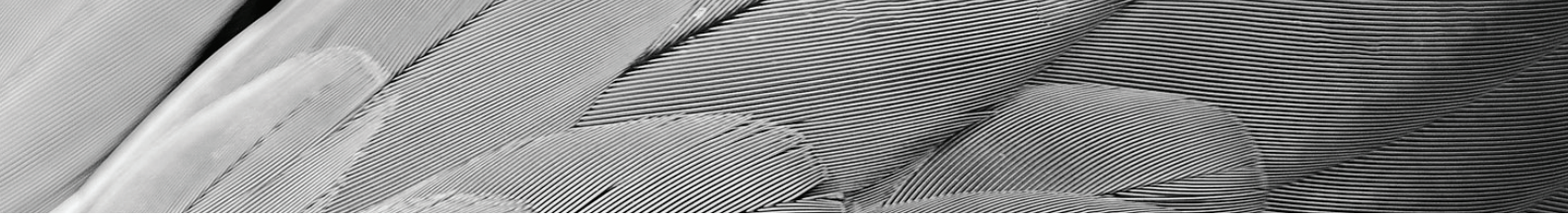


SET X

# Level 3 Certificate
# MATHEMATICAL STUDIES

## Paper 2B

# Mark scheme



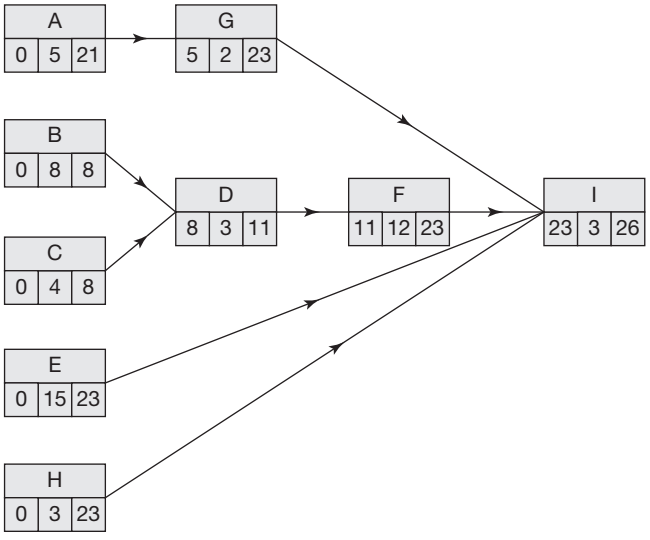
OXFORD

# 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 2B

| 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.<br>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) (i)** | This appears true – there are precisely 500 females and 500 males.<br>(There are also 60 girls and 60 boys.) | B1 B1 |
| **4 (a) (ii)** | This is also true – there are 83 sufferers out of 1000, i.e. 1 in 12.05. | B1 B1 |
| **4 (b)** | Conclusions which must be supported by numerical data include: | |
| | • asthma is more common amongst boys than girls | M1 A1 |
| | • asthma is more common amongst women than men | M1 A1 |
| | • asthma is more common amongst children than adults. | M1 A1 |
| **5 (a)** |  | |

| | | |
|---|---|---|
| | Network | M1 A2 |
| | Early times | M1 A1 |
| | Late times | M1 A1 |
| **5 (b)** | He must start preparing the meal by 6.30pm. | B1 |
| | The only way to achieve this is to do prepare the vegetables and spices in the first 12 minutes and then fry them before adding water and cooking the curry. | M1 A1 |
| | Laying the table and serving the chutneys and poppadoms can be done whilst the curry is cooking. The rice can be cooked at any convenient point in this process. | A1 |
| **6 (a)** | The expected gains in £s are $\frac{100\,000}{2\,000\,000} + \frac{10\,000}{400\,000} + \frac{250}{10\,000} + \frac{50}{5000} + \frac{20}{250} + \frac{10}{250} = 0.23$ | M1 A1 A1 |
| | The expected loss is therefore 77p per ticket. | A1 |
| **6 (b)** | The probability of winning a prize is $\frac{1}{2\,000\,000} + \frac{1}{400\,000} + \frac{1}{10\,000} + \frac{1}{5000} + \frac{1}{250} + \frac{1}{250} = 0.008\,303$ | M1 A1 |
| | This is 1 in 120.4 and so the stated odds are correct. | A1 |
| | What is misleading is the emphasis on the top prize that a person has very little chance of winning. | B1 |
| **7 (a)** | Undertake an action if, and only if, the expected extra benefit from undertaking it is greater than the expected extra cost. | B1 B1 |
| **7 (b)** | The extra costs of the proposed expansion in £s per month are $5000 + \frac{20 \times 100}{12} \approx 5167$ | M1 A1 A1 |
| | The definite extra benefits are $50 \times 60 = 3000$ | B1 |
| | In addition there is a probability, $p$ say, of a monthly benefit of $\frac{500\,000}{12} \times \frac{10}{100} \approx 4167$. | M1 A1 |
| | The break-even point would be if $5167 = 3000 + 4167p$ | M1 |
| | i.e. $p \approx 0.52$ | A1 |
| | The chance of winning the contract must be greater than 0.52. | A1 |