Mark-Recapture Density Problems
Show all work!

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1. Suppose that naturalists catch, tags, and release 50 deer in a forest. After allowing time for the tagged deer to mix with the others, they catch a sample of 100 deer, 10 of which have tags. What is the estimate for the number of deer in the forest? (2 pts)

2. Suppose that wildlife workers capture 328 penguins on an island, mark them, and allow them to mix with the rest of the population. Later, they capture 200 penguins, 64 of which are marked. What is the estimate for the number of penguins on the island? (2 pts)

3. Suppose that the high school in a town has 500 students. A random survey of 200 people in the town finds 40 high school students. What is the estimate for the number of people in the town? (2 pts)

4. Visitors conducted a capture-recapture experiment to determine the number of taxi cabs in Edinburgh, Scotland. On the first day, observers saw 48 taxicabs. The next day they observed 52 cabs, 20 of which they had seen the previous day. What is the estimate for the number of taxicabs in Edinburgh? (2 pts)

5. In a study of raccoons in a certain region of northern Florida, 48 animals were captured using cages baited with fish heads. The raccoons were marked and released. In the following week 71 raccoons were captured, 31 of which had been marked. What is the estimate for the number of raccoons in this region? (2 pts)

6. Suppose that wildlife workers capture 20 pheasants in a square mile area. They tag them and release them to allow them to mix with the rest of the population. Later they capture 30 pheasants, 15 of which are marked. Determine an estimate of the pheasant population for the square mile and determine the population density per acre. (1 square mile = 640 acres)   (4 pts)
   (hint: first use the mark-recapture formula, then use the population density formula)