

13. The world human population, P billions, is modelled by the equation

$$P = ab^t$$

where a and b are constants and t is the number of years after 2004

Using the estimated population figures for the years from 2004 to 2007, a graph is plotted of $\log_{10}P$ against t .

The points lie approximately on a straight line with

- gradient 0.0054
- intercept 0.81 on the $\log_{10}P$ axis

(a) Estimate, to 3 decimal places, the value of a and the value of b .

(4)

In the context of the model,

(b) (i) interpret the value of the constant a ,

(ii) interpret the value of the constant b .

(2)

(c) Use the model to estimate the world human population in 2030

(2)

(d) Comment on the reliability of the answer to part (c).

(1)