Africa Check workings

We used a standard formula to calculate the annual rate of growth of a population, which you can try for yourself if you have a scientific calculator or a maths background (you can also see the calculation for yourself here, and swap in different numbers to see how the rate changes).

$$r = \left(\frac{p_f}{p_s}\right)^{\frac{1}{t}} - 1$$

In the formula, shown above, the value p_s is the population of elephants at the start of the period we were interested in, and p_f is the final population size. The value t is the number of years over which the population has grown. The rate r effectively tells us how many new elephants there were in an average year, for each elephant in the year before.

A rate of $r = 1$ would mean that the population grew by 100% in an average year, and so for each elephant at the start of one year there was one more elephant by the start of the next. If this population kept growing at the same rate, there would be four elephants the next year (one more for each of the two that already exist).

Using the actual number of elephants in 1989 (16,000) and 2020 (34,354), (a time span of 31 years) we found that the population had grown by roughly 2.5% (or around r = 0.025). You can think of this as meaning that for each elephant that existed in an average year, there would be 0.025 more elephants the next year (obviously 0.025 of an elephant doesn't exist, but this is an average number which accounts for all the births and deaths in a large elephant population over many years).

If we already know the rate, we can rearrange the formula to calculate how many elephants we will end up with if a certain population grows at that rate for a certain number of years. The new formula is shown below (again, you can see the calculation for yourself here).

$$p_f = p_s\,(1 + r)^t$$

With a population of 16,000 elephants in 1989, a growth rate of 2.8% should give us a final population of 37,662 elephants in 2020. But this is much higher than the 34,354 elephants actually recorded that year. This suggests that 2.8% is inaccurate, as it is higher than the real growth rate over that time.