives, for example when passing through towns and villages.</td><td>
B1
B1</td></tr>
<tr><td>Assuming a route of 1600 km and an average length of 100 m per shot, the number of shots would be $1600 \times \frac{1000}{100} = 16\,000$.
(For interest it can be noted that completing the equivalent task across the USA took Floyd Rood 114 737 shots in 1963–4 but was completed by Luke Bielawski in 2013 in only 52 345 shots.)</td><td>M1 A1</td></tr>
<tr><td>5 (a)</td><td>Pay as you earn.</td><td>B1</td></tr>
<tr><td rowspan="3">5 (b)</td><td>£24 000 – £10 600 = £13 400</td><td>B1</td></tr>
<tr><td>£13 400 × 0.2 = £2680</td><td>M1 A1</td></tr>
<tr><td>$\frac{£2680}{12}$ = £223.33</td><td>M1 A1</td></tr>
<tr><td>5 (c)</td><td>D2 = B2 × D1</td><td>B1</td></tr>
</table>

6 (a)	Box and whisker diagram for the newspaper readers should have: Least time 20, Greatest time 900 Median approx. 170 LQ approx. 77, UQ approx. 355	B1 × 5
	Allow 3 comments, e.g.: • range for newspaper readers is smaller • IQR for newspaper readers is much lower • newspaper readers spent less time on average (justify using median) • least time, LQ, UQ and greatest times are all less for the newspaper readers.	B1 × 3
6 (b)	The two readerships might be very different.	B1
	Bias may have been introduced by the way the surveys were carried out.	B1
7 (a)	$C = 2000$, $t_1 = 1$, $t_2 = 2$, $i = 0.15$	B1 × 4
7 (b)	$2000 = \frac{A}{1.15} + \frac{A}{1.15^2}$	M1
	$2000 \approx 1.626A$	M1 A1
	£$A \approx$ £1230	A1
8 (a)	Allow 2 comments, e.g.: • If it is needed urgently. • If it is much more convenient to (for example) shop locally. • If any difference in cost for such a product is likely to be minimal.	B1 × 2
8 (b)	Assumptions should include sensible figures for: Cost of petrol 130p per litre Distance per litre 10 miles Size of a tank 50 litres	B1 × 3
	Allow up to 2 other possibilities for assumptions, e.g.: • ignoring standing charges that have to be paid irrespective of distance driven • smaller costs for tyres etc. • including (or not) the cost of one's time.	B1 × 2
	The main calculation should then have a form such as:	
	For a garage 1 mile away. Cost of fuel used (2 miles) $= \frac{130}{5} = 26$p	M1
	Money saved on tank of fuel = 50p	M1
	This gives a rough figure that a 1p per litre saving justifies travelling to a garage 2 miles away. Including other costs (and the cost of one's time) reduces this figure.	A1