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3 Exam Questions
Yr 1 – e^x and $\ln x$

(1) Sketch the graph of

$$y = 4 - e^{2x}$$

stating the equations of the any asymptotes and points of intersection with the coordinate axes. Give your answers in exact form where appropriate.

(2) The population of rats in a colony can be modelled by the formula $P = 200 + 50e^{kt}$ where P is the number of rats in the colony after t days.

(a) State the initial population.

(b) Given that there were 316 rats after 6 days, find the value of k to 3 significant figures.

Find, to the nearest day, when the population of rats was increasing by 30 rats per day.

(3) Solve the equation

$$e^x - 6e^{-x} - 1 = 0$$

giving your answer as a natural logarithm.

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