**YEAR 11 TEST 5 NON-CALCULATOR ENHANCED**

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| Common Graphs | /20 | Inequalities  | /15 | Algebraic fractions  | /20 | Loci Vectors | /20 |

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|  | **Algebra: Graphs** |  |
| **1.****S** | Sketch the following graphs. Make sure you label any intercepts on the axes. a) $y=x^{3}$ b) $y=5-x^{2}$ c) $y=-\frac{1}{x}$ d) $y=3^{x}$   | **(6)** |
| **2.****F** |

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| *A* | *B* | *C*  |

Match the letter of the graph with the number of the possible equation:

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| --- | --- | --- | --- |
| *1* | *2* | *3* | *4* |
| *y = x2 + 6x + 5* | *y = -5 + 6x - x2*  | *y = 5 + 4x –- x2* | *y = x2  + 4x – 5* |

 | **(3)** |
| **3.****F** | The graph of y = f(*x*) is shown.1. Write down the co-ordinates of the turning point of the graph.
2. Write down estimates for the roots of f(x) = 0
3. Use the graph to find an estimate of f(2)
 | **(1)****(1)****(1)** |
| **4.****M** | The graph shows      *y* = sin *x*    for    0° ≤ *x*  ≤ 360°a) sin *x* = sin 30°      and      90° < *x* < 360° Work out the value of angle *x*.b) sin *x* = −sin 30°     and     180° < *x* < 360° Work out **two** of the values of angle *x*.  | **(1)****(2)** |
| **5.****F** | Matt sketches the graph of $y=0.5^{x}$ for *x* ≥ 0.Make one criticism of his sketch. | **(1)** |
| **6.****M** | Here is a sketch of the graph $y=x^{2}+bx+c$.The curve intersects the *x* axis at (5, 0) and the point P.The curve intersects the *y* axis at (0, -10)Work out the *x* co-ordinate of the turning point of the graph. | **(4)** |
|  | **TOTAL** | **20** |
|  | **Algebra: Inequalities** |  |
| **1.****S** |

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| a) | Write the inequality shown below. | b) | Write down the integer values satisfied by this diagram. |
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 | **(2)****(2)** |
| **2.****F** | Work out **all** the integers that satisfy the inequality:  12 < 5*x* - 3 ≤ 32 | **(2)** |
| **3.****F** | Solve    9*x* + 4 > 2*x* – 1 | **(2)** |
| **4.****F** | Copy the grid shown.Show the region satisfied by the three inequalities.

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| *y* | ≥ | 1 |
| *y* | ≤ | *x* |
| *x* + 2*y* | ≤ | 8  |
|  |  |  |

Label the region clearly with the letter R | **(3)** |
| **5.****M** | Solve $x^{2}+x\leq 6$ | **(4)** |
|  | **TOTAL** | **15** |
|  |  |  |
|  | **Algebra: Algebraic fractions** |  |
| **1.****S** | Simplify $\frac{2x+5}{3}-\frac{x-3}{5}$      | **(3)** |
| **2.****F** | Write as a single fraction  $\frac{2}{x-3}-\frac{x}{2x+1}$      | **(3)** |
| **3.****F** | Simplify  $\frac{4x+8}{x^{2}+7x+10}$  | **(3)** |
| **4.****F** |

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| Express |  | as a single fraction in its simplest form. |

 | **(3)** |
| **5.****M** | Simplify $\frac{3x+12}{x^{2}-4x-12}÷\frac{x^{2}+4x}{x^{2}-36}$  | **(4)** |
| **6.****M** | The function f is defined by $f\left(x\right)=\frac{2(x+1)}{x^{2}-2x-3}+\frac{1}{x-3}$Show that $f\left(x\right)=\frac{3}{x-3}$ | **(4)** |
|  | TOTAL | **20** |
|  | **Geometry: Loci and Vectors** |  |
| **1.****F** | Use ruler and compasses to **construct** an angle of 30° | **(4)** |
| **2.****S** | $a=\left(\begin{array}{c}-4\\-1\end{array}\right) $ and $b=\left(\begin{array}{c}3\\-1\end{array}\right)$Calculate the following:a) $2a$ b) $a+b$ c) $2a-b$ | **(4)** |
| **3.****F** | *OAB* is a triangle.$\vec{OA}=$ **a**$\vec{OB}=$ **b**a)  Write down the vector $\vec{AB}$ in terms of **a** and **b**.*X* is the point on *AB* such that *AX* : *XB* = 1 : 4b)  Express the vector $\vec{OX} $in terms of **a** and **b**. | **(1)****(3)** |
| **4.****F** | *ABC* is a straight line.*AB* : *BC* = 2 : 5$\vec{OA}=2a+b$ $$\vec{OB}=3a+2b$$a) Express $\vec{AB}$ in terms of **a** and **b**.  Give your answer in its simplest form.b) Express $\vec{AC}$ in terms of **a** and **b**.  Give your answer in its simplest form. | **(2)****(3)** |
| **5.****M** | Is BCD a straight line?You must show working out to justify your answer. | **(3)** |
|  | **TOTAL** | **20** |