$W = \text{span}\{(1,1,1),(1,0,-1),(2,1,0)\}$ _____

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
2

Sem2 Statistics2

Section Id :	64065359245
Section Number :	8
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	12
Number of Questions to be attempted :	12
Section Marks :	40
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653122947
Question Shuffling Allowed :	No

Question Number : 161 Question Id : 640653825752 Question Type : MCQ
Correct Marks : 0
Question Label : Multiple Choice Question
THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : SEMESTER II: STATISTICS FOR DATA SCIENCE II (COMPUTER BASED EXAM)"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

(IF IT IS NOT THE CORRECT SUBJECT, PLS CHECK THE SECTION AT THE TOP FOR THE SUBJECTS

REGISTERED BY YOU)

Options :

6406532776598. ✔ YES

6406532776599. ✖ NO

Question Number : 162 Question Id : 640653825753 Question Type : MCQ

Correct Marks : 0

Question Label : Multiple Choice Question

Discrete random variables:

Distribution	PMF ($f_X(k)$)	CDF ($F_X(x)$)	$E[X]$	$\mathrm{Var}(X)$
Uniform(A) $A=\{a,a+1,\dots,b\}$	$\frac{1}{n}$, $x=k$ $n=b-a+1$ $k=a,a+1,\dots,b$	$\begin{cases}0 & x<0\\ \frac{k-a+1}{n} & k\le x<k+1\\ & k=a,a+1,\dots,b-1,b\\ 1 & x\ge n\end{cases}$	$\frac{a+b}{2}$	$\frac{n^2-1}{12}$
Bernoulli(p)	$\begin{cases}p & x=1\\ 1-p & x=0\end{cases}$	$\begin{cases}0 & x<0\\ 1-p & 0\le x<1\\ 1 & x\ge 1\end{cases}$	p	$p(1-p)$
Binomial(n,p)	${}^nC_k p^k(1-p)^{n-k}$, $k=0,1,\dots,n$	$\begin{cases}0 & x<0\\ \sum_{i=0}^{k} {}^nC_i p^i(1-p)^{n-i} & k\le x<k+1\\ & k=0,1,\dots,n\\ 1 & x\ge n\end{cases}$	np	$np(1-p)$
Geometric(p)	$(1-p)^{k-1}p$, $k=1,\dots,\infty$	$\begin{cases}0 & x<0\\ 1-(1-p)^k & k\le x<k+1\\ & k=1,\dots,\infty\end{cases}$	$\frac{1}{p}$	$\frac{1-p}{p^2}$
Poisson(λ)	$\frac{e^{-\lambda}\lambda^k}{k!}$, $k=0,1,\dots,\infty$	$\begin{cases}0 & x<0\\ e^{-\lambda}\sum_{i=0}^{k}\frac{\lambda^i}{i!} & k\le x<k+1\\ & k=0,1,\dots,\infty\end{cases}$	λ	λ

Continuous random variables:

Distribution	PDF ($f_X(k)$)	CDF ($F_X(x)$)	$E[X]$	$\mathrm{Var}(X)$
Uniform$[a,b]$	$\frac{1}{b-a}$, $a\le x\le b$	$\begin{cases}0 & x\le a\\ \frac{x-a}{b-a} & a<x<b\\ 1 & x\ge b\end{cases}$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$
Exp(λ)	$\lambda e^{-\lambda x}$, $x>0$	$\begin{cases}0 & x\le 0\\ 1-e^{-\lambda x} & x>0\end{cases}$	$\frac{1}{\lambda}$	$\frac{1}{\lambda^2}$
Normal(μ,σ^2)	$\frac{1}{\sigma\sqrt{2\pi}}\exp\left(\frac{-(x-\mu)^2}{2\sigma^2}\right)$, $-\infty<x<\infty$	No closed form	μ	σ^2
Gamma(α,β)	$\frac{\beta^\alpha}{\Gamma(\alpha)}x^{\alpha-1}e^{-\beta x}$, $x>0$		$\frac{\alpha}{\beta}$	$\frac{\alpha}{\beta^2}$
Beta(α,β)	$\frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)}x^{\alpha-1}(1-x)^{\beta-1}$ $0<x<1$		$\frac{\alpha}{\alpha+\beta}$	$\frac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$

- **Markov's inequality:** Let X be a discrete random variable taking non-negative values with a finite mean μ. Then,

$$P(X\ge c)\le\frac{\mu}{c}$$

- **Chebyshev's inequality:** Let X be a discrete random variable with a finite mean μ and a finite variance σ^2. Then,

$$P(|\,X-\mu\,|\ge k\sigma)\le\frac{1}{k^2}$$

Options :

6406532776600. ✔ Useful Data has been mentioned above.

6406532776601. ✖ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number : 2

Sub-Section Id : 640653122948

Question Shuffling Allowed : Yes

Question Number : 163 Question Id : 640653825754 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

Suppose that the number of miles that a car can run before its battery wears out is exponentially distributed, with an average value of 10,000 miles. If you desire to take a 5,000-mile trip, what is the probability that you will be able to complete the trip without replacing the car battery?

Options :

6406532776602. ✖ $\frac{1}{10000}\exp\left(\frac{-5000}{10000}\right)$

6406532776603. ✖ $10000\exp(-5000 * 10000)$

6406532776604. ✖ $1-\exp\left(\frac{-5000}{10000}\right)$

6406532776605. ✔ $\exp\left(\frac{-5000}{10000}\right)$

Question Number : 164 Question Id : 640653825756 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

Consider a random variable X that takes integer values from 1 to 10 with equal probability 1/10. Define another random variable $Y = X$ modulo 4. Find the PMF of Y.

Options :

6406532776607. ✔

y	0	1	2	3
$P(Y=y)$	1/5	3/10	3/10	1/5

6406532776608. ✖

y	0	1	2	3	4
$P(Y=y)$	1/5	1/5	1/5	1/10	3/10

6406532776609. ✖

y	0	1	2	3
$P(Y=y)$	1/2	1/5	1/5	1/10

6406532776610. ✖

y	1	2	3	4
$P(Y=y)$	3/10	3/10	1/5	1/5

Question Number : 165 Question Id : 640653825757 Question Type : MCQ
Correct Marks : 3
Question Label : Multiple Choice Question

Consider n bits $X_1, \ldots, X_n$, where each bit is equally likely to be 0 or 1, and is independent of all other bits. Define $n-1$ bits $Y_i = X_i X_{i+1}$, $i = 1, \ldots, n-1$. Let N_X and N_Y be, respectively, the number of 1s in $\{X_1, \ldots, X_n\}$ and $\{Y_1, \ldots, Y_{n-1}\}$. Assuming $n = 100$, what is the expected value of N_X and N_Y?

Options :

6406532776611. ✖ $E(N_X) = 50, E(N_Y) = 49.5$

6406532776612. ✔ $E(N_X) = 50, E(N_Y) = 24.75$

6406532776613. ✖ $E(N_X) = 100, E(N_Y) = 50$

6406532776614. ✖ $E(N_X) = 100, E(N_Y) = 99$

Sub-Section Number : 3
Sub-Section Id : 640653122949
Question Shuffling Allowed : Yes

Question Number : 166 Question Id : 640653825755 Question Type : SA
Correct Marks : 3
Question Label : Short Answer Question

A teacher observes that the cumulative distribution function (CDF) for the scores on a mathematics test is

$$F(x) = \begin{cases} 0, & x < 0 \\ x^2, & 0 \le x \le 1 \\ 1, & x > 1 \end{cases}$$

for $0 \le x \le 1$, where x is the score normalized to 1. If a student scores above 0.7, what is the conditional probability that they actually score above 0.9? Enter the answer correct to two decimal places.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
0.35 to 0.39

Sub-Section Number :	4
Sub-Section Id :	640653122950
Question Shuffling Allowed :	Yes

Question Number : 167 Question Id : 640653825758 Question Type : MSQ
Correct Marks : 3 Max. Selectable Options : 0
Question Label : Multiple Select Question

The joint PMF of two discrete random variables X and Y is given by

Y \ X	0	1	2	$P(Y=y)$
0	1/4	1/6	1/6	7/12
1	1/6	1/8	1/8	5/12
$P(X=x)$	5/12	7/24	7/24	1

Select the correct options from the following.

Options :

6406532776615. ✔ $P(X=Y)=\frac{3}{8}$

6406532776616. ✖ $P(X=2,Y=1)=\frac{1}{6}$

6406532776617. ✔ $P(X\leq 2,Y=0)=\frac{7}{12}$

6406532776618. ✖ $P(X\leq 2,Y=0)=\frac{1}{3}$

Sub-Section Number :	5
Sub-Section Id :	640653122951

Question Shuffling Allowed : No

Question Id : 640653825759 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Question Numbers : (168 to 169)

Question Label : Comprehension

Let X be a continuous random variable with the following PDF:

$$f_X(x) = \begin{cases} cx^2(1-x) & 0 \le x \le 1 \\ 0 & \text{otherwise} \end{cases}$$

Based on the above data, answer the given subquestions

Sub questions

Question Number : 168 Question Id : 640653825760 Question Type : SA

Correct Marks : 2

Question Label : Short Answer Question

Find the value of c so that $f_X(x)$ is a valid PDF.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

12

Question Number : 169 Question Id : 640653825761 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

Calculate the CDF of X.

Options :

$$F_X(x) = \begin{cases} 0, & \text{for } x < 0 \\ 4x^3 - 3x^4, & \text{for } 0 \le x < 1 \\ 1, & \text{for } x \ge 1 \end{cases}$$

6406532776620. ✔

$$F_X(x) = \begin{cases} 0, & \text{for } x < 0 \\ \frac{1}{12}\left(\frac{x^3}{3} - \frac{x^4}{4}\right), & \text{for } 0 \le x < 1 \\ 1, & \text{for } x \ge 1 \end{cases}$$

6406532776621. ✖

$$F_X(x) = \begin{cases} 0, & \text{for } x < 0 \\ 24x - 36x^2, & \text{for } 0 \leq x < 1 \\ 1, & \text{for } x \geq 1 \end{cases}$$

6406532776622.

$$F_X(x) = \begin{cases} 0, & \text{for } x < 0 \\ \frac{x}{6} - \frac{x^2}{4}, & \text{for } 0 \leq x < 1 \\ 1, & \text{for } x \geq 1 \end{cases}$$

6406532776623.

Question Id : 640653825762 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Question Numbers : (170 to 171)

Question Label : Comprehension

In a new game designed by a developer, players can choose between two character types: warrior and mage, with probabilities of selection being 0.4 and 0.6, respectively. Players then choose between two types of equipment: a sword or a staff. If a player chooses the warrior character, there is a 0.3 chance that they will select a sword, whereas if they choose the mage character, there is a 0.5 chance they will select a staff.

Based on this information, answer the given sub questions.

Sub questions

Question Number : 170 Question Id : 640653825763 Question Type : SA Correct Marks : 3

Question Label : Short Answer Question

What is the probability that a player will choose a character equipped with a sword? Enter the answer correct to two decimal places.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

0.39 to 0.45

Question Number : 171 Question Id : 640653825764 Question Type : SA
Correct Marks : 2
Question Label : Short Answer Question

What is the probability that a player chooses a warrior character with the staff?

Enter the answer correct to two decimal places.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
0.25 to 0.31

Question Id : 640653825765 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix
Question Numbers : (172 to 173)
Question Label : Comprehension

A company has scheduled interviews for job applicants, and 40 people have confirmed their interview slots. Each applicant independently attends the interview with a probability $p = 3/4$. Let X denote the number of people who actually attend the interview.

Based on the above data, answer the given subquestions
Sub questions

Question Number : 172 Question Id : 640653825766 Question Type : MSQ
Correct Marks : 3 Max. Selectable Options : 0
Question Label : Multiple Select Question

Using Markov inequality, find an upper bound to the probability $P(X \geq 35)$.
Which values below are greater than or equal to that upper bound?

Options :
6406532776626. ✔ 0.86
6406532776627. ✖ 0.086
6406532776628. ✖ 0.75
6406532776629. ✔ 0.90

Question Number : 173 Question Id : 640653825767 Question Type : SA
Correct Marks : 2
Question Label : Short Answer Question

Using Chebyshev's inequality, find an upper bound to the probability that at least 35 people attended the interview. Enter the answer correct to one decimal place.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
0.3

Question Id : 640653825768 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix
Question Numbers : (174 to 175)
Question Label : Comprehension

An urn contains 20 white balls and 12 red balls. 2 balls are selected at random. Let X denote the number of red balls drawn and let Y denote the number of white balls drawn.

Based on the above data, answer the given subquestions
Sub questions

Question Number : 174 Question Id : 640653825769 Question Type : SA
Correct Marks : 2
Question Label : Short Answer Question

Find the probability $P(X = 1, Y = 1)$. Enter the answer correct to two decimal places.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
0.46 to 0.50

Question Number : 175 Question Id : 640653825770 Question Type : SA
Correct Marks : 3
Question Label : Short Answer Question

Find the expected value of X.
Enter the answer correct to two decimal places.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
0.73 to 0.77

Question Id : 640653825771 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix
Question Numbers : (176 to 177)
Question Label : Comprehension

Let $X_1, X_2, X_3 \sim$ i.i.d. Binomial$(5, 0.5)$. Based on this information, answer the given subquestions.

Sub questions

Question Number : 176 Question Id : 640653825772 Question Type : MCQ
Correct Marks : 2
Question Label : Multiple Choice Question

What is the probability that exactly one out of the three random variables takes value greater than 4?

Options :

6406532776633. ✖ $3 \times {}^5C_4(0.5)^5[1 - {}^5C_4(0.5)^5]^2$

6406532776634. ✔ $3 \times (0.5)^5[1 - (0.5)^5]^2$

6406532776635. ✖ $3 \times (0.5)^5$

6406532776636. ✖ $3 \times [{}^5C_4(0.5)^5]^3$

Question Number : 177 Question Id : 640653825773 Question Type : SA

Correct Marks : 3

Question Label : Short Answer Question

Find the probability $P(\max(X_1, X_2, X_3) > 4)$.
Enter the answer correct to three decimal places.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

0.089 to 0.093

AppDev1

Section Id :	64065359246
Section Number :	9
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	17
Number of Questions to be attempted :	17
Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653122952
Question Shuffling Allowed :	No

Question Number : 178 Question Id : 640653825774 Question Type : MCQ

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : MODERN APPLICATION DEVELOPMENT I (COMPUTER BASED EXAM)"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?