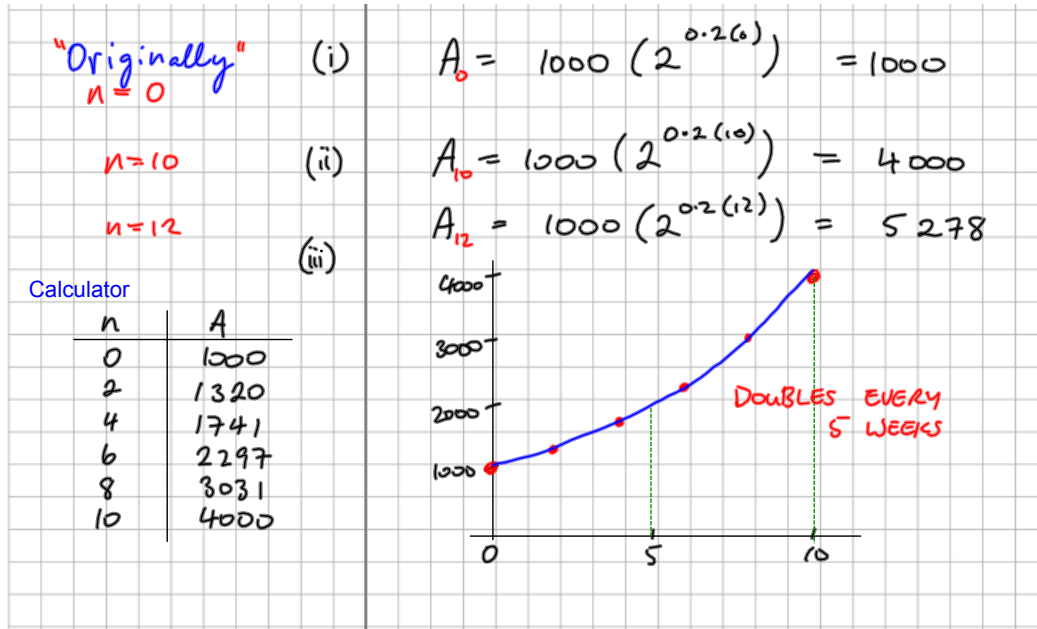


2. An entomologist monitoring a grasshopper plague notices that the area affected by the grasshoppers is given by $A(n) = 1000 \times 2^{0.2n}$ hectares, where n is the number of weeks that have elapsed after the initial observation. Find
- the area originally affected
 - the affected area after (a) 10 weeks (b) 12 weeks.
 - Draw a graph of $A(n)$ against n for $0 \leq n \leq 10$.
 - From the graph or otherwise, calculate the “doubling time” for the colony.



7. Carbon-14, the radioactive element of carbon, decays according to the formula $P = 100(0.99988)^n$, where P is the percentage of the original mass of Carbon-14 that remains after n years.
- Find the percentage of Carbon-14 that remains after (i) 200 years (ii) 500 years.
 - Estimate (using trial and error) how long it will take the Carbon-14 sample to decay to half its original mass. Give your answer correct to the nearest 10 years.
 - A bone containing 79% of its original Carbon-14 was discovered in a bog in County Offaly. Estimate its age.

