

29. The American coot, *Fulica americana*, lays clutches of eggs that depend on habitat quality and population density. In a large wetland the distribution of clutch sizes for this species is characterized by the following probability density function:

| | | | | | | |
|-----------------|------|------|------|------|------|------|
| x (# of eggs) | 7 | 8 | 9 | 10 | 11 | 12 |
| $f(x)$ | 0.10 | 0.10 | 0.15 | 0.35 | 0.25 | 0.05 |

- Construct the cumulative density function, $F(x)$, for the pdf above.
 - Using the expected value approach, find the mean and variance for the clutch size in this population.
 - Find $F(10)$.
 - Find $P(X = 12)$.
 - Find $P(X > 9)$.
 - Find $P(X = 12 | X > 9)$.
0. Amazingly, the West Nile virus has been found in more than 200 species of wild vertebrates in North America. Monitoring the spread of this pathogen is difficult but essential. Suppose 10% of a population of American crows in eastern Oklahoma are infected with the virus. How many crows would have to be sampled (analyzed) to be at least 50% certain of finding one infected individual? How many to be 90% certain?
- If the infected and non-infected birds in the preceding problem are binomially distributed, find the following:
 - In a sample of 15 less than 3 will be infected.
 - In a sample of 15 exactly 3 will be infected.
 - In a sample of 15 more than 3 will be infected.