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GCSE MATHS

Probability

Edexcel 1MA1 | Subtopic collection Topic 53

# Tree diagrams and combined events

## Foundation tier

Answers and examiner comments

| 14 | 2012-2024 | Foundation |
| --- | --- | --- |
| question groups | available papers | tier |

### Using this booklet

1. Answer numbers match the companion question booklet.
2. Follow the original question number on marking tables.
3. Examiner comments are included where available.

**Name** _____ **Date** _____

Some entries use full source marking material in an appendix. Any unavailable mark schemes are identified beside the relevant answer.

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| 6 | (a) | | No + reason | 1 | B1 for No because she has 1 choice out of 3 which is the same as Mike oe |
| | (b) | (r,g)(r,b)(g,b)(g,r)(b,g)(b,r)<br>(r,r)(b,b)(g,g) | Complete list | 2 | M1 for listing pairs (at least 5 correct pairs)<br>A1 for fully correct list (ignore repeats) |
| | (c) | | $\frac{1}{9}$ | 1 | B1 for $\frac{1}{9}$ oe<br>( If M1A0 in (b), then SC B1 in (c) for $\frac{\text{their number of (b,g)}}{\text{their total number of outcomes}}$ ) |

| | | | | | |
|---|---|---|---|---|---|
| 5 | (a) | | 1.45 | 1 | B1 cao |
| | (b) | 1.15 + 2.49 | 3.64 | 2 | M1 for 1.15 + 2.49<br>A1 cao |
| | (c) | | B and D | 2 | M1 for adding two of the prices or 3.94 – 'any price'<br>A1 for B and D in any order<br><br>SC B1 for answer of 1.45 and 2.49 if M0 scored |

# Original question 6

The full source mark scheme begins on page 23. Use the original paper code, tier and question number shown above.

| | | | | | |
|---|---|---|---|---|---|
| 5 | (a) | | unlikely | 1 | B1 cao |
| | (b) | | cross at $\frac{1}{2}$ | 1 | B1 for cross at $\frac{1}{2}$ |
| | (c) | | cross at O | 1 | B1 for cross at O |

**PAPER: 1MA0/1F**

| | | | | |
|---|---|---|---|---|
| 17 | | $\frac{4}{9}$ | M1<br><br>A1 | for listed outcomes (allow 1 error eg omission or repeat) **or**<br>fractions $\frac{1}{3}\times\frac{2}{3}+\frac{2}{3}\times\frac{1}{3}$<br>for $\frac{4}{9}$ oe |

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 22 | Probabilities should sum to 1 | C1 | for stating that the probabilities should total 1<br>eg 0.25 should be 0.35 | |
| | 0.35 and 0.65 reversed | C1 | for recognising that the 0.35 and 0.65 in the first branches for the 2nd throw should be reversed<br>eg, “for the second throw, the probability it lands on 4 should be 0.65” | Can be shown on the diagram |

| | | | | | |
|---|---|---|---|---|---|
| 27 | (a) | $\frac{7}{10}, \frac{4}{9}, \frac{5}{9}, \frac{4}{9}$ | B2<br><br>(B1 | for all probabilities correct (oe)<br><br>for 2 or 3 correct) | |
| | (b) | $\frac{15}{90}$ | M1<br><br>A1 | for $\frac{3}{10} \times \frac{5}{9}$ oe<br><br>$\frac{15}{90}$ oe | Accept any equivalent fraction, decimal form 0.16(6...) or 0.17 or percentage form 16(.6...)% or 17% |

**Paper: 1MA1/1F**

**Paper: 1MA1/3F**

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 27 (a) | $\frac{1}{3},\frac{2}{3}$ $\frac{1}{3},\frac{2}{3},\frac{1}{3},\frac{2}{3}$ | B2 | six fully correct probabilities | Accept any equivalent fraction, decimal form 0.33(3...) and 0.66(6...) or 0.67 or percentage form 33(.3...)% and 66(.6...)% or 67% |
| | | (B1 | at least 2 correct probabilities) | |
| (b) | $\frac{2}{9}$ | M1 | for $\frac{1}{3}\times\frac{2}{3}$ oe or ft probabilities from diagram | |
| | | A1 | for $\frac{2}{9}$ oe | Accept any equivalent fraction, decimal form 0.22(2...) or percentage form 22(.2...)% |

| | | | | |
|---|---|---|---|---|
| 7 | EJ, EK, FJ, FK, GJ, GK | B2<br><br>(B1 | fully correct list with no repeat<br><br>for at least 4 correct) | Allow letters in either order |

Paper: 1MA1/2F

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 20 (a) | 0.87, 0.94, 0.94 | B2<br><br>(B1 | for all probabilities correct<br><br>for 0.87 or 0.94 correctly placed) | Accept any equivalent fraction, eg $\frac{87}{100}, \frac{47}{50}$<br>or equivalent percentage form 87%, 94% |
| (b) | 0.0078 | M1<br><br>A1 | for $0.13 \times 0.06$ oe<br><br>0.0078 oe | Accept any equivalent fraction, eg $\frac{39}{5000}$<br>or equivalent percentage form 0.78%<br>or $7.8 \times 10^{-3}$ |

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 26 (a) | 0.7 | B1 | for 0.7 on the first branch | Accept equivalent fractions or percentages for probabilities |
| | 0.65, 0.65 | B1 | for 0.65, 0.65 on the second branches | |
| (b) | 0.105 | M1 | for 0.3 × 0.35 | |
| | | A1 | oe | |

| | | | | |
|---|---|---|---|---|
| 31 | 0.06 | M1<br><br>A1 | for 0.2 × 0.3 oe<br><br>0.06 oe | <br><br>Accept any equivalent fraction or 6% |

## Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 1F

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme. Notes apply to both MLP papers and Braille papers unless otherwise stated.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5º
Measurements of length: ±5 mm

| PAPER: 1MA1_1F | | | |
|---|---|---|---|
| **Question** | | **Modification** | **Mark scheme notes** |
| 2 | | Wording added 'Look at the diagram for Question 2 in the Diagram Booklet. It shows a shaded shape.'; Wording 'this' removed and replaced with 'the'. Diagram enlarged. Shading changed. | Standard mark scheme |
| 6 | | Wording added 'Look at the diagram for Question 6 in the Diagram Booklet.'<br>Wording added 'three'. Wording 'this' removed and replaced with 'the'.<br>Wording added 'shown in the Diagram Booklet.'<br>Diagram enlarged, open headed arrows, frames removed, labels straightened, Centre dot enlarged. | Standard mark scheme |
| 8 | | Wording added 'Look at the diagram for Question 8 in the Diagram Booklet. It shows two angles marked $x$ and 50°' Diagram enlarged.<br>Angles moved outside the angle arcs. Angle arcs made smaller. | Standard mark scheme |
| 9 | | Wording added 'Look at the diagram for Question 9 in the Diagram Booklet. It shows a grid.'<br>Diagram enlarged. Black grid lines. Crosses changed to solid dots. Open headed arrows.<br>Axes labels moved to top of vertical axis and to right of horizontal axis. | Standard mark scheme |
| 13 | (a) | Letter $a$ changed to $w$. | Standard mark scheme but note change of letter |
| 13 | (b) | Letter $b$ changed to $p$; Letter $c$ changed to $q$. | Standard mark scheme but note change of letter |
| 13 | (c) | Letter $d$ changed to $y$. | Standard mark scheme but note change of letter |
| 16 | | Wording added 'Look at the information for Question 16 in the Diagram Booklet.'<br>Wording removed 'Here'. Frame removed | Standard mark scheme |
| 18 | | Letter $b$ changed to B; Letter $c$ changed to C. | Standard mark scheme but note change of letter |

| | | | |
|---|---|---|---|
| 23 | | Table enlarged and left aligned. Black outline and tracking lines added. Values changed in the table: 8 changed to 5; 24 changed to 25; 13 changed to 15; 11 changed to 10; 4 changed to 5<br>Wording 'Draw' removed and replaced with 'Look at the diagram for Question 23 in the Diagram Booklet. It shows a blank grid. On the grid, draw'. Wording 'this' removed and replaced with 'the'.<br>Axes labels moved to the top of the vertical axis and to the left of the horizontal axis.<br>Right axis labelled. Grid enlarged and small squares removed. Grid lines made black.<br>Open headed arrows. | Standard mark scheme but note the change in points to be plotted. |
| 24 | | Wording added 'Look at the diagram for Question 24 in the Diagram Booklet. It shows an incomplete Venn diagram.' Wording added 'in the Diagram Booklet'.<br>Diagram enlarged. Labels changed to 'set A' and 'set B'.<br>For Braille add "Ans: (i) __ (ii) __ (iii) __ (iv) __" | Standard mark scheme |
| 25 | | Wording added 'Look at the diagram for Question 25 in the Diagram Booklet. It shows a scatter graph with'. Wording removed 'The scatter graph shows'.<br>Axes labels moved to the top of the vertical axis and to the left of the horizontal axis.<br>Right axis labelled. Grid enlarged and small squares removed.<br>Grid lines made black. Open headed arrows. Crosses changed to dots. | |
| 25 | (b) | Wording added 'in the Diagram Booklet'. Value changed from 5.8 kg to 6.0kg. | B2 for an answer in the range 2.5 to 4.5<br>(B1 for a suitable line of best fit drawn<br>**or** for a point on the grid at ($x$, 6) where $x$ lies between 2.5 and 4.5<br>**or** a horizontal line drawn from 6 across to ($x$, 6) where $x$ is in the range 2.5 to 4.5) |
| 27 | | Wording added 'Look at the diagram for Question 27 in the Diagram Booklet. You may be provided with a model. They are NOT accurate. They show'.<br>Wording removed 'The diagram shows'. Diagram enlarged.<br>A floor added to the diagram, labelled 'Floor' to match the model provided.<br>Label '40 cm' changed to 'height 40 cm'. Dashed lines made longer and thicker.<br>Formula moved to top left of the diagram and frame removed. Model provided. | Standard mark scheme |

| | | | |
|---|---|---|---|
| 28 | | Wording added 'Look at the diagram for Question 28 in the Diagram Booklet. It shows two intersecting straight lines on a grid.' Equations moved outside the grid.<br>Grid enlarged. Grid lines made black. Open headed arrows. Graph lines made thicker.<br>Axes labels moved to the top of the vertical axis and to the right of the horizontal axis. | Standard mark scheme |
| 31 | | Wording added 'Look at the diagram for Question 31 in the Diagram Booklet. It is a probability tree diagram showing'. Wording removed 'The probability tree diagram shows' Diagram enlarged. | Standard mark scheme |

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 27 (a) | 0.4 | B1 | for 0.4 in correct position | Accept equivalent fractions or percentages for probabilities |
| | 0.45, 0.55, 0.45 | B1 | for the correct probabilities for coin **B** in the correct place on the branches | |
| (b) | 0.33 | M1 | for a correct method, eg $0.6 \times 0.55$ only | |
| | | A1 | for 0.33 oe | An answer of $\frac{0.33}{1}$ scores M1A0 |

| | | | | | |
|---|---|---|---|---|---|
| 20 | (a) | (0.3) 0.7 0.3 0.7<br>0.3 0.7 | B2<br><br>(B1 | all probabilities correctly placed<br><br>for 0.7 correctly placed for Game 1) | Accept equivalent fractions or percentages for probabilities |
| | (b) | 0.49 | M1<br><br>A1 | for a correct method, ft their tree diagram<br>eg $0.7 \times 0.7$ only<br><br>oe, ft their tree diagram | ft their diagram provided probabilities are less than 1<br><br>An answer of $\frac{0.49}{1}$ scores M1A0 unless 0.49 seen |

| Paper: 1MA1/3F |
|---|

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edexcel

# Mark Scheme (Results)

## November 2013

## Pearson Edexcel GCSE
## In Mathematics Modular (2MB01)
## Unit 2: (5MB2F_01) Foundation
## (Non-Calculator)

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**NOTES ON MARKING PRINCIPLES**

**1** All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

**2** Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

**3** All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

**4** Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

**5** Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

**6** Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii) *select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

**7 With working**

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

**8 Follow through marks**

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

**9 Ignoring subsequent work**

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

**10 Probability**

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

**11 Linear equations**
Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

**12 Parts of questions**
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

**13 Range of answers**
Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

| **Guidance on the use of codes within this mark scheme** |
| --- |
| M1 – method mark<br>A1 – accuracy mark<br>B1 – Working mark<br>C1 – communication mark<br>QWC – quality of written communication<br>oe – or equivalent<br>cao – correct answer only<br>ft – follow through<br>sc – special case<br>dep – dependent (on a previous mark or conclusion)<br>indep – independent<br>isw – ignore subsequent working |

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| PAPER: 5MB2F_01 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | (a) | | 90 | 1 | B1 cao |
| | (b) | | *O* marked correctly | 1 | B1 |
| | (c) | | Correct arrows | 1 | B1 |
| 2 | | | 8 | 2 | M1 for 30 ÷ 4 or at least 3 multiples of 4 shown<br>A1 cao<br>SC B1 7 on answer line, no working shown |
| 3 | (a) | | 3 or 5 or 21 | 1 | B1 for 3 or 5 or 21 |
| | (b) | | 16 | 1 | B1 cao |
| | (c) | | 24 | 1 | B1 cao |
| 4 | (a) | | Squares shaded | 1 | B1 for any 6 squares shaded |
| | (b) | | $\frac{1}{5}$ | 2 | M1 $\frac{20}{100}$ or equivalent fraction<br>A1 cao |
| 5 | (a) | | $3p$ | 1 | B1 for $3p$ |
| | (b) | | $8t$ | 1 | B1 for $8t$ |

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| PAPER: 5MB2F_01 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| *6 | | | No with working and (£)1.76 or (£)8.19 | 4 | M1 for method to find the total of the two items eg 3.25 + 2.99 (= 6.24)<br>M1 for complete method eg subtract the cost of two items from 8 or add on the cost of a coffee to the two items<br>A1 for (£)1.76 or (£)8.19<br>C1 (dep on M1) ft for statement shown with correct money notation.<br>OR<br>M1 for subtraction of the cost of an item from 4 or 8<br>M1 for complete method eg adding the two remainders or subtracting the second value from their running total<br>A1 for (£)1.76<br>C1 (dep on M1) ft for statement shown with correct money notation. |
| 7 | (a) | | Warsaw | 1 | B1 accept –8 |
| | (b) | | 6 | 1 | B1 accept –6 |
| | (c) | | –3 | 1 | B1 cao |
| 8 | (a) | | 40 | 1 | B1 cao |
| | (b)(i) | | 55 | 3 | M1 180 – (40 + 25 + 60) or 180 – 125 or 180-40-25-60<br>A1 cao |
| | (ii) | | | | B1 (indep) Sum of the angles on a straight line is $180^{o}$ |

| PAPER: 5MB2F_01 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 9 | (a) | 8×3 + 20 | 44 | 2 | M1 for 8 × 3 + 20<br>A1 cao |
| | (b) | | No + reason | 2 | B2 No + you only pay the £20 once oe<br>OR<br>B1 6×8+20(=68)<br>B1 No + valid comparison |
| 10 | (a) | | Correct pattern | 1 | B1 |
| | (b) | | 12 | 1 | B1 cao |
| | (c) | 20÷2 or<br>Diagram or<br>Table | 11 | 2 | M1 for a complete method to find the pattern number from the number of grey tiles<br>A1 cao |
| 11 | (a) | | 0.8 drawn | 1 | B1 cao |
| | (b) | $\frac{3}{4}+\frac{3}{4}=1\frac{1}{2}$<br>1.500 – 0.8 = 0.7<br>0.7 × 1000<br>OR<br>$\frac{3}{4}+\frac{3}{4}=1\frac{1}{2}$<br>$1\frac{1}{2}$ kg = 1500 g<br>0.8 kg = 800g<br>1500 – 800<br>OR<br>0.8kg = 800g<br>$\frac{3}{4}$ kg = 750g<br>800 – 750 = 50<br>750 – 50 | 700 | 4 | M1 For a complete method to find the weight of two puddings<br>M1 For a complete method to find the difference of 'weight of two puddings' and 0.8kg<br>M1 For a complete method to convert an appropriate weight from kg to g<br>A1 cao<br>OR<br>M1 For a complete method to find the difference between 0.8 kg and $\frac{3}{4}$ kg<br>M1 For a complete method to find the difference between $\frac{3}{4}$ kg and '0.8-$\frac{3}{4}$'<br>M1 For a complete method to convert an appropriate weight from kg to g<br>A1 cao |

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| PAPER: 5MB2F_01 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 12 | (a) | | Correct diagram | 1 | B1 |
| | (b) | | Correct diagram | 1 | B1 cao |
| *13 | | | Yes with working | 4 | M1 9.60 ÷3 (=3.20) or 9.60 × 2 (= 19.20) or 9.60 × $\frac{2}{3}$ (=6.40)<br>M1 for a fully correct method to find the cost of the two shirts<br>A1 12.8(0)<br>C1 (dep on M2) ft statement supported by working<br>OR<br>M1 9.60 ÷3 (=3.20) or 9.60 × $\frac{2}{3}$ (=6.40)<br>M1 13 ÷ 2<br>A1 for 6.4(0) and 6.5(0)<br>C1 (dep on M2) ft statement supported by working |
| 14 | | | 290 | 3 | M1 for (180 – 40) ÷ 2<br>M1 for 360 – '70'<br>A1 cao |
| 15 | (a) | | $10c + 15d$ | 1 | B1 cao |
| | (b) | $x + x + 3 + 2x = 4x + 3$<br>$2(3x – 2) = 6x – 4$<br>$6x – 4 – (4x + 3)$ | $2x – 7$ | 4 | M1 for $x + x + 3 + 2x$ (= $4x + 3$)<br>M1 for $2(3x – 2)$ (= $6x – 4$)<br>M1 for '$6x$' –'$4x$' – '4' ± '3' oe<br>A1 cao<br>OR<br>M1 for $2(3x – 2)$ (= $6x – 4$)<br>M1 for '$6x$'– $x$– $x$ – $2x$ (=$2x$) oe<br>M1 for '−4' ± 3<br>A1 cao |

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| PAPER: 5MB2F_01 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 16 | (a) | | Correct diagram | 2 | B2<br>(B1 any isometric face correct) |
| | (b) | | 6 | 2 | M1 (1) × 2 × 3<br>A1 6<br>OR<br>M1 for 2 × 4 × 6 ÷(2 × 2 × 2)<br>A1 6 |
| 17 | | | 4500 | 5 | M1 for splitting the shape (or show the recognition of the "absent" rectangle) and using a correct method to find the area of one rectangle<br>M1 for a correct method to find the area of a 2nd rectangle<br>M1 for a complete and correct method to find the total area<br>M1 (dep on at least one prevM1) for a correct method to find 90% of their total area<br>A1 cao |

**Modifications to the mark scheme for Modified Large Print (MLP) papers.**

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Angles: ±5°
Measurements of length: ±5 mm

| **PAPER:** | | | |
|---|---|---|---|
| **Question** | | **Modification** | **Notes** |
| Q1 | | Diagram is size × 2. | Standard mark scheme |
| Q3 | | 'eight' inserted into 1st line. | Standard mark scheme |
| Q4 | | 2cm squares. | Standard mark scheme |
| Q7 | | Map removed and replaced with a table giving places in alphabetical order | Standard mark scheme |
| Q9 | | No picture. | Standard mark scheme |
| Q10 | | 2cm squares. Shading is dotty. 'grey' changed to 'shaded' throughout. | Standard mark scheme |
| Q11 | | Just scale given. | Standard mark scheme |
| Q13 | | Just information given with no box. | Standard mark scheme |
| Q15 | | MLP only: $x$ changed to $y$, arrows removed, information written in. | Standard mark scheme ($x$ changed to $y$) |

PMT

| PAPER: | | | |
|---|---|---|---|
| **Question** | | **Modification** | **Notes** |
| Q16 | | Model for part (a) has no dimensions written on it. Models for part (b) – dimensions of 2 × 4 × 6 given. Wording given below | |
| Q16a | | Look at the model or at the diagram for Question 16(a). They show a cuboid.<br>For the cuboid<br>(i) write down the number of faces,<br>(ii) write down the number of edges,<br>(iii) write down the number of vertices.<br>(2 marks) | B2 All answers correct<br>(B1 at least one correct answer given) |
| Q16b | | Look at the two models or at the diagram for Question 16(b). They are NOT accurate.<br>A different box has been made to hold cubes. This box is in the shape of a cuboid.<br>A cube is also shown. Each cube has edges of length 2 cm<br><br>Work out the largest number of cubes that can fit into the box.<br>(2 marks) | Standard Mark Scheme |

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**Question 27**

Part (a) was generally answered well, and most students were able to write at least two correct probabilities on the tree diagram, sometimes writing these as equivalent fractions of $\frac{2}{4}$2/6 and 4/6. Some students chose to try to use decimals for this problem but were not able to score any marks due to inaccurate approximations of $\frac{1}{3}$.

Having perhaps achieved one or both marks in part (a) many students lacked the knowledge that they needed to select the correct branches and multiply the fractions together and the few that did were rewarded with the marks in part (b).

**Question 7**

Those students who adopted a systematic approach to listing the outcomes were the ones who gained full marks most regularly. A common error was to repeat outcomes.

**Question 20**

Part (a) saw a pleasing number of successful attempts for a late question on the paper with almost a third of the cohort scoring both marks. Many students were able to place 0.87 correctly, with the 0.94 proving more difficult for others. A commonly seen misconception involved trying to sum the probabilities to make 0.13 or 0.87 in the second stage instead of summing to 1. Centres should remind students of this difference between probability tree diagrams and frequency tree diagrams.

Part (b) proved to be more of a challenge for this cohort, with many adding the probabilities instead of multiplying. There were some students who could not identify the required probabilities. This question was not well answered.

**Question 26**

In the first part of this question, there was a clear split between those candidates who understood the concepts of a tree diagram and were able to insert the correct probabilities and those that seemed to not know that probabilities needed to sum to 1 and often just repeated values in the tree that they could already see. Full marks and zero marks were the most common, although some students were able to identify the 0.7 but not the other two probabilities.
In part (b) most candidates attempted some form of calculation although 0.3 + 0.35 = 0.65 was the most common approach and led to zero marks. Very few candidates seemed to know that they needed to multiply the probabilities.

**Question 31**

Few solutions were fully correct in this question. 0.2 + 0.3 (= 0.5) was the most common error. Those correctly trying to find the product often gave an answer of 0.6 instead of 0.06 Often a lack of showing working out meant that 0.6 didn't gain any credit. Students need to be encouraged to show their calculations for this reason.
Many students highlighted the correct probabilities but did not go any further.

**Summary**

On the evidence of performance on this paper, students need to:

- take more care when reading the questions.
- take care when carrying out arithmetical operations and check their working to avoid careless errors. Also, they need to check that they have answered the question e.g. Q10 and Q14c.
- write clearly so that correct values quoted are not altered in subsequent working.
- show clear methods of working particularly in basic calculations such as finding fractions or percentages of quantities.
- set their working out clearly and systematically, crossing out working that is being replaced.
- write the decision when asked for e.g. Yes or No and keep comments short and simple to avoid contradiction. Explanations should be brief, but comprehensive (concise).
- estimate the demand of a question by looking at how many marks a question is worth (Q28 for example) in allocating time.

**Question 27**

Part (a) saw mixed results with 0, 1 and 2 marks awarded regularly. A good number of students were able to complete the probability tree diagram correctly and gain 2 marks. Of those that gained 1 mark, completing coin B's branches incorrectly was the most common error. In part (b) few students gained 2 marks for a correct answer. Of those that didn't, most scored 0 marks and there was a huge variety of incorrect methods seen, such as 0.6 + 0.55 or showing the correct product but doing further incorrect work such as adding to another product. It should be noted that M1 could be gained for 0.6 × 0.55 only, so any additional work lost the method mark.

**Question 20**

Part (a) saw some success with a good number of learners gaining 2 marks for correctly completing the tree diagram. Of those that didn't, many gained 1 mark for correctly filling out the branch for Game 1, but made errors on Game 2 branches such as mixing up the order of 0.3 and 0.7. In part (b) many did not understand the need to multiply the 2 probabilities and instead added or simply gave their answer as 0.7. If a learner did not have correct probabilities in (a) they could still gain 2 marks on the follow through in (b) and this was seen on occasions.