**Summary:**

25000 variations. First order linear recurrence relation.

**Question:**

The number of numbats in an area near Perth has been dropping by  per year. Researchers have determined that the current population of numbats is . The researchers start trialling a program where  numbats are introduced into the area each year.

The population of numbats can be modelled using a first-order linear recurrence relation.



where *Tn* is the number of numbats in the area at the beginning of the nth year.

1. Explain the coefficient  in the context of the situation.
2. State the value of a in the equation.
3. Graph the number of numbats numbers in the area for every 3 year period (commencing at n = 0) up to the 30th year on the axes below.



1. Using your graph, comment on how the population of numbats is changing over time.
2. To the nearest whole number, what is the long-term effect of the repopulation program.

**Solution:**

1.  is the ratio of numbats remaining in the area each year. This is equivalent to a percentage of 
2. a = . This is the number of numbats added to the population each year.



1. The population of numbats is . The population is levelling out over time.
2. 

The population of numbats will settle to approximately .