1. Which of the following is not a property of a binomial experiment?

- **a.** B: Each trial can only have two possible outcomes.
- **b.** I: The outcomes are independent.
- **c.** n: the number of trials is constant.
- **d.** S: Probability of a success varies from trial to trial.

2. The situations will change each time you access the question. Even though no work is required, I strongly recommend that you write down the work somewhere.
In each of the three situations, is it reasonable to use a binomial distribution for the random variable?

3. A binomial random variable is completely described by the number of trials, n.

- **a.** True
- **b.** False

4. Suppose $X \sim B(n,p)$. Then $E(X) = np$.

- **a.** True
- **b.** False

5. More children are being rushed to the hospital because they were able to push down and twist the cap on a medication bottle and were poisoned by a common drug. A recent research study suggested that 25% of all preschool children can open a medication bottle and 10 preschool children are selected at random. Let the random variable X be the number of children who can open the bottle.
a. What is the probability that exactly 4 children open the bottle? ___ (3 decimal places)
b. What is the probability that more than 1 child opens the bottle? ___ (3 decimal places)
c. What is the expected number of children that open the bottle? ___ (2 decimal places.)
d. What is the standard deviation of the number of children that can open the bottle? ___ (2 decimal places.)

6. A Poisson random variable is often used to count _____.

- **a.** items per time
- **b.** the first time that something occurs.
- **c.** the times that something occurs in n trials
- **d.** when the trials are NOT independent of each other.

7. For a Poisson random variable, the mean is equal to the variance.

- **a.** True
- **b.** False

8. According to recent FBI statistics, the mean number of bank robberies per day in the Southern Region of the United States is 4.32. Suppose a day is selected at random.
a. What is the probability of exactly two bank robberies in the Southern Region? ___ (Please use 3 decimal places.)
b. What is the standard deviation? ___ (Please use 2 decimal places.)

9. For a continuous random variable X with probability density function f, $P(X = x) = f(x)$.

- **a.** True
- **b.** False

10. The cumulative density function, F(x), is defined as

- **a.** $P(X \leq a)$
- **b.** This is not a term in probability.
- **c.** $P(X < a)$
- **d.** $P(X = a)$

11. The following function is a density function, where k is a constant.

$f(x) = kx$ for $0 < x < 4$.
a) What is the value of k? ___ (Please use 3 decimal places in the answer.)
b) What is $P(X < 1)$? ___ (Please use 3 decimal places in the answer.)

12. The standard normal random variable has mean _Answer 1__ and variance _Answer 2_.

13. We will NOT be using interpolation in this class.

- **a.** True
- **b.** False

14. The values will be different each time you access the problem.
Let the random variable Z have a standard normal distribution.

Fill in the blanks. (Give your answers to four decimal places.)

a. $P(Z < a)$
b. $P(Z \leqslant -b \cup Z \geqslant b)$
c. $P(Z > c)$
d. $P(d < Z < e)$.

15. The values will be different each time you access it.
Let the random variable Z have a standard normal distribution.

Fill in the blanks. (Give your answers to two decimal places.)

a. Value of the a^{th} percentile
b. Value of the top b^{th} percent
c. Value of b when $P(-b \leqslant Z \leqslant b) = c$