Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pd: \_\_\_\_

**Population Growth Practice**

Equations to use:



1(a). A population of 265 swans are introduced to Circle Lake.  The population’s birth rate is 0.341 swans/year per capita, and the death rate is 0.296 swans/year per capita.  What is the rate of population growth per capita, and is it increasing or decreasing?

r = b - d = .341 - .296 =.045

**r is increasing.  r=0.045**

2. There are 190 grey tree frogs in a swamp.  The population is under carrying capacity. If r= -0.093 frogs/ year, predict the population size next year.

Rmax\*N -0.093\*190= lose -17.67 frogs; 190-17.67 = 172

**172 frogs**

3. A population of 1,492 Baltimore Orioles is introduced to an area of Nerstrand woods.  Over the next year, the Orioles show a death rate of 0.395 while the population drops to 1,134.  What’s the birth rate for this population?  Is this proving to be a suitable habitat?

**dN/dt= rN r = b - d**

**dN/dt= (b-d)N**

**(1134-1492)/1 = (b- 0.395) 1492**

**so b= 0.155.**

**Not suitable, because birth rate is much lower than death rate.**

4. 780 turkeys live in Merriam township, which is 92 acres in size.  The birth rate is 0.472 turkeys/ year per capita.  The death rate is 0.331 turkeys/ year per capita.

|  |  |  |
| --- | --- | --- |
| What is the population density? Round to the nearest tenth. | What is dN/dt? Round to the nearest whole number | Predict N after one year, assuming dN/dt stays constant. Round to the nearest whole number. |
| **8.5 turkeys/acre****780/92** | **110 turkeys/ year** **dN/dt= (b-d)N****(0.472-0.331)780** | **890 turkeys** **pop growth = 110 turkeys/year****780 turkeys + 110** |

5. One dandelion plant can produce many seeds, leading to a high growth rate for dandelion populations.  If a population of dandelions is currently 40 individuals and rmax= 0.2 dandelions/month per capita, predict how many dandelions would be in this population after 4 months.

**dN/dt = rmaxN**

**Month 1: dN/dt = (0.2)(40) = 8 dandelions
Month 2: = 0.2(48) = 9.6
Month 3: 0.2(57.6) = 11.5**

**Total at end of four months = 69 dandelions**

|  |  |  |
| --- | --- | --- |
| Month | Population | # added |
| 1 | 40 | 8 |
| 2 | 48 | 9.6 |
| 3 | 57.6 | 11.5 |
| 4 | 69.1 |  |

6.       Imagine the dandelion population of 40 mentioned in #12 cannot continue to grow exponentially, due to lack of space.  The carrying capacity for their patch of lawn is 100 dandelions.  What is their population growth rate at the end of the first month? Round to the nearest tenth.

**dN/dt = rmaxN[(K-N)/K]**

**dN/dt= 0.2\*40 [(100-40)/100]**

**dN/dt = 4.8 dandelions for the first month**