

Exponentials and Logarithms Revision

(a)	(b)	(c)
<p>Given that $a = \log_5 8$, write in simplest form in terms of a:</p> <p>(i) $\log_5 64$</p> <p>(ii) $\log_5 \left(\frac{2\sqrt{2}}{125}\right)$</p>	<p style="text-align: center;">Solve</p> $2 \log_4(x + 1) = \frac{1}{2} + \log_4(3x - 1)$	<p style="text-align: center;">Solve</p> $2^x \times e^{x+4} = 8$ <p style="text-align: center;">giving your answer in terms of natural logarithms.</p>
(d)	(e)	(f)
<p style="text-align: center;">Solve</p> $e^x + 12e^{-x} = 8$	<p>Sketch the graph of $y = 2 \ln(x - 3)$, stating any coordinates of intersection with the axes and the equations of any asymptotes.</p>	<p>Find the exact coordinates of the point on the curve $y = 4e^{2x} - 3$ where the gradient is 10.</p>
(g)	(h)	
<p>A population P of rabbits at time t in months can be modelled by the equation $P = ab^t$ where a and b are constants. The initial population of rabbits is 225 and after 8 months it is 331.</p> <p>(i) Find the value of a and the value of b to 4 significant figures.</p> <p>(ii) Use the model to predict the population of rabbits after 1 year.</p> <p>(iii) Interpret the value of b with reference to the model.</p>	<p>The mass m grams of a radioactive isotope at time t can be modelled by the equation $m = ae^{-kt}$ where a and k are constants.</p> <p>(i) Show algebraically that the graph of $\ln m$ against t is linear</p> <p>(ii) When the graph of $\ln m$ against t is plotted, the gradient of the line is -0.03 and the point $(0, 9)$ lies on the line, find the exact values of a and k.</p>	