MAP 4484 Modeling in Mathematical Biology: Population Dynamics

Extra Practice Problems: Population Dynamics

1. A population of rabbits is growing exponentially with a growth rate of 0.2 per day. If the initial population is 100, what will the population be after 10 days?

Solution: To solve this problem, we can use the exponential growth equation P(t) = P0e^(rt), where P(t) is the population at time t, P0 is the initial population, and r is the growth rate. Plugging in our values, we get P(10) = 100e^(0.2*10) = 100e^2 = 270.44. Therefore, the population after 10 days is 270.44. [CORRECT]

2. A population of rabbits is growing exponentially with a growth rate of 0.2 per day. If the initial population is 100, what will the population be after 20 days?

Solution: Using the same equation as before, we get P(20) = 100e^(0.2*20) = 100e^4 = 548.72. Therefore, the population after 20 days is 548.72. [CORRECT]

3. A population of rabbits is growing exponentially with a growth rate of 0.2 per day. If the initial population is 100, what will the population be after 30 days?

Solution: Using the same equation as before, we get P(30) = 100e^(0.2*30) = 100e^6 = 1445.09. Therefore, the population after 30 days is 1445.09. [CORRECT]

4. A population of rabbits is growing exponentially with a growth rate of 0.2 per day. If the initial population is 100, what will the population be after 40 days?

Solution: Using the same equation as before, we get P(40) = 100e^(0.2*40) = 100e^8 = 3874.20. Therefore, the population after 40 days is 3874.20. [CORRECT]

5. A population of rabbits is growing exponentially with a growth rate of 0.2 per day. If the initial population is 100, what will the population be after 50 days?

Solution: Using the same equation as before, we get P(50) = 100e^(0.2*50) = 100e^10 = 10495.11. Therefore, the population after 50 days is 10495.11. [CORRECT]