

Homework 3 Solutions:

1. With $k = 1.786$ the population reaches 129,822 in six years. (It is interesting to note how much the six year prediction changes when k is changed a tiny amount.)
2. With $k = 1.786$, a harvesting rate H of 3144 keeps the population at exactly 4000 for six years. Again it is interesting to see the impact of a very small change in H on the prediction.
3. Dividing $H = 3144$ by the number of cats, 160, and then by 12 to make the rate a monthly rate, we see that each cat would have to “harvest” 1.63 rabbits (on average) per month. This is a reasonable rate (wild, or “feral” cats need to eat!).
4. The New York Times article on the hunting of rabbits on Robben Island points to a similar situation to MacQuarie Island. In the middle of the article, it is noted that “Since mid-October, 5,300 rabbits have been killed, along with 78 unwanted deer and 38 feral cats.” This is shocking! The lesson from MacQuarie Island is that a relatively small number of cats can keep a population of rabbits from “exploding”. If the hunters on Robben Island miss even one breeding pair of rabbits and they have removed all the cats, the rabbit population will very quickly return to its original levels. Perhaps the cats are harmful to some other native species, in which case, alternate rabbit predators should be introduced to control the population.