Abbas Lagrour University - Khenchela
Faculty of Economic, Commercial and Management Sciences
2nd Semester of the 2025/2026 university year first year students
Exam model answer in statistics 2(section A& B)

Questions : put an X next to the correct answer

1 . The set of all possible outcomes of an experiment is called:

A. Event
B. Population
C. Sample space
D. Parameter

2. A set with no elements is called:

A. Universal set
B. Finite set
C. Empty set
D. Equal set

3. If $P(A) = 0.7$, then the probability of the complement event $A'$is:

A. 0.7
B. 0.3
C. 1.7
D. 0

4. If $P(A) = 0.5$, $P(B) = 0.4$, and $P(A \cap B) = 0.2$, then:
$P(A \cup B)$ =?

A. 0.5
B. 0.6
C. 0.7
D. 0.9

5. The number of ways to choose 2 students from 5 students is:

A. 10
B. 20
C. 25
D. 5

6. The number of permutations of 4 objects taken all at once is:

A. 4
B. 12
C. 24
D. 16

7. The number of arrangements of 3 objects selected from 5 objects is:

A. 10
B. 20
C. 60
D. 125

8. A discrete random variable takes:

A. Infinite decimal values only
B. Countable values
C. Negative values only
D. Continuous intervals only

9. For a probability mass function:

A. Probabilities can be negative
B. The sum of probabilities equals 1
C. The sum of probabilities equals 0
D. Probabilities are always greater than 1

10. A discrete random variable Xhas the following PMF:

x	0	1	2
$P(X = x)$	0.2	0.5	0.3

-Find $P(X = 1)$.

A. 0.2
B. 0.3
C. 0.5
D. 1

11. Which of the following can represent a valid PMF?

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A. 0.3 + 0.4 + 0.5
B. 0.2 + 0.3 + 0.5
C. 0.6 + 0.7 + 0.2
D. 1.2 + 0.1

12. Given:

x	1	2	3
$P(X = x)$	0.2	0.4	0.4

Find:

$$\boldsymbol{F(2) = P(X \leq 2)}$$

A. 0.2
B. 0.4
C. 0.6
D. 1

13. Which of the following is a property of a PDF?

A. $f(x) < 0$
B. $f(x) \geq 0$
C. Total area is greater than 1
D. Probabilities are negative

14. The CDF values are always between:

A. $-1$and 1
B. $0$and 1
C. $1$and 10
D. $-\infty$and $+\infty$

15. Let *X*be a continuous random variable with PDF:

$$f(x) = \begin{cases} k(2x), & 0 \leq x \leq 1 \\ 0, & \text{otherwise} \end{cases}$$

The value of *k* is:

A. $\frac{1}{2}$
B. 1
C. 2
D. $\frac{1}{4}$

16. Let:

$$F(x) = \begin{cases} 0, & x < 0 \\ x^3, & 0 \leq x \leq 1 \\ 1, & x > 1 \end{cases}$$

The PDF is:

A. $3x^2$on $[0, 1]$
B. x^3
C. $3x$
D. 1

17. If $F(x)$is a CDF, then:

A. It decreases always
B. It can be negative
C. It is non-decreasing
D. It is always greater than 1

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Model Solutions

1. C. Sample space
2. C. Empty set
3. B. 0.3
4. C. 0.7
5. A. 10
6. C. 24
7. C. 60
8. B. Countable values
9. B. The sum of probabilities equals 1
10. C. 0.5
11. B. 0.2 + 0.3 + 0.5
12. C. 0.6
13. B. $f(x) \geq 0$
14. B. 0 and 1
15. Normalize the PDF:

$$\int_0^1 k(2x)\,dx = 1$$

$$2k\int_0^1 x\,dx = 1$$

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$$2k\left(\frac{1}{2}\right) = 1 \Rightarrow k = 1$$

B. 1

16. The PDF is the derivative of the CDF:

$$F(x) = x^3 \Rightarrow f(x) = \frac{d}{dx}(x^3) = 3x^2$$

A. $3x^2$ on $[0, 1]$

17. C. It is non-decreasing