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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **1a** | **Figure 1** | Graph has a distinct V-shape. | **M1** | 2.2a | 5thSketch the graph of the modulus function of a linear function. |
| Labels vertex  | **A1** | 2.2a |
| Finds intercept with the *y*-axis. | **M1** | 1.1b |
| Makes attempt to find *x*-intercept, for example states that  | **M1** | 2.2a |
| Successfully finds both *x*-intercepts. | **A1** | 1.1b |
|  | **(5)** |  |
| **1b** | Recognises that there are two solutions. For example, writing  and  | **M1** | 2.2a | 5thSolve equations involving the modulus function. |
| Makes an attempt to solve both questions for *x*, by manipulating the algebra. | **M1** | 1.1b |
| Correctly states *x* =  or *x* = . Must state both answers. | **A1** | 1.1b |
| Makes an attempt to substitute to find *y*. | **M1** | 1.1b |
| Correctly finds *y* and states both sets of coordinates correctlyand | **A1** | 1.1b |
|  | **(5)** |  |  |
| (10 marks) |
| Notes |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **2a** | States or implies that  | **M1** | 2.2a | 5thFind composite functions. |
| States or implies that  | **M1** | 2.2a |
| Makes an attempt to solve . For example,  or  is seen. | **M1** | 1.1b |
| States that . Must show all steps and a logical progression. | **A1** | 1.1b |
|  | **(4)** |  |  |
| **2b** |  | **M1\*** | 2.2a | 5thFind the domain and range of composite functions. |
| States that as there are no real solutions to the equation. | **B1\*** | 3.2b |
|  | **(2)** |  |  |
| (6 marks) |
| Notes2bAlternative MethodM1: Uses the method of completing the square to show that  or B1: Concludes that this equation will have no real solutions. |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **3** | Understands the need to complete the square, and makes an attempt to do this. For example, is seen. | **M1** | 2.2a | 6thFind the domain and range of inverse functions. |
| Correctly writes  | **A1** | 1.1b |
| Demonstrates an understanding of the method for finding the inverse is to switch the *x* and *y*. For example, is seen. | **B1** | 2.2a |
| Makes an attempt to rearrange to make *y* the subject. Attempt must include taking the square root. | **M1** | 1.1b |
| Correctly states  | **A1** | 1.1b |
| Correctly states domain is *x* > −9 and range is *y* > 4 | **B1** | 3.2b |
| (6 marks) |
| Notes |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **4a** | **Figure 2**\\192.168.0.251\Pearson\A Level Maths\WIP files\Unit tests\Pure 2\Artwork\02. Files from YPS\alevel_ut_p2_u3_markscheme_aw2.png | Clear attempt to reflect the negative part of the original graph in the *x*-axis. | **M1** | 2.2a | 7thSketch the graphs of the modulus function of unfamiliar non-linear functions. |
| Labels all three points correctly. | **A1** | 1.1b |
| Fully correct graph. | **A1** | 1.1b |
|  | **(3)** |  |  |
| **4b** | **Figure 3**\\192.168.0.251\Pearson\A Level Maths\WIP files\Unit tests\Pure 2\Artwork\02. Files from YPS\alevel_ut_p2_u3_markscheme_aw3.png | Clear attempt to reflect the positive *x* part of the original graph in the *y*-axis. | **M1** | 2.2a | 7thSketch the graphs of the modulus function of unfamiliar non-linear functions. |
| Labels all three points correctly. | **A1** | 1.1b |
| Fully correct graph. | **A1** | 1.1b |
|  | **(3)** |  |  |
| **4c** | **Figure 4** | Clear attempt to move the graph to the left 3 spaces. | **M1** | 2.2a | 6thCombine two or more transformations, including modulus graphs. |
| Clear attempt to stretch the graph vertically by a factor of 2. | **M1** | 2.2a |
| Fully correct graph. | **A1** | 1.1b |
|  | **(3)** |  |  |
| (9 marks) |
| **Notes** |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **5a** | States the range is  or  | **B1** | 3.2b | 5thFind the domain and range for a variety of familiar functions. |
|  | **(1)** |  |  |
| **5b** | Recognises that  and  | **M1** | 2.2a | 7thSolve problems involving the modulus function in unfamiliar contexts. |
| Makes an attempt to solve both of these equations. | **M1** | 1.1b |
| Correctly states . Equivalent version is acceptable. | **A1** | 1.1b |
| Correctly states . Equivalent version is acceptable. | **A1** | 1.1b |
| Makes an attempt to substitute one equation into the other in an effort to solve for *k*. For example, and  is seen. | **M1 ft** | 2.2a |
| Correctly solves to find  | **A1 ft** | 1.1b |
| States the correct range for *k*.  | **B1** | 3.2b |
|  | **(7)** |  |  |
| (8 marks) |

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| Notes**6b**Award ft marks for a correct method using an incorrect answer from earlier in the question.**Alternative Method**Student draws the line with gradientpassing through the vertex and calculates that, so answer is**M1**: States the *x*-coordinate of the vertex of the graph is 4**M1**: States the *y*-coordinate of the vertex of the graph is −5**M1**: Writes down the gradient ofor implies it later in the question.**M1**: Attempts to use  with  and **A1**: Finds o.e.**B1**: States the correct range for *k*:  |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **6a** | Makes an attempt to substitute *t* = 0 into. For example, or  is seen. | **M1** | 3.1a | 6thSet up and use exponential models of growth and decay. |
| Concludes that the *TR* terms will always cancel at *t* = 0, therefore the room temperature does not influence the initial coffee temperature. | **B1** | 3.5a |
|  | **(2)** |  |  |
| **6b** | Makes an attempt to substitute  and *t* = 10 into . For example, is seen. | **M1** | 1.1b | 6thSet up and use exponential models of growth and decay. |
| Finds. Accept awrt 62.5°. | **A1** | 1.1b |
|  | **(2)** |  |  |
| (4 marks) |
| **Notes** |