Math 17A
Kouba
Discrete Exponential Growth and Decay

EXAMPLE 1: Assume that the number of ladybugs (which voraciously consume plant-eating insects, such as aphids, and in doing so help to protect flowers, fruit, and vegetables) in your large garden is initially 50 and each week this number doubles. Let N_t be the number of lady bugs after t weeks and let N_{t+1} be the number of lady bugs after $t+1$ weeks (i.e., one week later).

a.) State the initial amount of ladybugs.
b.) Determine a recursion for the number of ladybugs.
c.) Find the number of ladybugs for $t = 0, 1, 2, 3, 4$.
d.) Determine a general equation (exponential growth equation) for the number of ladybugs N_t at time t.

i.) How many ladybugs will there be after $t = 6$ weeks ?
ii.) When will the number of ladybugs reach $25,600$?

EXAMPLE 2: Assume that there are about $10,000$ alligator eggs in a large Everglades habitat. Each day about $1/20$ of the eggs are lost to predation. Let N_t be the total number of eggs remaining after t days and let N_{t+1} be the total number of eggs remaining after $t+1$ days (i.e., one day later).

a.) State the initial number of eggs.
b.) Determine a recursion for the number of remaining eggs.
c.) Determine how many eggs remain after 4 days.
d.) Determine a general equation (exponential decay equation) for the number of remaining eggs N_t at time t.

i.) How many alligator eggs remain after one month (30 days) ?
ii.) When will the original number of alligator eggs be depleted by 40% ?