

- (e) From the original cross, what is the probability that 2 of 6 progeny will have ovoid seed capsules?
- (f) From the original cross, what is the probability of at least 1 progeny with ovoid seed capsules in a sample of 7 offspring?
8. Suppose that you have read that the leopard frog, *Rana pipiens*, has a sex ratio in most populations of 60% females and 40% males. If this is true, what is the probability that
- (a) in a random sample of 20 individuals collected from Odell's Pond fewer than 10 will be female?
- (b) in a random sample of 13 exactly 8 will be female?
9. In a large population, 16% of the people are left-handed. In a random sample of 10 find
- (a) the probability that exactly 2 will be left-handed;
- (b) the probability that fewer than 2 will be left-handed.
10. In a study of the effectiveness of an insecticide against gypsy moths, *Lymantria dispar*, a large area of land was sprayed. Later the area was examined for live adult insects by randomly selecting and surveying 10-m \times 10-m squares. Past experience has shown the average number of live adult insects per square after spraying to be 3. If these insects are Poissonally distributed, find
- (a) the probability that a square will contain exactly 3 live adult insects;
- (b) $f(3)$;
- (c) the probability that a square will have more than 3 live adult insects.
11. If the capacities of the cranial cavity of a certain population of humans are approximately normally distributed with a mean of 1400 cc and a standard deviation of 125 cc, find the probability that a person randomly picked from this population will have a cranial cavity capacity
- (a) greater than 1450 cc;
- (b) less than 1350 cc;
- (c) between 1300 cc and 1500 cc.
12. The "Summary Data for the April 2000 MCAT" (Medical College Admission Test) published by the Association of American Medical Colleges indicated that the mean score on the biological sciences section was 8.4 (the scale is 1 to 15) with a standard deviation of 2.4. Assume that MCAT scores are approximately normally distributed.
- (a) Because individual scores are given only as whole numbers, a score of 9 must be considered 8.5 to 9.5 on a continuous scale. What percent of the applicants would you expect to score 9 on the biological sciences section?
- (b) If a highly selective medical school looks at applicants only in the 90th percentile or above, what minimum score would an applicant need on this section to be considered by this school?