Probability and Probability Distributions: Questions & Solutions

1. Choose an incorrect statement from the ones given below:

a. If an event is certain to occur, its probability is 1.

b. Two events are said to be mutually exclusive if both events cannot occur at the same time.

c. For any event A, $0 \geq P(A) \geq 1$

d. The collection of all possible outcomes of a probability experiment is called a sample space.

2. When a single die is rolled, the probability of getting an even number is_____.

a. 0

b. 1/2

c. 1/6

d. 5/6

3. If P(A) = 0.5, P(B) = 0.4, and A and B are mutually exclusive events, then P(A and B) = _____and P(A or B) =_____.

a. 0.9

b. the information given is not enough

c. 0.4

d. 0.2

e. 0

f. 1

g. 0.5

h. 0.1

4. There are 25 students in a class. Many of the students were not well. The school nurse examined each student and constructed the following table 1:

Table 1

	Sore throat	No Sore Throat
Runny Nose	6	12
No Runny Nose	4	3

The probability that a randomly selected student has a running nose or sore throat is

a. $\frac{7}{25}$

b. $\frac{22}{25}$

c. $\frac{18}{25}$

d. $\frac{6}{25}$

5. Let A and B be events with P(A) = 0.8, P(B) = 0.6. Assume that A and B are independent events. Choose the correct answer for P(A and B).

a. 1.4

b. 0.75

c. 0.2

d. 0.48

6. Which of the following pair of events is independent?

a. Tossing a coin and spinning a spinner

b. Drawing a colored ball from a bag, and then drawing a second ball without replacing the first ball

c. Fatima getting grade A in fours subjects and Fatima getting a higher GPA

d. Getting flu vaccination and falling sick due to flu

7. Let A and B be events with P(A and B) = 0.3, P(B) = 0.8, P(A) = 0.4 and Find the conditional probability P(A|B) .

a. 0.375

b. 0.75

c. 0.5

d. 0.7

8. A random variable that may take on any value in an interval is known as a

a. either a continuous or a discrete random variable, depending on the unit of measurement

b. continuous random variable

c. discrete random variable

d. either a continuous or a discrete random variable, depending on the number

9. Which one of the following is not a requirement for a binomial experiment

a. outcomes of each trial must be independent

b. probability of success must change for each trial.

c. each trial can have only two outcomes or outcomes that can be reduced to two outcomes. These
outcomes can be considered as either success

d. there must be a fixed number of trials

10. A computer monitor is composed of a very large number of points of light called pixels. It is not uncommon for a few of these pixels to be

defective. Let X represent the number of defective pixels on a randomly chosen monitor. The probability distribution of X is as follows

Table 2

x	0	1	2	3
P(x)	0.2	0.5	0.2	0.1

Then the expected number of defective pixels is_____ and the variance is_____.

a. 0.96

b. 0.663

c. 1.4

d. 0.98

e. 0.76

f. 1.2

g. 0.872

h. 0.44

11. Fill in the following blanks with correct answers:

The distribution given in table 3_____a probability distribution because

_____.

Table 3

x	-2500	3000	4000	4500
P(x)	0.3	0.4	0.1	0.2

a. the mean of the distribution is 1750

b. one of the values of x is negative

c. the sum of all the probabilities is equal to 1 and all the probabilities are between 0 to 1 (both inclusive)

d. does not represent

e. represents

f. the values of x are too big

12. If 16 trials are conducted for a Binomial Distribution where p = 25%, then P(X=5) is given by

a. $P(X = 5) = {}^{16}C_5 \ (0.25)^{16}$

b. $P(X = 5) = {}^{16}C_5 \ (0.75)^{16}$

c. $P(X = 5) = {}^{16}C_5 (0.25)^5$

d. $P(X = 5) = {}^{16}C_5 \ (0.25)^5 \ (0.75)^{11}$

13. What is the probability of getting 3 heads if a fair coin is flipped 10 times?

a. 0.1250

b. 0.1172

c. 0.0001

d. 0.0105

14. Choose the correct answer from the options given below:

1. If the mean of a binomial distribution is 10 and the probability of success is 0.25, then its variance will be **7.5.**

2. If the mean of a binomial distribution is 5 and the probability of success is 0.25, then its standard deviation will be **1.94.**

3. If mean and variance of a binomial distribution are 25 and 20, respectively. Then, the probability of failure is **0.8.**

a. 7.5

b. 1.94

c. 1.23

d. 0.8

e. 0.25

f. 3.75

g. 0.75

h. 0

i. 2.74

j. 0.2

15. If a die is rolled 600 times. Find:

1. Mean of showing 5 on the die **100.**

2. Variance (to 1 d.p.) of showing 5 on the die **83.3**

3. The standard deviation (to 1 d.p.) of showing 5 on the die **9.1.**

a. 10.6

b. 50

c. 100

d. 67

e. 45.1

f. 25

g. 11.1

h. 9.1

i. 83.3

j. 7.6