

Rat pow



**ASSIGN
BUSTER**

RAT POW Problem Statement: In this POW we were assigned to find the population of the exponential growth of a rat population, residing on a perfect, utopian island after a year. Organisms will flourish prosperity on the Island and no deaths would occur. The journey began when merely 2 full-grown rats, the one original male and female, arrived on the island. Their offspring would be determined by the following: Every day from January 1st, the original mother would give birth to a litter of 6 infant rats. Within this 6, half would consist of female offspring, leaving the other half to become male. She would continue to produce offspring every 40 days (the 1st Generation of Offspring). The 1st Generation would then produce their 2nd generation of offspring 120 days after their birth. Finally, the 2nd Generation would produce the 3rd Generation of their offspring after 40 days. Process: I organized my final data in a table format, but it was not a result of my first attempts to solve the problem by any means. First, I made a sort of chart solely calculating which days were the markers for the original Mother's babies (the 1st Generation).

I counted 40 continuous days, starting from January 1st, and when I got to the 40th day after January first (which was February 9th) I started over counting from 1-40 once again. I continued on with this method to conclude that 9 cycles of descendants would occur during 365 life p, reproducing every 40 days. In addition, I also had the dates of each of the days that Generation 1 would be produced, which I found out was no use to my problem or solution. From there, I thought I could simply count the days that the 1st, 2nd, and 3rd generations were born, but then I came to a realization with just how many rats there would actually be.

I came to the assumption that such a tactic would take a tremendous amount of time to complete and that a different, and more efficient maneuver should be perused. So I got together with a friend to see if we could come up with a competent strategy. We decided we would conduct thefamilytree strategy, so we first taped many regular printer paper sheets together to have enough space for the tree. We started with a Male and Female plot, and attempted to branch of from there to depict each generation accurately.

We quickly learned that our procedure, and the rate we were going, would probably take days to complete and that is was completely insufficient time-wise. We tried to find ways around it, and eventually decided to call it a day. At home, I explain the situation to one of my parents and they have me the idea for a table. It would consist of time intervals by day (day 1, 40, 80, 120, 160, 200, 240, 280, 320, and 360), the breeders during that time/day, and the number of rats during that day included in either the 1st Generation, 2nd Generation, of 3rd Generation.

On day 1, there were 2 Breeders (the original Mother and Father), six 1st Generation babies, and no 2nd or 3rd Generations yet. On day 40, there were still only 2 breeders (the Mother and Father because the babies had just been born), 6 1st Generation baby rats, 6 2nd Generation baby Rats, and no 3rd generation baby rats. As you can observe in the table below, I continued on with the pattern until I got to day 360 and every column in the table with completed. I counted up the total number of rats in every column, and it totaled up to 1, 808 rats which I knew was correct because I had official verification.