



SET X

Level 3 Certificate
MATHEMATICAL STUDIES

Paper 2A

Mark scheme

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 2A

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 <i>not</i> '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	Sample mean = 390.4	B1
	$\frac{4}{\sqrt{5}}$ seen, 1.96 seen	B1 B1
	$390.4 \pm 1.96 \frac{4}{\sqrt{5}} = [386.9, 393.9]$	M1 A1
	The measurements are significantly raised from typical outside measurements.	B1
	However, this poses no environmental risk since the level is well within the typical range for indoor levels.	B1
5 (a)	The gradient is 1.35.	B1
	For each extra mark on Paper I, candidates tend to score 1.35 more marks on Paper II.	M1 A1
5 (b)	(Strong) positive correlation.	B1
	The two papers measure very similar skills.	B1
5 (c)	The point for Candidate I is furthest from the line of best fit.	M1 A1
	A total mark of $33 + 50 = 83\%$ could be considered.	A1

6 (a)	Features should include:	
	● bell-shaped histogram	B1
	● correctly labelled axes	B1
	● centred on 37°C	B1
	● values between roughly 35.8°C and 38.2°C.	B1
	● (maximum height at frequency density approximately 1)	
6 (b)	Comments could include:	
	● bell-shaped OR symmetrical	B1
	● comments about proportions lying within ± 1 , ± 2 , ± 3 standard deviations of the mean.	B1 \times 3
7 (a)	<p>The graph shows a positive linear correlation between GDP per person and health expenditure per person. The line of best fit is defined by the equation $y = 0.185x - 2650$. The data points are approximately at (12000, 400), (38000, 4000), (40000, 3500), (40000, 4800), (45000, 5000), and (55000, 9000).</p>	M1 A1
7 (b)	$y = 0.185x - 2650$	M1 A2
	Line correctly drawn.	M1 A1
7 (c)	Either from the equation or from the graph, the estimates are \$4000 and -\$1500.	B1
	The estimate for Italy can be expected to be reasonably accurate because it has many similarities with other countries in this list. (In fact it is significantly higher than the actual figure of roughly \$3200.)	B1
	The estimate for India is obviously impossible.	B1
	This illustrates the dangers both of extrapolation and of applying figures from (largely) developed countries to other countries.	B1
8 (a)	s.d. = 0.1	B1
	$\Phi\left(-\frac{0.01}{0.1}\right) = 1 - \Phi(-0.1) = 0.460$	M1 A1 A1
8 (b)	s.d. = $\frac{0.1}{5} = 0.02$	B1
	$\Phi\left(-\frac{0.01}{0.02}\right) = 1 - \Phi(-0.5) = 0.309$	M1 A1 A1