

At time t days after the start of observations, the number of insects in a population is N . The variation in the number of insects is modelled by a differential equation of the form $\frac{dN}{dt} = kN^{\frac{3}{2}} \cos 0.02t$, where k is a constant and N is a continuous variable. It is given that when $t = 0$, $N = 100$.

- (a) Solve the differential equation, obtaining a relation between N , k and t . [5]

[illegible]

- (b)** Given also that $N = 625$ when $t = 50$, find the value of k . [2]

[illegible]

- (c) Obtain an expression for N in terms of t , and find the greatest value of N predicted by this model. [2]

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