Câu 1. Assume that the random variable X has a density probability function

$$f(x) = \begin{cases} kx & \text{if } 0 \le x \le 1 \\ k & \text{if } 1 \le x \le 4 \\ 0 & \text{if } x \notin [0,4]. \end{cases}$$

Determine k.

A. $\frac{2}{7}$. **B**. $\frac{7}{2}$. **C**. $\frac{1}{14}$. **D**. 14.

Câu 2. The density probability function of a random variable is given by

$$f(x) = \begin{cases} \frac{10}{x^2}, & \text{if } x > 10 \\ 0, & \text{if } x \le 10. \end{cases}$$

Find $P(X \ge 15)$.

A. $\frac{1}{3}$. **B**. $\frac{2}{3}$. **C**. $\frac{2}{5}$. **D**. $\frac{3}{5}$.

Câu 3. Let $f(x) = \frac{a}{1+x^2}, x \in \mathbb{R}$ be the density probability function a random variable X. Determine a.

A. $a = \frac{1}{\pi}$. **B**. $a = \frac{1}{2\pi}$. **C**. $a = \frac{2}{\pi}$. **D**. $a = \pi$.

Câu 4. Suppose the cumulative distribution of the random variable X is

$$F(x) = \begin{cases} 0 & \text{if } -2 < x \\ 0{,}25x + 0{,}5 & \text{if } -2 \le x < 1 \\ 0{,}5x + 0{,}25 & \text{if } 1 \le x < 1{,}5 \\ 1 & \text{if } 1{,}5 \le x. \end{cases}$$

Determine $P(X < -1 \text{ or } X > 1{,}6)$.

A. 0,47. **B**. 0,16. **C**. 0,25. **D**. 0,75.

Câu 5. Suppose a uniform random variable can be used to describe the outcome of an experiment with outcomes ranging from 25 to 35. What is the mean outcome of this experiment?

A. 30. **B**. 30,5. **C**. 25. **D**. 35.

Câu 6. Suppose that prices of a certain model of new homes are normally distributed with a mean 150 000$. Find the percentage of buyer who paid between 148885$ and 151220$ if the standard deviation is 1250$.

A. 68,1%. **B**. 95,6%. **C**. 99,7%. **D**. 64,9%.

Câu 7. Find z if the normal curve area to the left of z is 0,1611.

A. -0,88. **B**. -0,99. **C**. -0,44. **D**. -0,77.

Câu 8. Which of the following is always true for a normal distribution.

A. $P(X > 8) = P(X \ge 9)$. **B**. $P(2 \le X \le 8) = P(2 < X < 8)$.

C. $P(X \le 8) = P(X \ge 8)$. **D**. $P(X < 5) \ne P(X \le 5)$.

Câu 9. The time (in year) until the first critical part failure for a certain car is exponentially distributed with a mean of 3,5 years. Find the probability that the time until the first critical part failure is 6 years or more.

A. 0,493383. **B**. 0,229790. **C**. 0,730220. **D**. 0,180092.

Câu 10. Let the density probability function of a random variable X be defined as follows

$$f(x) = \begin{cases} kx^2(1-x), & x \in [0,1] \\ 0 & x \notin [0,1]. \end{cases}$$

Find $P(0.1 < X < 0.6)$.

A. 0.4175. **B**. 0.269. **C**. 0.396. **D**. 0.369.

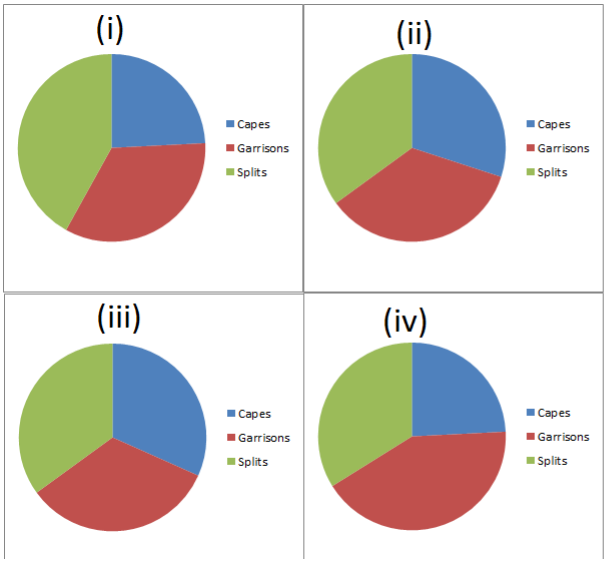
Câu 11. Let

$$f(x) = \begin{cases} \frac{1}{2}x & \text{if } 0 \le x \le 2 \\ 0 & \text{if } x \notin [0,2] \end{cases}$$

be the density probability function of a random variable X. Compute $E[X]$.

A. $E[X] = -\frac{4}{3}$. **B**. $E[X] = \frac{1}{3}$. **C**. $E[X] = 1$. **D**. $E[X] = \frac{4}{3}$.

Câu 12. The following data give the distribution of the types of houses in a town containing 3100 houses. Caps 750, Garrisons: 1050 and Splits: 1300. Construct a pie chart representing the given data set.



A. (ii). **B**. (i). **C**. (iii). **D**. (iv).

Câu 13. A sociologist recently conducted a survey of senior citizens who have net worths too high to qualify for Medicald but have no private health insurance. The ages of the 25 uninsured senior citizens were as follows

69	74	67	77	87
75	62	90	66	91
70	93	77	63	82
64	69	82	71	74
61	88	76	65	83

Find the median of the observations.

A. 75. **B**. 71. **C**. 74,5. **D**. 74.

Câu 14. Use the given sample data to find three quartiles:

$$5, 21, 13, 16, 11, 28, 36, 13, 22.$$

A. 17, 11, 14,5. **B**. 13, 16, 22.
C. 12, 16, 25. **D**. None of the others.

Câu 15. Which of the following statements is false.

(i) If $X_1, X_2, \ldots, X_n$ is a random sample of size n, the sample standard deviation S is not a statistic.

(ii) The probability distribution of a statistic is call a sampling distribution.

(iii) A statistic is any function of the observations in a random sample.

(iv) The sampling distribution of a statistic does not depend on the distribution of the population.

A. (i) and (ii). **B**. (ii) and (iii). **C**. (i) and (iv). **D**. Only (i).

Câu 16. The owner of a fish market has an assistant who has determined that the weights of catfish are normal distributed, with mean of 3,5 pounds and standard deviation of 0,7 pound. If a sample of 64 fish is randomly selected, what is probability that sample mean is more than 3,7 pounds?

A. 0,4987. **B**. 0,0111. **C**. 0,0228. **D**. 0,0001.

Câu 17. Cr batteries produced by company A have a mean life of 3,5 years with a standard deviation of 0,4 years. A similar battery produced by company B has a mean life 3,3 year and a standard deviation 0,3 years. What is the probability that a random sample of 25 batteries from company A with have a mean life at least 0,4 years more than the mean life of a sample of 36 batteries from company B?

A. 1. **B**. 0. **C**. 0,0166. **D**. 0,9834.

Câu 18. Assume that X is a random variable that has the density probability function

$$f(x) = \begin{cases} e^{-x} & \text{if } x \geq 0 \\ 0 & \text{if } x < 0. \end{cases}$$

Find $P(X \leq 2)$?

A. 0,1353. **B**. 0,6321. **C**. 0,8646. **D**. 0,3678.

Câu 19. Assume that X is a random variable that has the density probability function

$$f(x) = \begin{cases} kx(2-x) & \text{với } x \in [0, 2] \\ 0 & \text{otherwise} \end{cases}$$

Find $V(X)$?

A. 0,44. **B**. 0,4. **C**. 0,2. **D**. 0,3.

Câu 20. Assume that X is a normal distribution with $\mu = 3$ and $\sigma^2 = 9$. Find $P(2 < X < 5)$?

A. $P(2 < X < 5) = 0{,}3779$. **B**. $P(2 < X < 5) = 0{,}7486$.
C. $P(2 < X < 5) = 0{,}5303$. **D**. $P(2 < X < 5) = 0{,}7206$.

Câu 21. Suppose that X is a normal distribution with $\mu = 3$ and $\sigma^2 = 9$. Find $P(|X - 3| > 6)$?

A. $P(|X - 3| > 6) = 0{,}7486$.
B. $P(|X - 3| > 6) = 0{,}8413$.
C. $P(|X - 3| > 6) = 0{,}3779$.
D. $P(|X - 3| > 6) = 0{,}0456$.

Câu 22. Let X be a normal distribution with $\mu = 5$ and $\sigma^2 = 4$. Determine such that $P(|X| < a) = 0{,}95$.

A. 8,92. **B**. 8,29. **C**. 6,90. **D**. 6,95.

Câu 23. Let X be a normal distribution with $\mu = 10$ and $\sigma^2 = 4$. Determine $P(X < 12)$.

A. 0,8413. **B**. 0,6915. **C**. 0,5. **D**. 0,9772.

Câu 24. Let X be a normal distribution with $\mu = 10$ and $\sigma^2 = 4$. Determine $P(X < 15|X > 12)$.

A. 0,9609.
B. 0,1587.
C. 0,1525.
D. None of the others.