Exemplar P2 Q7

7. The concentration of the pesticide, *Xpesto*, in soil can be modelled by the equation.

$$P_t = P_0 e^{-kt}$$

where:

- P_0 is the initial concentration;
- P_t is the concentration at time t;
- t is the time, in days, after the application of the pesticide.

Once in the soil, the half-life of a pesticide is the time taken for its concentration to be reduced to one half of its initial value.

(a) If the half-life of *Xpesto* is 25 days, find the value of k to 2 significant figures.

On all *Xpesto* packaging, the manufacturer states that 80 days after application the concentration of *Xpesto* in the soil will have decreased by over 90%.

(b) Is this statement correct? Justify your answer.

Answers

(a) $k = 0.028$

(b) No, the concentration will not have decreased by over 90%. 89% decrease.