

Review
Discrete distributions

Name _____

1. Which of the following is/are condition(s) for a binomial experiment?
 - I. The number of trials n is random number (not fixed number).
 - II. The n trials are independent.
 - III. The probability of success p is equal to the probability of failure q

A) I only
B) II only
C) III only
D) I and II only
E) I, and III only

2. Which of the following is/are condition(s) for a binomial experiment?
 - I. The probability of success p is equal the probability of failure q .
 - II. The n trials are independent.
 - III. Each observation results in one of two possible outcomes, called 'success' and 'failure'.

A) I only
B) II only
C) III only
D) I and II only
E) II, and III only

3. Which of these has a binomial model?
 - A) The number of cards drawn from a deck until we find all four aces.
 - B) The number of people in a class of 25 who have taken statistics.
 - C) The colors of the cars in the grocery store parking lot.
 - D) The number of people we survey until we find someone who owns an iPod.
 - E) The number of sodas students drink per day.

For Questions 4-6: A headache remedy is said to be 40% effective in curing headaches caused by simple nervous tension. An investigator tests this remedy on 10 randomly selected patients suffering from nervous tension.

4. Define the random variable being measured

- A) X = the number of people who take the remedy
- B) X = the number of people who have headaches cured
- C) X = the number of selected patients
- D) X = the average number of people who have headaches cured
- E) None of these

5. Calculate the mean of X

- A) 4.5
- B) 3.5
- C) 7
- D) 4
- E) 3

6. Determine the probability that exactly 8 subjects experience headache relief with this remedy.

- A) 0.0229
- B) 0.0430
- C) 0.0014
- D) 0.0106
- E) None

7. Let $X \sim \text{Bin}(3, P)$. If $P(X \geq 1) = 124/125$ then $P(X = 1)$ equals

- A) 0.096
- B) 0.375
- C) 0.222
- D) 0.141
- E) none

8. The mean number of errors due to a particular bug occurring in a minute is 0.0001. What is the probability that no error will occur in 20 minutes?
9. A man was able to complete 3 files per day on an average. Find the probability that he can complete 5 files the next day.
10. The number of calls coming per minute into a hotels reservation center is Poisson random variable with mean 3. Find the probability that no calls come in a given 1 minute period.
11. Products produced by a machine has a 3% defective rate. What is the probability that the first defective occurs in the fifth item inspected?.
12. If a production line has a 20% defective rate. What is the average number of inspections to obtain the first defective?.
13. There are 66 bulbs in a house out which 33 are defective. If 22 bulbs are picked randomly, find the probability that at least one is defective.

14. In a village, power cuts occur randomly at a rate of 3 per year. Find the probability that in any given year there will be
- (a) exactly 7 power cuts.
 - (b) at least 4 power cuts.
15. Patients arrive at a hospital emergency department at random at a rate of 6 per hour. Find the probability that, during 90 minute period, the number of patients arriving at the hospital accident and emergency department is
- (a) exactly 7
 - (b) at least 10
16. An online shop sells a computer game at an average rate of 1 per day. Find the probability that the shop sells more than 10 games in a 7 day period.
17. A batch of 100 printed circuit cards is populated with semiconductor chips. 20 of these are selected without replacement for function testing. If the original batch contains 30 defective cards, how will these show up in the sample? Let X = the number of defective cards in the sample. Find $p(X = 3)$