**Year 11 to Year 12 Transition Paper**

**Straight Line Graphs**

**Mark Scheme**

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| **Question** | **Scheme** | **Marks** |
| **1(a)** |  | M1 |
|  | A1 |
|  | **(2)** |
| **(b)** |  | M1 |
|  | A1 |
|  | **(2)** |
| **(4 marks)** | | |
| **Notes**  **(a)**  M1 or  A1 cao  **(b)**  M1 for use of correct gradient in the equation of a straight line in any form,  eg  A1 for oe | | |

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| **Question** | **Scheme** | **Marks** |
| **2** | States gradient of is oe  or rewrites as | B1 |
| Attempts to find gradient of line joining and | M1 |
|  | A1 |
| States neither with suitable reasons | A1 |
| **(4 marks)** | | |
| **Notes**  **B1:** States that the gradient of line is or writes in the form  **M1:** Attempts to find the gradient of line using Condone one sign error Eg allow  **A1:** For the gradient of or the equation of  Allow for any equivalent such as or  **A1: CSO ( on gradients)**  Explains that they are neither parallel as the gradients not equal nor perpendicular asoe  Allow a statement in words ''they are not negative reciprocals '' for a reason for not perpendicular and ''they are not equal'' for a reason for not being parallel | | |

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| **Question** | **Scheme** | **Marks** |
| **3**  **(Way 1 )** | Use *y* = *mx + c* with both (3, 1) and (4, 2) and attempt to find *m* or *c* | M1 |
| *m* = 3 | A1 |
| *c =* 10 so *y* = 3*x* + 10 | A1 |
|  | **(3)** |
| **Or**  **(Way 2)** | Uses = with both (3,1) and (4, −2) | M1 |
| Gradient simplified to −3 (may be implied) | A1 |
| *y* = −3*x* + 10 oe | A1 |
|  | **(3)** |
| **Or**  **(Way 3)** | Uses *ax* + *by* + *k* = 0 and substitutes both *x* = 3 when *y* = 1 and *x* = 4 when *y* = −2 with attempt to solve to find *a*, *b* or *k* in terms of one of them | M1 |
| Obtains *a* = 3*b*, *k* = − 10*b* or 3*k* = − 10*a* | A1 |
| Obtains *a* = 3, *b* = 1, *k* = − 10  Or writes 3*x* + *y* – 10 = 0 oe | A1 |
|  | **(3)** |
| **(3 marks)** | | |
| **Notes**  M1: Need correct use of the given coordinates  A1: Need fractions simplified to – 3 (in way 1 and 2)  A1: Need constants combined accurately  N.B. Answer left inform (y – 1) = − 3 (x −3) or (y−(−2)) = − 3(x−4) is awarded M1A1A0 as answers should be simplified by constant being collected  *Notes that a correct answer implies all three marks in this question.* | | |

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| **Question** | **Scheme** | **Marks** |
| **4(a)** | Gradient of perpendicular = | M1 |
| Either or | A1 |
|  | **(2)** |
| **(b)** | Combines 'their' with | M1 |
| oe | A1 |
|  |  | **(2)** |
| **(4 marks)** | | |
| **Notes** | | |
| **(a)**  **M1:** Attempts to set given equation in the form with oe such as **AND** deduces that Condone errors on the  An alternative method is to find both intercepts to get gradient and use the perpendicular gradient rule.  **A1:** Correct answer. Accept **either** **or**  This must be simplified and not left as or unless you see .  Watch: There may be candidates who look at and incorrectly state that the gradient is 2 and use the perpendicular rule to get They will score M0 A0 in (a) and also no marks in (b) as the lines would be parallel. In a case like this don't allow an equation to be ''altered''  Candidates who state or **with no incorrect working** can score both marks  (b)  **M1:** Substitutes their into , condoning slips, in an attempt to form and solve an equation in *x*. Alternatively equates their with their in an attempt to form and solve, condoning slips, an equation in *x*. Don't be too concerned by the mechanics of the candidates attempt to solve. (E.g. allow solutions from their calculators).  You may see with being found before the value of *x* appears  It cannot be awarded from ''unsolvable'' equations (e.g. lines that are parallel).  **A1:**  The answer alone can score both marks as long as both equations are correct and no incorrect working is seen.  Remember to isw after the correct answer and ignore any *y* coordinate | | |

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| **Question** | **Scheme** | **Marks** |
| **5(a)** | Gradient of **L1** is − | M1 |
| *y* = −*x* + *c*  1 = − × 2 + *c*  *c =* | M1 |
| *y* = −*x* + | A1 |
|  | **(3)** |
| **(b)** | Gradient of **L1** is − | M1 |
| Gradient of **L3** =  *y* – −5 =  (*x* – 0) | M1 |
| 4*x* − 3*y* − 15 = 0 | A1 |
|  | **(3)** |
| **(6 marks)** | | |
| **Notes**  **(a)**  M1 for method to find gradient of **L1** or sight of “*m* = − ”  M1 for method to find equation, ie use of *y* – *y*1 = *m*(*x* – *x* 1) or  *y* = *mx* + *c,* with attempt to find *c*  A1 for *y* = −*x* +  **(b)**  M1 for method to find gradient of **L3,** eg use of - or sight of “*m* = ”  M1 for method to find equation, ie use of *y* – *y*1 = *m*(*x* – *x* 1) or  *y* = *mx* + *c,* with attempt to find *c*  A1 for 4*x* − 3*y* − 15 = 0 or -4*x* + 3*y* + 15 = 0  (accept 4*x* + −3*y* + −15 = 0) | | |

| **Question** | **Scheme** | | | | **Marks** |
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| **6(a)** | oe | | or exact equivalents such as 1.25 but **not** | | B1 |
|  | | | | **(1)** |
| **(b)** |  | | | Uses a line with a parallel gradient oe or their gradient from part (a). Evidence is or similar. | M1 |
|  | | | Method of finding an equation of a line with numerical gradient and passing through. Score even for the perpendicular line. Must be seen in part (a). | M1 |
|  | | | Correct equation. Allow for -10 | A1 |
|  | | | | **(3)** |
| **(c)** |  | Follow through on their 'c'. Allow also if – 10 is marked in the correct place on the diagram. Allow *x* = 0, *y* = -10 (the *x* = 0 may be seen “embedded” but not just *y* = -10 with no evidence that *x* = 0) | | | B1ft |
|  | Correct coordinates. Allow also if 8 is marked in the correct place on the diagram. Allow *y* = 0, *x* = 8 (the *y* = 0 may be seen “embedded” but not just *x* = 8 with no evidence that *y* = 0) | | | B1 |
| **Do not penalise lack of “0” twice so penalise it at the first occurrence but check the diagram if necessary.** | | | |  |
|  | | | | **(2)** |
| **(d)**  **Way 1** | Area of Parallelogram = | | | Uses area of parallelogram = Follow through on their 10 and their 8 | M1 |
| = 104 | | | cao | A1 |
| **Correct answer only scores both marks** | | | | **(2)** |
| **(d)**  **Way 2** | Trapezium *AOCD* + Triangle *OCB* | | | A correct method using their values for *AOCD* + *OCB*. | M1 |
| = 104 | | | cao | A1 |
|  | | | | **(2)** |
| **(d)**  **Way 3** | 2 Triangles + Rectangle | | | A correct method using their values for 2x*OBC* + rectangle. | M1 |
| = 104 | | | cao | A1 |
|  | | | | **(2)** |
| **(d)**  **Way 4** | Triangle *ACD* + Triangle *ACB* | | | A correct method using their values for *ACD* + *ABC*. | M1 |
| = 104 | | | cao | A1 |
|  | | | | **(2)** |
|  |  | | | | **(8 marks)** |

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| **Question** | **Scheme** | | **Marks** |
| **7(a)** | *l*: passes through (5, 8) and (3,11) | |  |
| Gradient of *l* is | A correct gradient in any form, simplified or unsimplified. (May be implied by subsequent work) | B1 |
| **or**  **and** | or with their gradient **or** uses with or (5, 8) and their gradient and reaches as far as *c* = … | M1 |
| Correct equation of *l* in **any form**. | A1 |
| or e.g. | Correct equation in the **required form**. (Allow any integer multiple) | A1 |
|  |  | **[4]** |
| **(b)** | **or** | Fully correct method for the length of *AB* or *AB*2 | M1 |
| = | Cao | A1 |
|  |  | **[2]** |
| **(c)**  **Way 1** |  | Correct use of Pythagoras for *BC* and sets equal to (5 – *t*) (Allow (*t* – 5)) | M1 |
|  | Solves for *t* using correct processing. **Dependent on the previous mark.** | **d**M1 |
|  | Allow equivalent answers e.g.  1.75 (allow *x* = .. or *t* = … or just the correct value) | A1 |
|  |  | **[3]** |
| **(c)**  **Way 2** | Midpoint of (5, 8) and (3, 11) is (4, 9.5) | Finds equation of perpendicular bisector using perpendicular gradient and midpoint. Must be a correct method for the midpoint and a correct straight line method using the negative reciprocal gradient from (a) | M1 |
|  | Substitutes *y* = 8 into their perpendicular bisector and solves for *x*. **Dependent on the previous mark.** | **d**M1 |
|  | Allow equivalent answers e.g.  1.75 (allow *x* = .. or *t* = … or just the correct value) | A1 |
|  |  | **[3]** |
| **(d)**  **Way 1** |  | Fully correct methodfollowing through their non-zero value for *t* | M1 |
|  | Area of triangle is or equivalent fraction e.g. | A1 |
|  |  |  | **[2]** |
| **(d)**  **Way 2** | Fully correct methodfollowing through their non-zero value for *t* | | M1 |
|  | Area of triangle is or equivalent fraction e.g. | A1 |
|  |  |  | **[2]** |
| **(d)**  **Way 3** |  | Fully correct methodfollowing through their non-zero value for *t* and their midpoint | M1 |
|  | Area of triangle is or equivalent fraction e.g. or possibly | A1 |
|  |  | **[2]** |
|  |  |  | **11 marks** |

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| **Question** | **Scheme** | **Marks** |
| **8(a)** | (= − ) | M1 |
|  | M1 |
| 7*x +* 4*y =* 34 | A1 |
|  | **(3)** |
| **(b)** | **L2** gradient found | M1 |
| 5 = × 7 + *c* or = | M1 |
|  | A1 |
|  | **(3)** |
| **(c)** | No, with reason | M1 |
|  | **(1)** |
| **(7 marks)** | | |
| **Notes** | | |
| **(a)**  M1 for method to find gradient of **L1**, eg (= − )  M1 for a correct equation in any form,  eg  A1 for 7*x* + 4*y* = 34 oe with integer coefficients in the form *ax* + *by* = *c*  **(b)**  M1 for method to find gradient of **L2**  M1 (dep M1) for a method to find the equation in any form eg 5 = × 7 + *c* or =  A1 ft from (a) for  **(c)**  M1 for No, with reason, eg 3× | | |

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| **Question** | **Scheme** | **Marks** |
| **9(a)** |  | M1 |
| *y* (*x* – 2) or | M1 |
|  | A1 |
|  | **(3)** |
| **(b)** | **L2 =** | M1 |
| See notes | M1 |
|  | A1 |
|  | **(3)** |
| **(c)** | or | M1 |
| Perpendicular with reason | A1 |
|  | **(2)** |
| **(8 marks)** | | |
| **Notes** | | |
| **(a)**  M1 for correct use of gradient, eg  M1 for a correct equation in any form,  eg *y* (*x* – 2) or  A1 for oe with integer coefficients  **(b)**  M1 for gradient of **L2 =**  ft from (a)  M1 for a complete method to find equation  A1 for oe  **(c)**  M1 for at least one correct gradient , or  A1 for line is perpendicular with reason,  eg × = oe | | |

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| **Question** | **Scheme** | **Marks** |
| **10(a)** | Gradient = | M1 |
| *c* (= 4) | M1 |
|  | A1 |
|  | **(3)** |
| **(b)** |  | B1 |
|  | **(1)** |
| **(4 marks)** | | |
| **Notes** | | |
| **(a)**  M1 for method to find gradient of **L,** eg  M1 for complete method to find the value of *c* (= 4)  A1 oe in correct form  **(b)**  B1 ft their gradient from (a) | | |

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| **Question** | **Scheme** | **Marks** |
| **11(a)** | *x* − 2*y* = 2 |  |
|  | **(1)** |
| **(b)** |  | M1 |
|  | M1 |
| − 5 | A1 |
|  | **(3)** |
| **(4 marks)** | | |
| **Notes** | | |
| **(a)**  B1 for eg *x* − 2*y* = 2 or −*x* + 2*y* = −2  **(b)**  M1 for use of gradient of = , eg  M1 for a correct method to find *c*, eg  A1for – 5 | | |

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| **Question** | **Scheme** | **Marks** |
| **12** | Gradient of *L*1is − *y* = *x* + | M1 |
| Gradient of *L*2= | M1 |
| *y* – 5 =  (*x* – 1) | M1 |
| *y* = *x* + | A1 |
|  | **(4)** |
| **(4 marks)** | | |
| **Notes**  M1 for attempt to find gradient of *L*1 or sight of *m* = −  M1 for substitution into  M1 for attempt to use *y* – *y*1 = *m*(*x* – *x* 1) or *y* = *mx* + *c*, with attempt to find *c*  A1 for *y* = *x* + | | |

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| **Question** | **Scheme** | **Marks** |
| **13(a)** | gradient of – | M1 |
| find *c* | M1 |
|  | A1 |
|  | **(3)** |
| **(b)** | *mn* = | M1 |
|  | A1 |
|  | **(2)** |
| **(5 marks)** | | |
| **Notes**  **(a)**  M1 for use of the gradient of – in an equation of a straight line  M1 (dep M1) for method to find *c*  A1  **(b)**  M1 for using *mn* = eg gradient of perpendicular line shown as  A1 for oe | | |