**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* – 6M1 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$\frac{6}{5}$ (2 – 3*x*) or $\frac{5}{6}$ (*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 $(\leq $ 0) | M1 |
| establishing critical values, 5 and $-$1 | M1 |
| $$x\leq -1, x\geq 5$$ | A1 |
|  | **(3)** |
| **(b)** | use of *b*²$ - $4*ac* < 0 or *b*²$ < $4*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 correctlyM1 for drawing *y* – *x* = 5 correctlyM1 for drawing 7*x* + 5*y* = 35 correctlyA2 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 correctlyM1 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* = $\frac{5}{2}$ | A1 |
| *x* = 2, *y* = – $\frac{1}{2}$ | A1 |
| **(5 marks)** |
| **Notes**M1 for correct method to eliminate one variable M1 (dep M1) for quadratic (= 0) in one variableM1 (dep M2) for correct method to solve their quadratic, eg correct factorisation or substitution into the formulaA1 *x* = –1, *x* = 2 or *y* = $\frac{5}{2}$, *y* = – $\frac{1}{2}$A1 *x* = –1, *y* = $\frac{5}{2}$ and *x* = 2, *y* = – $\frac{1}{2}$(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 correctlyM1 for drawing *y* = 4  *x* correctlyA2 for correctly shading required region(A1 for correct shading for 2 inequalities) |

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| **Question** | **Scheme** | **Marks** |
| **8** | $$49-28x+4x²$$$$147-84x+12x²+4x²=43$$ | $$49-14y+y²$$$$49-14y+y²+3y²=43$$ | M1 |
| $$104-84x+16x²=0$$$$4x²-21x+26=0$$ | $$2y²-7y+3=0$$ | M1 |
| $$\left(4x-13\right)\left(x-2\right)=0$$ | $$\left(2y-1\right)\left(y-3\right)=0$$ | 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* = $7-2x$ or $2x=7-y $oe into the quadratic equation to eliminate one variableM1 (dep on M1) for expansion of brackets within the quadratic M1 (dep on M2) for equation of the form *a*$x^{2}$ $+$ *bx* $+$ *c* (= 0)A1 *x* = 2, 3.25 oe or *y* = 3, 0.5 oeA1 for $x=2, $*y* = $3$ and *x* = $3.25,$ $y=$ $0.5$  |

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| **Question** | **Scheme** | **Marks** |
| **9** |   | M1 |
|  | M1 A1 |
|   | M1 |
|   | A1 cso |
| Sub into orSub 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 trueTests say   whereas  | M1  |
|  States sometimes true and gives reasonsEg. when  *x* =5  whereas  True When   whereas Not true | A1 |
|  | **(2)** |
| **(5 marks)** |
| **Alternative methods may be accepted** |