HL AA mixed prep 2
Please solve on extra paper!

1. Solve $(4^{x})(5^{x+1}) = 2^{2x+1}$.
   Give your answer in the form $x = \frac{ln\, a}{ln\, b}$ where $a, b\ \varepsilon\ Q.$

[5]

2. Simplify $1 + log_{3}5 + log_{5}3$

[3]

3.
$(x-1)$ *is a factor of the polynomial* $(2x^{3} - 7x + 7x - 2)$. *Find all other factors of the polynomial*.

[3]

4. Discriminante
   a) The equation $x^{2} = 2kx - 1$ has two distinct real roots. Find the set of all possible values of k.

[3]

   b) The quadratic equation $kx^{2} + (k-3)x + 1 = 0$ has two equal real roots. Find the possible values of k.

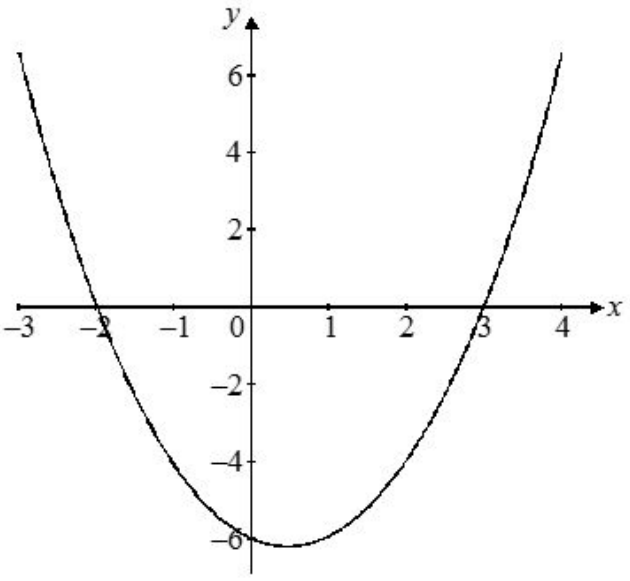
[3]

5. Next page

5.

The diagram shows part of the graph with equation $y = x^2 + p\,x + q$.

The graph cuts the x-axis at –2 and 3.



(a) Find the values of q and q.

(b) Write $y = x^2 + p\,x + q$ in the form $y = (x - t)^2 + k$ and state the values of t and k.

[4]