**GCSE Mathematics (1MA1)**

**Themed papers – Algebraic proof**

**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 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 2(2*x* + 1), 2(*x* + 2), 4*x* | M1 | This mark is given for a method to list the dimensions of the pentagon |
| 2(2*x* + 1) + 2(*x* + 2) + 4*x* = 18 | M1 | This mark is given for a method to add the dimensions of the pentagon together |
| 4*x* + 2 + 2*x* + 4 + 4*x* = 18  10*x* + 6 = 18 | C1 | This mark is given for collecting and rearranging terms to show 10*x* + 6 = 18 as required |
| (b) | 10*x* + 6 = 18  10*x* = 12 | M1 | This mark is given for a method to find the value of *x* |
| *x* = 1.2 | A1 | This mark is given for a correct answer only |

**Question 2 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | *a*  = 1, *b* = 3, then 2 × (1 + 3) = 8 | 1 | This mark is given for choosing two odd numbers and working out 2(*a* = *b*) |
| 8 ÷ 4 = 2, so 8 is a multiple of 4 | 1 | This mark is given for a correct statement |
| (b) | *a* + *b* is even, 2*a* and 2*b* are even | 1 | This mark is given for a correct statement |
| *a* + *b* is always multiple of 2, so 2(*a* + *b*) is always a multiple of 4 | 1 | This mark is given for a correct conclusion |

**Question 3 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | (*x* + 3) × (*x* + 3) | M1 | This mark is given for writing the area using algebraic terms |
| *x*2+ 3*x* + 3*x* + 9 = 10 | M1 | This mark is given for expanding (*x* + 3)(*x* + 3) |
| *x*2 + 6*x* = 1 | A1 | This mark is given for rearranging to give the given expression |

**Question 4 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | starts chain of reasoning eg finds area of large square and area of triangle or use of Pythagoras | C1 |  |
| for (*x* + *y*)2 – 4× (*x*×*y*÷2) oe or × | C1 |  |
| complete chain of reasoning with correct algebra | C1 |  |

**National 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** |
| **1a** | 17a | Nov 2018 | 3F | 3 | Algebra | G17, A21 | 2 | **33** | 1.00 | 2.55 | 1.73 | 0.90 | 0.30 | 0.06 | 0.04 |
| **1b** | 17b | Nov 2018 | 3F | 2 | Algebra | A17 | 1 | **61** | 1.21 | 1.96 | 1.71 | 1.22 | 0.59 | 0.20 | 0.01 |
| **2a** | 14a | Nov 2017 | 2F | 2 | Number | A2, N2, N4 | 2 | **68** | 1.35 | 1.91 | 1.70 | 1.42 | 0.92 | 0.41 | 0.12 |
| **2b** | 14b | Nov 2017 | 2F | 2 | Algebra | A6 | 2 | **2** | 0.04 | 0.25 | 0.07 | 0.04 | 0.01 | 0.00 | 0.00 |
| **3** | 24 | June 2017 | 1F | 3 | Algebra | A4, G16 | 3 | **5** | 0.14 | 0.61 | 0.18 | 0.06 | 0.02 | 0.01 | 0.00 |
| **4** | 28 | Spec Set 2 | 3F | 3 | − | − | − | − | − | − | − | − | − | − |  |
|  |  |  |  | **15** |  |  |  |  | **3.74** | **7.28** | **5.39** | **3.64** | **1.84** | **0.68** | **0.17** |