

13 A computer game awards points to a player based on the time taken to complete a level.

The points awarded decrease as the time taken to complete a level increases.

Rebekah believes that the points awarded, P , can be modelled by the equation

$$P = Ae^{kt}$$

where t is the time, in seconds, taken to complete the level and A and k are constants.

13 (a) Explain, in context, the meaning of the value of A

[1 mark]

13 (b) Show that

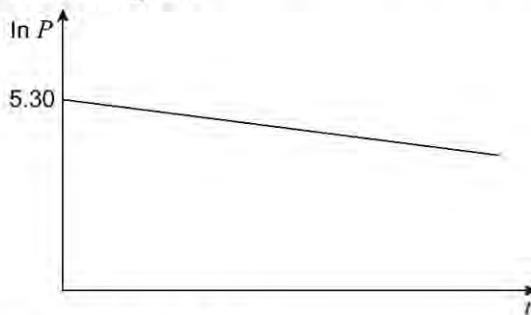
$$\ln P = \ln A + kt$$

[2 marks]

13 (c) Rebekah records the points and the time taken for her to complete each level.

She plots the values of $\ln P$ against t

Rebekah obtains a straight-line graph with a gradient of -0.08 and a vertical intercept of 5.30 , as shown in the diagram.



Find the value of A and the value of k

[3 marks]

13 (d) Rebekah scores 20 points for completing a particular level.

Find, to the nearest second, the time taken to complete this level.

[3 marks]