Population = habitat area x population density   (BE able to rearrange this)

$$P = \frac{T_F\, T_L}{M} \qquad A = P(1 + r\ )^t \qquad \text{Rule 70} \quad \frac{70}{rate\ as\ \%}$$

1. Alaska has the lowest population density of any state in the United States. It has 626,932 people in 570 374 mi². What is its population density? Round to the nearest person per square mile.

2. Analyze the following situation. You captured, marked, and released 5 turtles from a pond, and caught 10 unmarked turtles the next day. Would you have enough information to estimate the population using the mark-recapture method?

3. There are 4 foxes in 10 square kilometers of a forest. How many foxes would you expect to find in 50 square kilometers?

4. Suppose you want to know how many box turtles are in a wooded park. On the first day, you hunt through the woods and capture 24 turtles. You place a spot of paint on each turtle's shell and release all turtles back where you found them. A week later you return, and with an extraordinary effort, catch 60 turtles. Of these, 15 are marked and 45 are unmarked. What is the estimated size of the box turtle population?

5. The population in the town of Huntersville is presently 38 300. The town grows at an annual rate of 1.2%. What will be the population of Huntersville in 18 years?

6. A biologist originally marked 40 butterflies in Wilson Park. Over a month long period butterfly traps caught 200 butterflies. Of those 200, 120 did not have tags. What would be the estimated size of a butterfly population in Wilson Park?

7. On October 15, 1984 at the beginning of the squirrel-hunting season, biologists counted 95 gray squirrels in a 20-acre forest. On December 15, 1984, 42 gray were counted in the forest.
   a) What was the density of the gray squirrel population on October 15, 1984?
   b) What was the density of the gray squirrel population on December 15, 1984?
   c) What factors could have affected the density of the population?

8. Schushsville is an island of 5000 square miles off the coast of Northville. There are

currently 250,000 inhabitants of the island. Last year, there were 12,000 new children born and 10,000 people were recorded as deceased. It is believed that the island could support a population as dense as 150 people/square mile.

a) What is the current population density and what do you expect will happen to the density as time goes on?

b) What was last year's population?

c) If Schushsville's population growth rate is 0.8065%, how many years will it take for its population to double?

9. A population of 100 frogs increases at an annual rate of 22%. How many frogs will there be in 5 years?

10. Study the graph below.

a) What type of curve is shown below?

b) Indicate on the graph where exponential growth occurs.

c) What is the rabbit population's carrying capacity?

d) What factors prevent populations from growing at their biotic potential?

e) As the graph levels off, what is happening to the rabbit population?