**GCSE Mathematics (1MA1)**

**Themed papers – Angles: Regular Polygons**

**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 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
|  | = 150 | M1 | This mark is given for a complete method to find the interior angle of the dodecagon |
| at *B* or *C*, 360 – 150 – 90 = 120 | M1 | This mark is given for a complete method to find the interior angle of polygon **P** |
| = 120,  = 60,  *x* = 6 | A1 | This mark is given for using the interior and to find out the number of sides of polygon **P** |
| Polygon **P**has 6 sides, so is a hexagon | C1 | This mark is given for a complete solution, fully supported by accurate figures |

**Question 2 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 180 – 117 = 63 | P1 | This mark is given for a process to find the other angle in the parallelogram |
| 180 –  = 108 | P1 | This mark is given for a process to find the interior angle of the pentagon |
| 108 – 63 | P1 | This mark is given for a process to find the value of *x* |
| 45 | A1 | This mark is given for the correct answer only |

**Question 3 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | *RST* =  = 150 | 1 | This mark is given for finding an interior angle of a regular 12-sided polygon |
| *STR* = | 1 | This mark is given for a method to find the size of *STR* |
| 15 | 1 | This mark is given for the correct answer only |

**Question 4 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | interior angle: (8 – 2) × 180 ÷ 8  or  exterior angle: 360 ÷ 8 | M1 | This mark is given for a method to find the size of an interior angle or an exterior angle |
| interior angle = 135  or  exterior angle = 45 | A1 | This mark is given for finding the size of an interior angle or an exterior angle |
| *CDA* =  = 45 | M1 | This mark is given for method to find size of angle *CDA* |
| *CDJ* = 180 − 45 = 135 | C1 | This mark is given for a correct conclusion from correct working |

**Question 5 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | (180 × 3) ÷ 5 (= 108)  or  360 ÷ 5 (= 72) | P1 | This mark is given for a process to find either an interior or an exterior angle of the pentagon *ABCDE* |
| *FCD = CDF* = 72  *CFD* = 180 – 72 – 72 | P1 | This mark is given for a complete process to find angle *CFD* |
| 36 | A1 | This mark is given for a correct answer only |

**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** | **9** | **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **U** |
| 1 | 5 | June 2017 | 3H | 4 | Geometry | G3 | 2 | 53 | 2.12 | 3.88 | 3.57 | 2.95 | 2.22 | 1.40 | 0.60 | 0.17 | - | - | 0.05 |
| 2 | 8 | Nov 2019 | 3H | 4 | Geometry | G3, G4 | 3 | 49 | 1.97 | 4.00 | 3.84 | 3.64 | 3.41 | 2.67 | 1.45 | 0.68 | - | - | 0.27 |
| 3 | 12 | Nov 2017 | 2H | 3 | Geometry | G3 | 3 | 17 | 0.52 | 2.5 | 2.94 | 2.11 | 1.46 | 0.97 | 0.45 | 0.19 |  |  | 0.06 |
| 4 | 6 | Mock Set 3 | 1H | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5 | 6 | Mock Set 1 | 3H | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
|  |  |  |  | **18** |  |  |  |  | **4.61** | **10.38** | **10.35** | **8.7** | **7.09** | **5.04** | **2.5** | **1.04** | **-** | **-** | **0.38** |