**GCSE Mathematics (1MA1)**

**Themed papers – Area and Perimeter**

**Compiled from student-friendly mark schemes**

**Please note that this mark scheme is not the one used by examiners for making scripts. It is intended more as a guide to good practice, indicating where marks are given for correct answers. As such, it doesn’t show follow-through marks (marks that are awarded despite errors being made) or special cases.**

**It should also be noted that for many questions, there may be alternative methods of finding correct solutions that are not shown here – they will be covered in the formal mark scheme.**

**NOTES ON MARKING PRINCIPLES**

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| --- |
| **Guidance on the use of codes within this mark scheme** |
| M1 – method mark. This mark is generally given for an appropriate method in the context of the question. This mark is given for showing your working and may be awarded even if working is incorrect.  P1 – process mark. This mark is generally given for setting up an appropriate process to find a solution in the context of the question.  A1 – accuracy mark. This mark is generally given for a correct answer following correct working.  B1 – working mark. This mark is usually given when working and the answer cannot easily be separated.  C1 – communication mark. This mark is given for explaining your answer or giving a conclusion in context supported by your working.  Some questions require all working to be shown; in such questions, no marks will be given for an answer with no working (even if it is a correct answer). |

**Question 1 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  |  | 1 | This mark is given for any rectangle drawn where the length is twice the width |
| 4 × 8 rectangle correctly drawn | 1 | This mark is given for the correct answer only |

**Question 2 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 4 cm  4 cm  4 cm  2 cm  6 cm  6 cm  6 cm | P1 | This mark is given for a process to find the perimeter of the shape with the missing length 2 cm shown or the base of the shape (4 cm + 6 cm = 10 cm) shown |
| 6 + 4 + 2 + 6 + 4 + 6 + 4 | P1 | This mark is given for a complete process to find the length of the perimeter |
| 32 | A1 | This mark is given for the correct answer only |

**Question 3 (Total 4 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | 90 × 60 = 5400 | P1 | This mark is given for a process to find the area of the garden |
| 5400 × 0.4 = 2160 | P1 | This mark is given for a process to find the area of 40% of the garden (flowers) |
| 5400 – 2160 | P1 | This mark is given for a process to find the area of 60% of the garden (grass) |
| 3240 | A1 | This mark is given for the correct answer only |

**Question 4 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | √81 = 9 | P1 | This mark is given to find the length of the side of the square |
| 9 × 4 = 36 | A1 | This mark is given for the correct answer only |
| (b) | × 16 × 9 = 72 | M1 | This mark is given for finding the area of the triangle |
| 72 × 5 = 360 | M1 | This mark is given for finding the area of the parallelogram |
| *h* = 360 ÷ 30  = 12 | A1 | This mark is given for the correct answer only |

**Question 5 (Total 4 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | × 8 × 9 = 36 (cm2) | P1 | This mark is given for a process to find the area of the triangle |
| 6 × 36 = 216 (cm2) | P1 | This mark is given for a process to calculate the area of 6 such triangles |
| 216 ÷ 16 | P1 | This for process shown of dividing the area of the rectangle by the length of the given side to find the length of the other side |
| 13.5 (cm) | A1 | This mark is given for the correct answer only |

**Question 6 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 12 | 1 | This mark is given for the correct area |
| cm2 | 1 | This mark is given for the correct units |
| (b) | Kite | 1 | This mark is given for the correct answer only |

**Question 7 (Total 4 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | Number of paving stones needed =  (600 ÷ 30) + (120 ÷ 30) = 20 × 4 = 80 | M1 | This mark is given for a method to find the number of paving stones needed |
| = 20 × 4 = 80 | A1 | This mark is given for a correctly finding the number of paving stones needed |
| 80 × 2.50 = 200 | A1 | This mark is given for a method to find the total cost of the paving stones needed |
| 220 > 200 so Wasim has enough money to by all the paving stones needed | C1 | This mark is given for the correct conclusion following correct working |

**Question 8 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | *PQ* = 45 ÷ 10 = 4.5  *BC* = 4.5 | P1 | This mark is given for a process to use the area of *PQRS* to find the lengths of *PQ* and *BC* |
| 26 – (2 × 4.5) | P1 | This mark is given for a process to use the perimeter of *ABCD* to find the length *AB* |
| *AB* = 17 ÷ 2 | P1 | This mark is given for a process to to find the length *AB* |
| 8.5 | A1 | This mark is given for the correct answer only |

**Question 9 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | × 7 × (10 + 16) = 91 | P1 | This mark is given for a process to calculate the area of the trapezium |
| 91 ÷ 2 = 45.5 | P1 | This mark is given for a process to work out how many litres of paint are needed |
| 45.5 ÷ 5 = 9.1  so 10 tins needed | P1 | This mark is given for a process to work out how many tins are needed (rounded up to the nearest whole number) |
| 10 × 16.99 = 169.90 | P1 | This mark is given for a process to find out the total cost of the paint needed |
| No, John does not have enough money. | C1 | This mark is given for a correct conclusion supported by working |

**Question 10 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | Area of trapezium = *h* (*a* + *b*)  =  × 4 × (2 + 7)  = 18 | M1 | This mark is given for a method to find the area of the trapezium |
| Triangle of area 18  (e.g. base 9, height 4) | A1 | This mark is given for a correct diagram with area 18 |

**Question 11 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | × 3*x* × 3*x* = 162 | P1 | This mark is given for a process to set up an equation in *x* for the area of the triangle |
| 4.5*x*2 = 162  *x*2 =  = 36 | P1 | This mark is given for a process to find an expression for *x*2 |
| *x* = 6 | A1 | This mark is given for the correct answer only |

**Question 12 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 2*x* + 6 = 5*x* − 9 | 1 | This mark is given for forming an equation |
| 3*x* = 15  *x* = 5 | 1 | This mark is given for rearranging and solving for *x* |
| (2 × 5) + 6 = 16  or  (5 × 5) – 9 = 16 | 1 | This mark is given for substituting 5 into the side length |
| 48 ÷ 16 = 3  so *y* = 3 | 1 | This mark is given for the correct answer only |

**Question 13 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 2 × *π* × 0.82 = 4.021 | P1 | This mark is given for a process to find the area of the top and bottom of the tank |
| 2*π* × 0.8 × 1.8 = 9.047 | P1 | This mark is given for a process to find the curved surface area of the tank |
| 4.021 + 9.047… = 13.069 | P1 | This mark is given for a process to find the total surface area of the tank |
| 3 × 13.068 = 39.204 | P1 | This mark is given for a process to find the total surface area of three tanks |
| Jeremy only has enough paint to cover 35 m2 so Jeremy does not enough paint to completely cover 3 tanks | C1 | This mark is given for a correct conclusion supported by correct working |

**Question 14 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | Width = *x*  Length = *x* + 7 | 1 | This mark is given for forming expressions for the length and width of the rectangle |
| *x* + *x* + 7 + *x* + *x* + 7 + 7 + *x* + *x* + 7 + *x* + *x* + 7 + 7 = 70  8*x* + 42 = 70 | 1 | This mark is given for forming an equation for the width of the shape |
| *x* = | 1 | This mark is given for finding an expression for *x* |
| width = 3.5, length = 10.5 | 1 | This mark is given for finding values for the width and the length of the shape |
| 4 × 3.5 × 10.5 = 147 | 1 | This mark is given for finding the area of the shape |

**Performance data:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Q** | **Taken from** | | | **Total Marks available** | **TOPIC** | **Spec Ref** | **AO** | **% Mean marks** | **Edexcel mean averages Marks of candidates who achieved grade:** | | | | | | |
| **Q** | **Series** | **Paper** | **ALL** | **5** | **4** | **3** | **2** | **1** | **U** |
| 1 | 8 | Nov 2017 | 1F | 2 | Geometry | G16, R4 | 2 | 75 | 1.49 | 1.88 | 1.75 | 1.56 | 1.20 | 0.85 | 0.62 |
| 2 | 16 | June 2019 | 3F | 3 | Geometry | G17 | 3 | 60 | 1.80 | 2.69 | 2.34 | 1.86 | 1.37 | 0.90 | 0.40 |
| 3 | 15 | June 2019 | 2F | 4 | Ratio | G16, R9 | 3 | 59 | 2.34 | 3.85 | 3.53 | 2.61 | 1.23 | 0.41 | 0.12 |
| 4a | 13a | Nov 2018 | 2F | 2 | Geometry | G16, G17 | 3 | 44 | 0.88 | 1.79 | 1.30 | 0.83 | 0.49 | 0.27 | 0.18 |
| 4b | 13b | Nov 2018 | 2F | 3 | Geometry | G16, G17 | 3 | 49 | 1.46 | 2.77 | 2.21 | 1.44 | 0.64 | 0.20 | 0.06 |
| 5 | 15 | June 2017 | 1F | 4 | Geometry | G16,N2 | 3 | 41 | 1.63 | 3.17 | 2.48 | 1.62 | 0.76 | 0.19 | 0.04 |
| 6a | 10a | Nov 2017 | 2F | 2 | Geometry | G16 | 1 | 43 | 0.86 | 1.49 | 1.14 | 0.86 | 0.58 | 0.31 | 0.09 |
| 6a | 10b | Nov 2017 | 2F | 1 | Geometry | G4 | 2 | 71 | 0.71 | 0.72 | 0.76 | 0.73 | 0.64 | 0.54 | 0.49 |
| 7 | 18 | June 2019 | 1F | 4 | Ratio | R2, R10, R11,G14 | 2 | 40 | 1.59 | 3.32 | 2.33 | 1.54 | 0.96 | 0.44 | 0.13 |
| 8 | 28 | June 2019 | 1F | 4 | Algebra | A19, A21, G16 | 3 | 36 | 1.42 | 3.70 | 2.81 | 1.13 | 0.24 | 0.09 | 0.02 |
| 9 | 24 | Nov 2018 | 2F | 5 | Ratio | N13, R11, G16 | 3 | 31 | 1.57 | 3.82 | 2.43 | 1.49 | 0.70 | 0.26 | 0.07 |
| 10 | 21 | June 2018 | 3F | 2 | Geometry | G16 | 2 | 19 | 0.38 | 1.11 | 0.59 | 0.31 | 0.16 | 0.06 | 0.02 |
| 11 | 17 | June 2018 | 3F | 3 | Algebra | A4, A21, G16 | 2 | 13 | 0.39 | 1.59 | 0.69 | 0.21 | 0.08 | 0.09 | 0.10 |
| 12 | 28 | Nov 2017 | 1F | 4 | Algebra | G16, A4, A21 | 2 | 13 | 0.51 | 2.26 | 0.97 | 0.39 | 0.13 | 0.08 | 0.05 |
| 13 | 29 | June 2019 | 3F | 5 | Geometry | N2, R10, G14, G17 | 3 | 11 | 0.55 | 1.83 | 0.89 | 0.41 | 0.18 | 0.07 | 0.03 |
| 14 | 24 | Nov 2017 | 3F | 5 | Geometry | G16, G17, A21 | 3 | 4 | 0.18 | 1.73 | 0.36 | 0.09 | 0.02 | 0.01 | 0.00 |
|  |  |  |  | **53** |  |  |  |  | **17.76** | **37.72** | **26.58** | **17.08** | **9.38** | **4.77** | **2.42** |