**Chapter 8 Practice Test**

**1.** It has been estimated that as many as 70% of the fish caught in certain areas of the Great Lakes have liver cancer due to the pollutants present. A sample of 130 fish is caught and inspected for signs of liver cancer. The number of infected fish within two standard deviations of the mean is

(a) (81, 101). (b)(86, 97). (c) (63, 119). (d) (36, 146). (e) (75, 107).

**2.** In a triangle test a tester is presented with three food samples, two of which are alike, and is asked to pick out the odd one by tasting. If a tester has no well-developed sense of taste and can pick the odd one only by chance, what is the probability that in five trials he will make four or more correct decisions?

(a) 0.045 (b) 0.004 (c) 0.041 (d) 0.959 (e) 0.955

**3.** A set of 10 cards consists of 5 red cards and 5 black cards. The cards are shuffled thoroughly and you turn cards over, one at a time, beginning with the top card. Let X be the number of cards you turn over until you observe the first red card. The random variable X has which of the following probability distributions?

(a) The Normal distribution with mean 5

(b) The binomial distribution with *p* = 0.5

(c) The geometric distribution with probability of success 0.5

(d) The uniform distribution that takes value 1 on the interval from 0 to 1

(e) None of the above

**4.** Seventeen people have been exposed to a particular disease. Each one independently has a 40% chance of contracting the disease. A hospital has the capacity to handle 10 cases of the disease. What is the probability that the hospital’s capacity will be exceeded?

(a) 0.965 (b) 0.035 (c) 0.989 (d) 0.011 (e) 0.736

**5.** Refer to the previous problem. Planners need to have enough beds available to handle a proportion of all outbreaks. Suppose a typical outbreak has 100 people exposed, each with a 40% chance of coming down with the disease. Which is ***not correct***?

(a) This scenario satisfies the assumptions of a binomial distribution.

(b) About 95% of the time, between 30 and 50 people will contract the disease.

(c) Almost all of the time, between 25 and 55 people will contract the disease.

(d) On average, about 40 people will contract the disease.

(e) Almost all of the time, less than 40 people will be infected.

**6.** There are 10 patients on the neonatal ward of a local hospital who are monitored by 2 staff members. If the probability of a patient requiring emergency attention by a staff member is 0.3, what is the probability that there will not be sufficient staff to attend all emergencies? Assume that emergencies occur independently.

(a) 0.3828 (b) 0.3000 (c) 0.0900 (d) 0.9100 (e) 0.6172

**7.**In 1989 *Newsweek* reported that 60% of young children have blood lead levels that could impair their neurological development. Assuming that a class in a school is a random sample from the population of all children at risk, the probability that more than 3 children have to be tested until one is found to have a blood level that may impair development is

(a) 0.064. (b) 0.096. (c) 0.64. (d) 0.16. (e) 0.88.

**8.** Would most wives marry the same man again, if given the chance? According to a poll of 608 married women conducted by *Ladies Home Journal* (June 1988), 456 would marry their current husbands. Assume that, in reality, 70% of all married women would marry their current husbands. What the probability that in a poll of 608 married women, at least 456 of women would answer “yes” to that question? (Use the Normal approximation. Don’t forget to justify your use of this method by check the “rule of thumb”).

**9.** The Internal Revenue Service estimates that 8% of all taxpayers filling out long forms make mistakes. Suppose that a random sample of 10,000 forms is selected.

(a)P(X > 800) (b) P(X < 1000) (c) P(X ≥ 800) (d) P(250 ≤ X < 600) (e) P(100 < X < 800)

**10.** A survey conducted by the Harris polling organization discovered that 63% of all Americans are overweight. Suppose that a number of randomly selected Americans are weighed.

(a) Find the probability that the fourth person weighed is the first person to be overweight.

(b) Find the probability that it takes more than 4 people to observe the first overweight person.

(c) Find the probability that it takes no more than 5 people but more than 2 people to observe the first overweight person.

(d) Find the mean and standard deviation of the number of Americans that would have to be weighed in order to find the first person that was overweight. Interpret these values in context.

(e) Construct a probability table and histogram out to n=5