**Stanground Academy**



Year 9 Higher work

Week beginning July 6th 2020

**ANSWERS**

Student’s name.............................................................................

Teacher..........................................................................................

# Task 1: Basic number recap

1. Which of the following are prime numbers...

**47** 27 106 91 **67**  **73**

1. Two consecutive prime numbers below 100 multiply together to equal 437.

What are the two prime consecutive prime numbers? **19 x 23**

1. Calculate the following…
2. -6 + - 13 = **-19**
3. (-7)2 + (5 - - 3) = **57**
4. (-4)3 - - 22 + (-5 x 3) = **-57**
5. Fill in the venn diagram of factors of 68 and 102 out of the following…

1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13, 17, 21, 34, 51, 68, 102

**5, 7, 8, 9, 12,**

**13, 21,**

**3**

**6**

**51**

**102**

**4**

**68**

**1**

**2**

**17**

**34**

102

68

# Task 2: Basic algebra recap

1. Factorise the following expressions…
2. 15x2 + 35x **= 5x (3x + 7)**
3. 27ab – 36a2b2c = **9ab(3 – 4abc)**
4. 24x3y4z + 60x5yz3 = **12x3yz (2y3 + 5x2z2)**
5. g3h2i2 – gh3i = **gh2i (g2i – h)**
6. 49a8b3c9 – 35abc6 + 14abc = **7abc (7a7b2c8 – 5c5 + 2)**
7. 42r2s2t – 70r4 = **14r2 (3s2t – 5r2)**
8. Expand and simplify the following…
9. (a + 3)(a – 4) **= a2 – 4a + 3a – 12 = a2 – a – 12**
10. (2b + 3)(b + 5) = **2b2 + 10b + 3b + 15 = 2b2 + 13b + 15**
11. (6c – 3)(2c + 3) = **12c2 + 18c – 6c – 9 = 12c2 + 12c - 9**
12. (d – 6)(6d – 5) = **6d2 – 5d – 36d + 30 = 6d2 - 41d + 30**
13. 6(2e + 3)(4e – 5) =

**(12e + 18)(4e – 5) = 48e2 – 60e + 72e – 90 = 48e2 + 12e - 90**

1. (4f + 4)(7 – 3f) = **-12f2 + 16f + 28**
2. (g + 2)(g – 3)(g + 4) **= g3 + 3g2 – 10g - 24**
3. (2h + 3)(4 + 3h)(6h – 8) = **36h3 + 54h2 – 64h - 96**

# Topic Test 1: Mark Scheme

## Equations - Higher

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| **Q** | **Answer** | **Mark** | **Comments** |

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| **1** | **Alternative method 1** | | |
| 25 +  or 277 | M1 |  |
| 277 and No | A1 |  |
| **Alternative method 2** | | |
| (275 – 25) × 2 ÷ 9 or 55 | M1 |  |
| 55 and No | A1 |  |

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| **2** | (–2)3  and | M1 | Correct substitution in both sides of the equation |
| (2)3  and | M1 | Correct substitution in both sides of the equation |
| –2 → –8 = 4 No  and  2 → 8 = 8 Yes | A1 | SC2 correct substitution and decision for one value |

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| **Q** | **Answer** | **Mark** | **Comments** |

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| **3** | **Alternative method 1** | | |
|  | M1 |  |
| 3 = | M1 |  |
| 9 | A1 |  |
| **Alternative method 2** | | |
| and | M1 |  |
|  | M1 |  |
| 9 | A1 |  |

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| **4** | 5*x* – 2 | B1 |  |
| 3(*x* + 1) = 3*x* + 3 | B1 |  |
| their (5*x* – 2) = their (3*x* + 3)  or 2*x* = 5 | M1 | oe |
| or  or 2.5 | A1ft | ft incorrect bracket expansion |

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| **Q** | **Answer** | **Mark** | **Comments** |

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| **5** | 7(2*x* + 3) = 14*x* + 21  or  3(*x* – 1) = 3*x* – 3 | M1 |  |
| their (14*x* + 21) – their (3*x* – 3) = 84.5  or  11*x* + 24 = 84.5 | M1dep | oe |
| or  or 5.5 | A1 |  |
| 2 × (*x* – 1 + 3) | M1 |  |
| 15 | A1ft | ft 2 × (their 5.5 + 2) |

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| **6** | 3*w* – 5 = 2*w* + 4  or  –  = *w* + 2 | B1 |  |
| 3*w* – 2*w* = 4+ 5  or  – *w* = 2 +  or  = 4.5 | M1 | ft their four terms |
| 9 | A1ft | ft B0M1 |

# Topic Test 2: Mark Scheme

## Sequences - Higher

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| **Q** | **Answer** | **Mark** | **Comments** |

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| **1** | 17 – 2*n* | B1 |  |

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| **2** | 152 | B1 |  |

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| **3** | Two terms from the sequence  10*n* + 1  ie two from 11, 21, 31, 41, ... | B2 | B1 one correct term  or  lists at least the first three terms from both sequences  ie 5, 7, 9, ... and 1, 6, 11, ... |

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| **4(a)** | *a* × 1 + *b* = *a* + *b*  and  *b* × 1 + *a* = *a* + *b* | B1 |  |

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| **4(b)** | 2*a* + *b* or 3*b* + *a* | M1 |  |
| 2*a* + *b* = 3*b* + *a* so *a* = 2*b* | A1 |  |

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| **5** | Substitutes *n* = 1, 2, 3 etc into formula for at least three terms | M1 | Values are 11, 5, 1, 0.5, 0.28 for first 5 terms |
|  | A1 |  |

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| **6(a)** | 32(3 + 1) = 9 × 4 | B1 |  |

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| **6(b)** | 102(10 + 1) or  100 × 11 | M1 |  |
| 1100 | A1 |  |

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| **Q** | **Answer** | **Mark** | **Comments** |

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| **6(c)** | Full explanation  If *n* is odd then *n*2 is odd and *n* + 1 is even  and  If *n* is even then *n*2 is even and *n* + 1 is odd  and  odd × even = even | B2 | oe  eg If *n* is odd then *n*2(*n* + 1) is   odd × odd × even = even  and  If *n* is even then *n*2(*n* + 1) is   even × even × odd = even  B1 Partial explanation  eg If *n* is odd then *n*2 is odd and *n* + 1 is even  or  If *n* is even then *n*2(*n* + 1) is   even × even × odd = even |

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| **Q** | **Answer** | **Mark** | **Comments** |

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| **7(a)** | 113 and 159 | B2 | B1 one correct term |
| **7(b)** | **Alternative method 1** | | |
| First and second differences correct | M1 | 14 22 30   8 8 |
| Correctly subtracts from the given sequence | M1 | 5 7 9 (11 13 15) |
| 2*n* | M1dep |  |
| 4*n*2 + 2*n* + 3 | A1 | oe |
| **Alternative method 2** | | |
| Any three of  *a* + *b* + *c* = 9  4*a* + 2*b* + *c* = 23  9*a* + 3*b* + *c* = 45  16*a* + 4*b* + *c* = 75 | M1 | Allow one error but all equations must be in *a*, *b* and *c* |
| Eliminates one variable to obtain a pair of equations in two variables  eg 3*a* + *b* = 14 and 5*a* + *b* = 22 | M1 |  |
| Eliminates one variable correctly  eg *a* = 4 | M1dep | Allow one error |
| 4*n*2 + 2*n* + 3 | A1 | oe |
| **Alternative method 3** | | |
| Sets up table of differences   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | *n* | 0 | | | 1 | | 2 | | 3 | | 4 | | | *c* | 3 | | | 9 | | 23 | | 45 | | 75 | | | *a* + *b* |  | 6 | | | 14 | | 22 | | 30 | |  | | 2*a* |  | | 8 | | | 8 | | 8 | |  | | | M1 |  |
| Extends table back to *n* = 0 | M1 |  |
| Identifies rows as 2*a*, *a* + *b* and *c* | A1 |  |
| 4*n*2 + 2*n* + 3 | A1 | oe |