**GCSE Mathematics (1MA1)**

**Themed papers – Expand and Factorise, Solve Quadratics**

**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**

|  |
| --- |
| **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** |
| (a) | 10*m* – 15 | B1 | This mark is given for the correct answer only |
| (b) | 3(*n* + 4) | B1 | This mark is given for the correct answer only |

**Question 2 (Total 6 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 4*e*2 + 8*e* | B1 | One mark given for 4*e*2 |
| B1 | One mark given for 8*e* |

**Question 3 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 4(*m* + 3) | 1 | This mark is given for the correct answer only |
| (b) | term | 1 | This mark is given for the correct answer only |
| expression | 1 | This mark is given for the correct answer only |

**Question 4 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 3(3*b* – *b*2) | M1 | This mark is for finding a factor 3 |
| 3*b*(3 – *b*) | A1 | This mark is given for the correct answer only |

**Question 5 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | *x* = 2 + 1 | P1 | This mark is given for a process to solve *x* – 1 = 2 |
| *x* = 3 | P1 | This mark is given for finding the value of *x* |
| 2*x*2 = 2 × 32 = 18 | A1 | This mark is given for the correct answer only |

**Question 6 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | *x*2 + 5*x* – 9*x* – 45 | M1 | This mark is given for three terms correct |
| *x*2 – 4*x* – 45 | A1 | This mark is given for the correct answer only |
| (b) | 3(3*x*2 + 2*x*) | M1 | This mark is given for a partial factorisation |
| 3*x*(3*x* + 2) | A1 | This mark is given for the correct answer only |

**Question 7 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 5*p* + 15 – 2 + 4*p* | M1 | This mark is given for a method to expand the brackets in the expression |
| 9*p* + 13 | A1 | This mark is given for the correct answer only |

**Question 8 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 5(1 – 2*m*) | B1 | This mark is given for the correct answer only |
| (b) | 2*a*(*ab* + 3*b*2) or 2*b*(*a*2 + 3*ab*) or *ab*(2*a* + 6*b*)  | M1 | This mark is given for a method to start factorising the expression  |
| 2*ab*(*a* + 3*b*) | A1 | This mark is given for a correct answer only |

**Question 9 (Total 6 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 0, –4, –6, –4, 0 | M1 | This mark is given for a correct method to find at least two values |
| A1 | This mark is given for finding all five values in the table |
| (b) |  | M1 | This mark is given for at least 5 points correctly plotted |
| A1 | This mark is given for a fully correct graph |
| (c) |  | M1 | This mark is given for the line *y* = –2 drawn |
| 2.6, –1.6 | A1 | This mark is given for answers in the range 2.5 to 2.7 and –1.5 to –1.7 |

**Question 10 (Total 1 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 12*m* – 18 | B1 | This mark is given for the correct answer only |

**Question 11 (Total 1 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 6*x* – 2*x*2 | B1 | This mark is given for the correct answer only |

**Question 12 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | (*x* + 13)(*x* – 13) | B1 | This mark is given for the correct answer only |
| (b) | 6*x*2, 4*x*, 3*x*, 2 seen | M1 | This mark is given for finding all 4 terms (and no additional terms) correct with or without signs or for finding 3 out of no more than 4 terms correct with signs |
| 6*x*2 + *x* – 2 | A1 | This mark is given for the correct answer only |

**Question 13 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | *x*2+ -1*x +* 3x −3 | M1 | This mark is given for 3 terms correct |
| *x*2+2*x*−3 | A1 | This mark is given for the correct answer only |

**Question 14 (Total 1 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | (*x −* 4) (*x +* 4) | B1 | This mark is given for the correct answer only |

**Question 15 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | $$\left(x\pm 1\right)\left(x\pm 4\right)$$ | M1 | This mark is given for an answer with use of $\pm $ |
| (*x* – 1)(*x* + 4) | A1 | This mark is given for the correct answer or an equivalent |

**Question 16 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 5*x* × 2*x* = 10*x*2, 5*x* × –3 = –5*x*,2 × 2*x* = 4*x*, 2 × –3 = –6 | M1 | This mark is given for three correct terms or four terms without + or – signs |
| 10*x*2 – 11*x* – 6 | A1 | This mark is given for the correct answer only |
| (b) | (*x* 1) or (*x* 3) seen | M1 | This mark is given for a method to factorise the expression |
| (*x* + 1)(*x* + 3) | A1 | This mark is given for the correct answer only |

**Question 17 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 2*x*2 = 72, *x*2 = 36*x* = √36+6, –6 | B2(B1) | These marks are given for a pair of solutions (One mark is given for either +6 or –6) |
| (b) | 6*x*2 – 4*x* + 3*x* – 2 | M1 | This mark is given for at least three correct terms |
| 6*x*2 – *x* – 2 | A1 | This mark is given for the correct answer only |
| (c) | (*x* + 3)2 or (*x* + 3)(*x* + 3) | A1 | This mark is given for the correct answer only |

**Question 18 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | (1, –4) | B1 | This mark is given for the correct answer only |
| (b) | –1, 3 | B2 | This mark is given for both correct answers only(B1 is given for one correct solution seen) |

**Question 19 (Total 3 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | (*x* ± *a*)(*x* ± *b*), where *ab* = 24, or difference of *a* and *b* = 5or*a* = 1, *b* = 5, *c* = –24  | M1 | This mark is given for an attempt to factorise or for substitution into quadratic formula |
| (*x* + 8)(*x* – 3) = 0or | M1 | This mark is given for a correct factorisationorfor collecting terms in the quadratic formula |
| *x* = –8, *x* = 3 | A1 | This mark is given for the correct answer only |

**Performance data:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Q** | **Taken from**  | **Total Marks available** | **TOPIC** | **Spec Ref** | **AO** | **% Mean marks** | **Edexcel mean averagesMarks of candidates who achieved grade:** |
| **Q** | **Series** | **Paper** | **ALL** | **5** | **4** | **3** | **2** | **1** | **U** |
| **1a** | 16a | Jun-19 | 1F | 1 | Algebra | A4 | 1 | **69** | 0.69 | 0.98 | 0.91 | 0.77 | 0.53 | 0.25 | 0.07 |
| **1b** | 16b | Jun-19 | 1F | 1 | Algebra | A4 | 1 | **50** | 0.5 | 0.91 | 0.76 | 0.53 | 0.28 | 0.08 | 0.02 |
| **2** | 16b | Jun-18 | 1F | 2 | Algebra | A4 | 1 | **55** | 1.1 | 1.77 | 1.51 | 1.18 | 0.78 | 0.37 | 0.12 |
| **3a** | 17a | Nov-17 | 3F | 1 | Algebra | A4 | 1 | **53** | 0.53 | 0.83 | 0.7 | 0.55 | 0.34 | 0.13 | 0.01 |
| **3b** | 17b | Nov-17 | 3F | 2 | Algebra | A3 | 1 | **32** | 0.64 | 1.07 | 0.81 | 0.62 | 0.49 | 0.34 | 0.26 |
| **4** | 19b | Nov-18 | 2F | 2 | Algebra | A4 | 1 | **39** | 0.77 | 1.57 | 1.22 | 0.74 | 0.34 | 0.11 | 0.04 |
| **5** | 17 | Nov-19 | 1F | 3 | Algebra | A17, A2 | 3 | **37** | 1.1 | 2.22 | 1.61 | 1.06 | 0.52 | 0.37 | 0.1 |
| **6a** | 22a | Nov-19 | 3F | 2 | Algebra | A4 | 1 | **37** | 0.74 | 1.57 | 1.13 | 0.71 | 0.31 | 0.08 | 0.01 |
| **6b** | 22b | Nov-19 | 3F | 2 | Algebra | A4 | 1 | **41** | 0.82 | 1.51 | 1.19 | 0.81 | 0.34 | 0.07 | 0 |
| **7** | 20 | Jun-18 | 3F | 2 | Algebra | A4 | 1 | **42** | 0.83 | 1.39 | 1.16 | 0.88 | 0.55 | 0.22 | 0.04 |
| **8a** | 14a | Jun-17 | 2F | 1 | Algebra | A4 | 1 | **29** | 0.29 | 0.67 | 0.46 | 0.26 | 0.1 | 0.02 | 0 |
| **8b** | 14b | Jun-17 | 2F | 2 | Algebra | A4 | 1 | **21** | 0.41 | 1.09 | 0.64 | 0.32 | 0.1 | 0.02 | 0 |
| **9a** | 24a | Jun-18 | 2F | 2 | Algebra | A14 | 1 | **34** | 0.68 | 1.46 | 1.08 | 0.69 | 0.3 | 0.07 | 0.01 |
| **9b** | 24b | Jun-18 | 2F | 2 | Algebra | A14 | 2 | **25** | 0.5 | 1.22 | 0.83 | 0.49 | 0.19 | 0.04 | 0 |
| **9c** | 24c | Jun-18 | 2F | 2 | Algebra | A11 | 2 | **4** | 0.07 | 0.38 | 0.12 | 0.03 | 0.01 | 0 | 0 |
| **10** | 11c | Mock Set 1  | 1F | 1 | Algebra | − | − | **−** | − | − | − | − | − | − | − |
| **11** | 6b | Mock Set 2  | 2F | 1 | Algebra | − | − | **−** | − | − | − | − | − | − | − |
| **12a** | 30a | Mock Set 2  | 2F | 1 | Algebra | − | − | **−** | − | − | − | − | − | − | − |
| **12b** | 30b | Mock Set 2  | 2F | 2 | Algebra | − | − | **−** | − | − | − | − | − | − | − |
| **13** | 27 | Spec Set 1 | 1F | 2 | Algebra | − | − | **−** | − | − | − | − | − | − | − |
| **14** | 28 | Spec Set 1 | 1F | 1 | Algebra | − | − | **−** | − | − | − | − | − | − | − |
| **15** | 26 | Spec Set 1 | 3F | 2 | Algebra | − | − | **−** | − | − | − | − | − | − | − |
| **16a** | 26a | Nov-18 | 2F | 2 | Algebra | A4 | 1 | **24** | 0.47 | 1.55 | 0.83 | 0.41 | 0.17 | 0.07 | 0.07 |
| **16b** | 26b | Nov-18 | 2F | 2 | Algebra | A4 | 1 | **14** | 0.27 | 1.27 | 0.54 | 0.21 | 0.06 | 0.02 | 0 |
| **17a** | 24a | Nov-17 | 2F | 2 | Algebra | A18 | 1 | **20** | 0.4 | 0.79 | 0.58 | 0.41 | 0.2 | 0.08 | 0.01 |
| **17b** | 24b | Nov-17 | 2F | 2 | Algebra | A4 | 1 | **18** | 0.36 | 1.12 | 0.58 | 0.31 | 0.16 | 0.06 | 0.01 |
| **17c** | 24c | Nov-17 | 2F | 1 | Algebra | A4 | 1 | **16** | 0.16 | 0.55 | 0.28 | 0.13 | 0.05 | 0.01 | 0.01 |
| **18a** | 29a | Jun-19 | 1F | 1 | Algebra | A11, A12 | 2 | **51** | 0.51 | 0.89 | 0.75 | 0.53 | 0.32 | 0.16 | 0.05 |
| **18b** | 29b | Jun-19 | 1F | 2 | Algebra | A11, A18 | 2 | **9** | 0.18 | 0.65 | 0.29 | 0.12 | 0.07 | 0.05 | 0.04 |
| **19** | 24 | Jun-17 | 2F | 3 | Algebra | A18 | 1 | **7** | 0.21 | 0.86 | 0.3 | 0.09 | 0.02 | 0 | 0 |
|  |  |  |  | **52** |  |  |  |  | **12.23** | **26.32** | **18.28** | **11.85** | **6.23** | **2.62** | **0.87** |