**Year 11 to Year 12 Transition Paper**

**Equations and Inequalities**

**Mark Scheme**

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| **Question** | **Scheme** | **Marks** |
| **1** | drawing *y* = 3*x* – 6 | M1 |
|  | M1 |
| drawing 2*x* + *y* = 12 | A1 |
| Correct region indicated | A1 |
| **(4 marks)** | | |
| **Notes**  M1 for drawing *y* = 3*x* – 6  M1 for drawing 2*x* + *y* = 12  A2 for correctly indicating required region  (A1 for correctly indicating region satisfying 3 of the inequalities) | | |

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| **Question** | **Scheme** | **Marks** |
| **2** | correct expansion of both brackets or expansion of  (2 – 3*x*) or (*x* +1) | M1 |
| isolating terms in *x*, eg 7 < 23*x* | M1 |
| *x* ˃ | A1 |
| **(3 marks)** | | |

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| **Question** | **Scheme** | **Marks** |
| **3(a)** | writing in form *x*2  4*x*  5 (≥ 0) or *x*2  4*x*  5 0) | M1 |
| establishing critical values, 5 and 1 | M1 |
|  | A1 |
|  | **(3)** |
| **(b)** | use of *b*²4*ac* < 0 or *b*²4*ac* or *b* < 40 or 40 < *b* | M1 |
| 40 < *b* < 40 | A1 |
|  | **(2)** |
| **(5 marks)** | | |

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| **Question** | **Scheme** | **Marks** |
| **4(a)** | drawing *x* = 3 correctly | M1 |
| drawing *y* – *x* = 5 correctly | M1 |
| drawing 7*x* + 5*y* = 35 correctly | M1 |
|  | A1 |
| Correct region indicated | A1 |
|  | **(5)** |
| **(b)** | (2, 5) (2, 6) | B1 |
|  | **(2)** |
| **(5 marks)** | | |
| **Notes**  M1 for drawing *x* = 3 correctly  M1 for drawing *y* – *x* = 5 correctly  M1 for drawing 7*x* + 5*y* = 35 correctly  A2 for correctly shading required region  (A1 for correct shading for 2 inequalities)  B1 for both correct and no extras | | |

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| **Question** | **Scheme** | **Marks** |
| **5** | drawing 4*x* + 3*y* = 24 correctly | M1 |
| drawing *x* = 2 correctly | M1 |
| drawing 3*y* = 9 *x* correctly | M1 |
|  | A1 |
| Correct region indicated | A1 |
| **(5 marks)** | | |
| **Notes**  M3 for drawing 4*x* + 3*y* = 24, *x* = 2 and 3*y* = 9 *x* correctly  (M2 for drawing 2 lines correctly  M1 for drawing 1 line correctly)  A2 for correctly shading required region  (A1 for correct shading for 2 inequalities) | | |

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| **Question** | **Scheme** | **Marks** |
| **6** | correct method to eliminate one variable | M1 |
| for quadratic (= 0) in one variable | M1 |
| correct method to solve their quadratic,  eg correct factorisation or substitution into the formula | M1 |
| *x* = –1, *y* = | A1 |
| *x* = 2, *y* = – | A1 |
| **(5 marks)** | | |
| **Notes**  M1 for correct method to eliminate one variable  M1 (dep M1) for quadratic (= 0) in one variable  M1 (dep M2) for correct method to solve their quadratic,  eg correct factorisation or substitution into the formula  A1 *x* = –1, *x* = 2 or *y* = , *y* = –  A1 *x* = –1, *y* = and *x* = 2, *y* = –  (accept coordinate pairs) | | |

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| **Question** | **Scheme** | **Marks** |
| **7** | drawing *x* = −1 correctly | M1 |
| drawing 2*x* + *y* = 6 correctly | M1 |
| drawing *y* = 4  *x* correctly | M1 |
|  | A1 |
| Correct region indicated | A1 |
| **(5 marks)** | | |
| **Notes**  M1 for drawing *x* = −1 correctly  M1 for drawing 2*x* + *y* = 6 correctly  M1 for drawing *y* = 4  *x* correctly  A2 for correctly shading required region  (A1 for correct shading for 2 inequalities) | | |

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| **Question** | **Scheme** | | **Marks** |
| **8** |  |  | M1 |
|  |  | M1 |
|  |  | M1 |
| *x* = 2, 3.25 oe or *y* = 3, 0.5 oe | | A1 |
| *x* = 2, *y* = 3 and *x* = 3.25, *y* = 0.5 | | A1 |
| **(5 marks)** | | | |
| **Notes**  M1 for substitution of *y* = or oe into the quadratic equation to eliminate one variable  M1 (dep on M1) for expansion of brackets within the quadratic  M1 (dep on M2) for equation of the form *a* *bx*  *c* (= 0)  A1 *x* = 2, 3.25 oe or *y* = 3, 0.5 oe  A1 for *y* = and *x* = | | | |

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| **Question** | **Scheme** | **Marks** |
| **9** |  | M1 |
|  | M1 A1 |
|  | M1 |
|  | A1 cso |
| Sub into  or  Sub into | M1 |
|  | A1 |
| **(7 marks)** | | |

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| **Question** | **Scheme** | **Marks** |
| **10** |  | M1 |
|  | A1 |
|  | dM1 A1 |
| *y* = –, | M1 A1 |
| **(6 marks)** | | |

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| **Question** | **Scheme** | **Marks** |
| **11(a)** | 6*x* + *x >* 1 – 8 | M1 |
| *x* >  1 | A1 |
|  | **(2)** |
| **(b)** | (*x* + 3)(3*x* – 1) [= 0] | M1 |
| *x* = – 3 and | A1 |
|  | M1 |
|  | A1ft |
|  | **(4)** |
| **(6 marks)** | | |

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| **Question** | **Scheme** | **Marks** |
| **12(a)** | 5*x* > 20 | M1 |
| *x* > 4 | A1 |
|  | **(2)** |
| **(b)** | [ = 0] | M1 |
| *x* = 6, | A1 |
|  | M1 |
| *, x >* 6 | A1ft |
|  | **(4)** |
| **(6 marks)** | | |

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| **Question** | **Scheme** | | **Marks** |
| **13** |  |  | M1 |
| or | or | M1 |
|  |  | A1 |
|  |  | M1 |
|  |  | A1 |
|  |  | M1 |
|  |  | A1ft |
| **(7 marks)** | | | |

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| **Question** | **Scheme** | | **Marks** |
| **14(a)** | (o.e.) | | M1 |
| (o.e.) e.g. | | A1 |
|  | | M1 |
| , so no roots or no intersections or no solutions | | A1 |
|  | | **(4)** |
| **(b)** |  | Curve: shape and passing through (0, 0) | B1 |
| Curve: shape and passing through (5, 0) | B1 |
| Line : +ve gradient and no intersections  with *C.* If no *C* drawn score B0 | B1 |
| Line : Line passing through (0, 2) and  (0.8, 0) marked on axes | B1 |
|  | | **(4)** |
| **(8 marks)** | | | |

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| **Question** | **Scheme** | **Marks** |
| **15(i)** |  | M1 |
| with comment (see notes) | A1 |
| As   hence  for all *x* | A1 |
|  | **(3)** |
| **(ii)** | For an explanation that it may not always be true  Tests say   whereas | M1 |
| States sometimes true and gives reasons  Eg. when  *x* =5  whereas  True  When   whereas Not true | A1 |
|  | **(2)** |
| **(5 marks)** | | |
| **Alternative methods may be accepted** | | |