Midterm (MT2013-211-session 1)

UNIVERSITY OF TECHNOLOGY - VNUHCM
Faculty of Applied Science
Department of Applied Mathematics

MT2013 - Probability and Statistics - SEMESTER 211

MIDTERM EXAM (SESSION 1)

Date: October 9, 2021. Time: 9:00
Duration: 40 minutes
INTRODUCTION:

- Students are NOT allowed to use any software/electrical devices during the exam, except their pocket calculators, printed/written documents, camera and a computer/laptop (for doing the exam). This means that students are NOT allowed to open any pdf file. The table of statistical distributions will be provided in the exam.
- Do not round in between steps. Round your final answers to four decimal places (e.g. 5.1234).
- Students are allowed to try only one time on each question. Students must fill in answer boxes or choose correct answers, then submit their answers on time (Do not wait until the very last minute). The maximum score: 100 points.
- Students must have their camera to be turned on and show their face during the exam. On their screen, there must be one big window for BKEL, one small window for Google!Meeting showing their face (put at a corner of the screen), and another small window Google!Meeting for recording (showing the list of participants).

1. (0 pts)

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Your full name: _____

Your student ID: _____

If you have any concern about some questions of the exam, please discuss it in the box below and send your instructors an email after the exam.

Below are some statistical tables. Please click [+] for more details.

Statistical Tables   [+]

2. (30 pts)

A factory has four assembly lines, which manufacture the same products. The following table includes the contribution of these assembly lines to the total output of the factory and the percentages of defective parts produced by them.

The contribution of each assembly line to the total output $P(D_i)$	Assembly line	The percentage of NON-defective (N) parts produced by each assembly line $P(N|D_i)$
27 %	D_1	90 %
32 %	D_2	87 %
30 %	D_3	85 %
11 %	D_4	92 %

1. Compute the probability that randomly selected part is NON-defective.
   Answer: _____
2. Select a part at random for inspection. If this part is defective, what is the probability that it was produced by assembly line D_1?
   Answer: _____
3. Select randomly a sample of 12 parts produced by assembly line D_3. Compute the probability that there are exactly 4 defective parts among 12 selected parts and the average number of defective parts in the sample.
   The probability: _____
   The average number of defective: _____

3. (30 pts)

Assume that a company's products are sold in packages of 4 products and the number of defective products in each package has the following distribution:

X	0	1	2	3	4
P	0.15	0.25	0.21	0.23	c

1. Find c.
   Answer: $c =$ _____
2. Compute the mean and the standard deviation of the number of defective products in one package.
   Answer: $E(X) =$ _____
   Answer: $\sigma(X) =$ _____
3. Assume that the numbers of defective products in the packages are independent. Find the probability that the total number of defective products in 501 packages is more than 943 products.
   Answer: _____

4. (20 pts)

Suppose that the number of telephone calls received by the customer service department of a company in an hour is a random variable X following a Poisson distribution with the average of 23 calls every hour, and the number of emails received by the same department in an hour is a random variable Y following a Poisson distribution with the average of 42 emails every hour.

1. Compute the probability that this department receives exactly 21 telephone calls in one hour.
   Answer: _____
2. Suppose further that X and Y are independent. Calculate the standard deviation of the total number of responses (via email or telephone) received by this department in 17 minutes.
   Answer: _____

5. (20 pts)

Let X be a random variable with the density function satisfying $f(x) = cx^2$ for all $x \in (0, 3.5)$ and $f(x) = 0$ for all $x \notin (0, 3.5)$, where c is a constant.

1. Find c.
   Answer: _____
2. Calculute the expectation $E(X^3)$.
   Answer: _____
3. Calculate the probability $P(X < 2.1 | X < 2.5)$.
   Answer: _____

+++++++++++++++
Key - Form 1

1. ~ ~ ~
2. 0.8776 ~ 0.22058823529412 ~ 0.068284422509008 ~ 1.8
3. 2 ~ 1.3114877048604 ~ [0.975,0.978] ~ 0.16
4. 0.079280715504883 ~ 4.2914643965279
5. 0.06997084548105 ~ 21.4375 ~ 0.592704

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Midterm (MT2013-211-make-up)

UNIVERSITY OF TECHNOLOGY - VNUHCM
Faculty of Applied Science
Department of Applied Mathematics

MT2013 - Probability and Statistics - SEMESTER 211

MIDTERM EXAM (Make-up)

Date: October 21, 2021. Time: 18:30
Duration: 40 minutes
INTRODUCTION:

- Students are NOT allowed to use any software/electrical devices during the exam, except their pocket calculators, printed/written documents, camera and a computer/laptop (for doing the exam). This means that students are NOT allowed to open any pdf file. The table of statistical distributions will be provided in the exam.
- Do not round in between steps. Round your final answers to four decimal places (e.g. 5.1234).
- Students are allowed to try only one time on each question. Students must fill in answer boxes or choose correct answers, then submit their answers on time (Do not wait until the very last minute). The maximum score: 100 points.
- Students must have their camera to be turned on and show their face during the exam. On their screen, there must be one big window for BKEL, one small window for Google!Meeting showing their face (put at a corner of the screen), and another small window Google!Meeting for recording (showing the list of participants).

1. (0 pts)

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Your full name: _____

Your student ID: _____

If you have any concern about some questions of the exam, please discuss it in the box below and send your instructors an email after the exam.

Below are some statistical tables. Please click [+] for more details.

  Statistical Tables   [+]

2. (20 pts)

69% of the light aircraft that disappear while in flight in a region are subsequently discovered. Of the aircraft that are discovered, 59% have an emergency locator, whereas 11% of the aircraft not discovered do not have such a locator. Suppose a light aircraft has disappeared.

  1. If it has an emergency locator, what is the probability that it will not be discovered?
     Answer : _____
  2. What is the probability that it it has an emergency locator?
     Answer : _____

3. (30 pts)

A video game company conducts a survey about the number of minutes it tooks players to complete each level in a released game. The company notes that the time it takes to complete level I is a random variable X_1, which follows a normal distribution with the mean of 54.6 minutes and the standard deviation of 12.4 minutes.

1. Compute the probability that a randomly chosen player needs more than 56.1 minutes to complete level I of the game.
   Answer: _____
2. The company wants to determine the time t_0 such that 95% of players need less than t_0 minutes to complete level I of the game. What is t_0?
   Answer: _____
3. Suppose that there are 3 levels in this game, and X_2 and X_3 are the numbers of minutes required to complete level II and level III of the game respectively. Suppose further that $X_2 \sim N(46.6, 14.9^2)$ and $X_3 \sim N(52.4, 15.3^2)$, and the variables X_1, X_2, and X_3 are independent. Compute the expectation and the standard deivation of the total number of minutes that a randomly chosen player needs to complete all three levels.
   The expectation: _____ (minutes)
   The standard deviation: _____ (minutes)

4. (25 pts)

In preparation for student assessment, a math teacher recorded the number of absences (X) of his students and the results are give in the following table:

X	0	1	3	4	5
P	0.64	0.13	0.06	?	?

1. Given that $E(X) = 1.08$, compute the probabilities $P(X = 4)$ and $P(X = 5)$.
   Answer: $P(X = 4) =$ _____.
   Answer: $P(X = 5) =$ _____.
2. Randomly select a student in this class. Compute the probability that this student is absent for at most 1 class meeting.
   Answer: _____.
3. If the randomly chosen student is absent for less than 3 meetings, calculate the probability that this student misses exactly 1 meeting.
   Answer: _____

5. (25 pts)

A skilled worker requires at least 9 minutes and less than 21 minutes to complete an ordinary task. Let X be the time (minutes) that a skilled worker need to complete an ordinary task. The density function of X is given as below.

$f(x) = \frac{c}{x^2}$ if $9 \leq x \leq 21$ and $f(x) = 0$ elsewhere, where c is a constant.

1. Find c.
   Answer: _____
2. Find the probability that a skilled worker need less than 14 minutes to complete an ordinary task.
   Answer: _____

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Key - Form 1

1. ~ ~ ~
2. 0.077289211242067 ~ 0.4412
3. [0.451,0.452] ~ [74.812,75.06] ~ 153.6 ~ 24.695343690664
4. 0.08 ~ 0.09 ~ 0.77 ~ 0.1566265060241
5. 15.75 ~ 0.625

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Midterm (MT2013-211-session 1)

UNIVERSITY OF TECHNOLOGY - VNUHCM
Faculty of Applied Science
Department of Applied Mathematics

MT2013 - Probability and Statistics - SEMESTER 211

MIDTERM EXAM (SESSION 1)

Date: October 9, 2021. Time: 9:00
Duration: 40 minutes
INTRODUCTION:

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Below are some statistical tables. Please click [+] for more details.

Statistical Tables   [+]

2. (30 pts)

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The contribution of each assembly line to the total output $P(D_i)$	Assembly line	The percentage of NON-defective (N) parts produced by each assembly line $P(N|D_i)$
27 %	D_1	90 %
32 %	D_2	87 %
30 %	D_3	85 %
11 %	D_4	92 %

1. Compute the probability that randomly selected part is NON-defective.
   Answer: _____
2. Select a part at random for inspection. If this part is defective, what is the probability that it was produced by assembly line D_1?
   Answer: _____
3. Select randomly a sample of 12 parts produced by assembly line D_3. Compute the probability that there are exactly 4 defective parts among 12 selected parts and the average number of defective parts in the sample.
   The probability: _____
   The average number of defective: _____

3. (30 pts)

Assume that a company's products are sold in packages of 4 products and the number of defective products in each package has the following distribution:

X	0	1	2	3	4
P	0.15	0.25	0.21	0.23	c

1. Find c.
   Answer: $c =$ _____
2. Compute the mean and the standard deviation of the number of defective products in one package.
   Answer: $E(X) =$ _____
   Answer: $\sigma(X) =$ _____
3. Assume that the numbers of defective products in the packages are independent. Find the probability that the total number of defective products in 501 packages is more than 943 products.
   Answer: _____

4. (20 pts)

Suppose that the number of telephone calls received by the customer service department of a company in an hour is a random variable X following a Poisson distribution with the average of 23 calls every hour, and the number of emails received by the same department in an hour is a random variable Y following a Poisson distribution with the average of 42 emails every hour.

1. Compute the probability that this department receives exactly 21 telephone calls in one hour.
   Answer: _____
2. Suppose further that X and Y are independent. Calculate the standard deviation of the total number of responses (via email or telephone) received by this department in 17 minutes.
   Answer: _____

5. (20 pts)

Let X be a random variable with the density function satisfying $f(x) = cx^2$ for all $x \in (0, 3.5)$ and $f(x) = 0$ for all $x \notin (0, 3.5)$, where c is a constant.

1. Find c.
   Answer: _____
2. Calculate the expectation $E(X^3)$.
   Answer: _____
3. Calculate the probability $P(X < 2.1 | X < 2.5)$.
   Answer: _____

++++++++++++++++
Key - Form 1

1. ~ ~ ~
2. 0.8776 ~ 0.22058823529412 ~ 0.068284422509008 ~ 1.8
3. 2 ~ 1.3114877048604 ~ [0.975,0.978] ~ 0.16
4. 0.079280715504883 ~ 4.2914643965279
5. 0.06997084548105 ~ 21.4375 ~ 0.592704

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Midterm (MT2013-211-session 2)

UNIVERSITY OF TECHNOLOGY - VNUHCM
Faculty of Applied Science
Department of Applied Mathematics

MT2013 - Probability and Statistics - SEMESTER 211

MIDTERM EXAM (SESSION 2)

Date: October 9, 2021. Time: 11:00
Duration: 40 minutes
INTRODUCTION:

- Students are NOT allowed to use any software/electrical devices during the exam, except their pocket calculators, printed/written documents, camera and a computer/laptop (for doing the exam). This means that students are NOT allowed to open any pdf file. The table of statistical distributions will be provided in the exam.
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1. (0 pts)

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Your full name: _____

Your student ID: _____

If you have any concern about some questions of the exam, please discuss it in the box below and send your instructors an email after the exam.

Below are some statistical tables. Please click [+] for more details.

Statistical Tables   [+]

2. (20 pts)

Consider a game which is simplified from a Vietnamese traditional game. To start this game, a kid must throw a stone into the goal region, which consists of a circle and a square with a radius of 50 cm.
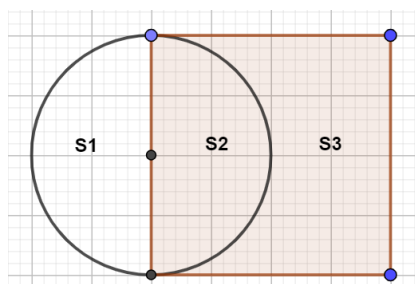
1. Find the probability that the kid's stone fell into the circle, given that the stone was in the goal region.
   Answer: _____
2. If the assigned scores are given as below:
   $S1 = 1$, $S2 = 5$, and $S3 = 3$ (see the figure), find the average score that a kid can earn in one throw.
   Answer: _____

3. (30 pts)

In a product quality inspection, products are tested in two rounds. A product is qualified if it has a rating of 1 or 2, and it is not qualified if it has a rating of 0. The following is the joint probability distribution:

		Round 1 (X)		
		0	1	2
Round 2 (Y)	0	0.125	0.121	0.013
	1	0.048	0.049	0.095
	2	0.058	0.29	0.201

1. If a product is randomly chosen, find the probability that this product is evaluated as qualified in both rounds.
   Answer: _____
2. If a product is randomly chosen, find the probability that this product is evaluated as qualified in the second round given that it is not qualified in the first round.
   Answer: _____
3. Compute $E(XY)$.
   Answer: _____

4. (20 pts)

A skilled worker requires at least 10 minutes and less than 24 minutes to complete an ordinary task. Let X be the time (minutes) that a skilled worker need to complete an ordinary task. The density function of X is given as below.

$f(x) = \frac{c}{x^2}$ if $10 \leq x \leq 24$ and $f(x) = 0$ elsewhere, where c is a constant.

1. Find c.
   Answer: _____
2. Find the probability that a skilled worker need less than 19 minutes to complete an ordinary task.
   Answer: _____

5. (30 pts)

A motorcycle manufacturer observes that the fuel efficiency of their brand A motorcycles (X_A) is normally distributed with a mean of 2.05 (litres/100km) and a standard deviation of 1.05 (liters/100km).

1. Find the proportion of motorcycles that the fuel efficiencies are less than 3.1 (litres/100km).
   Answer: _____
2. A motorcycle is qualified if its fuel efficiency is less than 3.1 (litres/100km). If this manufacturer is surveying 19 motorcycles, find the probability that there are at least 18 of them to be qualified.
   Answer: _____
3. This manufacturer also conducted a survey on motorcycles of brand B (X_B). Suppose that X_B also follows a normal distribution, which is $X_B \sim N(2.89, 0.54)$, and fuel efficiencies of these two motorcycle brands are independent. Let $Y = X_A - X_B$, compute $P(Y > 0)$.
   Answer: _____

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Key - Form 1

1. ~ ~ ~
2. 0.56393960024693 ~ 3
3. 0.635 ~ 0.45887445887446 ~ 1.623
4. 17.142857142857 ~ 0.81203007518797
5. 0.8413 ~ 0.17191770201137 ~ 0.2546

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UNIVERSITY OF TECHNOLOGY - VNUHCM
Faculty of Applied Science
Department of Applied Mathematics

MT2013 - Probability and Statistics - SEMESTER 212

MIDTERM EXAM (SESSION 1)

Date: March 6, 2022. Time: 12:00
Duration: 40 minutes
INSTRUCTIONS:

- Students are NOT allowed to use any software/electrical devices during the exam, except their pocket calculators, printed/written documents, camera and a computer/laptop (for doing the exam). This means that students are NOT allowed to open any pdf file. The table of statistical distributions is provided in the exam.
- Do not round in between steps. Round your final answers to four decimal places (e.g. 5.1234).
- Students are allowed to try only one time on each question. Students must fill in answer boxes or choose correct answers, then submit their answers on time (Do not wait until the very last minute). The maximum score: 100 points.
- You must have your camera to be turned on and show your face during the exam. You must also record the screen of your laptop/computer during the exam (Click here to know how to do it). On your screen, there must be two windows:
    - one big window for BKEX (to do the exam)
    - one small window for Google!Meeting (checking attendance)
- After the exam, you must upload the recorded video (.mp4, small resolution, less than 1GB) to your Google!Drive account and fill in a Google!form with the link (Do not send the file).
- If you get caught cheating, your score will be zero and the event will be reported to the Academic Affairs Office.

1. (0 pts)

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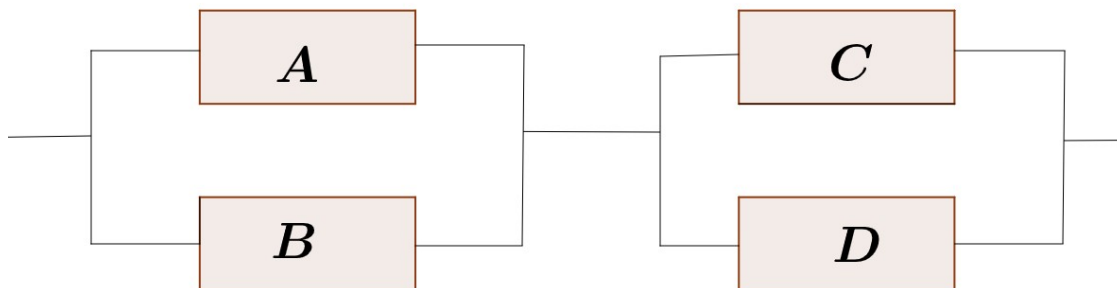
Your full name:

Your student ID:

If you have any concern about some questions of the exam, please discuss it in the box below and send your instructors an email after the exam.

Below are some statistical tables. Please click [+] for more details.

Statistical Tables

2. (30 pts)

An electrical system consists of four components illustrated in the figure. The circuit operates if and only if there is a path of functional devices from left to right. Let A, B, C and D represent the events that the corresponding devices function and the probabilities are given by

$P(A)=0.95, P(B)=0.9, P(C)=0.95, P(D)=0.9$.

Assume that the devices function independently.

   a. Find the probability that the device A functions but the device B does not.

       Answer: .

b. Find the probability that the device *A* or the device *B* or both function.

Answer: .

c. Find the probability that the circuit operates.

Answer: .

d. It is known that the circuit is operating, find the probability that the device *A* is functional.

Answer: .

3. (20 pts)

The number of stork sightings on a route in South Carolina per year follows a Poisson distribution with a mean of 3.

a. What is the probability that there are exactly 3 sightings within 8 months?

Answer:

b. What is the mean time between two consecutive sightings?

Answer: (years)

c. What is the probability that the time until the first sighting is more than 2 months?

Answer:

4. (30 pts)

A dealer's profit, in units of $1000, on a new automobile is a random variable *X* having density function

$$f(x)=\begin{cases}(2-x)/2, \text{ if } 0<x<2,\\ 0, \text{ elsewhere.}\end{cases}$$

a. Find the expectation and the variance of the dealer's profit.

The expectation = (dollars)

The variance = (square dollars)

b. What is the probability that the profit does not exceed $200?

Answer: .

c. Select 68 new automobiles randomly and independently. Find the probability that the average profit of the dealer on these automobiles will be more than $740.

Answer:

5. (20 pts)

The lifetime of a semiconductor laser at a constant power is normally distributed with a mean of 6650 hours and a standard deviation of 600 hours.

a. What is the probability that a laser fails before 6250 hours?

b. If 5 lasers are used in a product and they are assumed to fail independently, find the standard deviation of the average lifetime of these lasers.

   (hours)

c. If 5 lasers are used in a product and they are assumed to fail independently, what is the probability that there are exactly 2 lasers failing before 6250 hours?

++++++++++++++

Key - Form 1

1. ~ ~ ~
2. 0.095 ~ 0.995 ~ 0.990025 ~ 0.95477386934673
3. 0.18044704431548 ~ 0.33333333333333 ~ 0.60653065971263
4. 666.66666666667 ~ 222222.22222222 ~ 0.19 ~ [0.09,0.11]
5. [0.2514,0.2546] ~ 268.32815729997 ~ [0.265,0.269]

Make-up exam 212

1. (0 pts)

Your full name:

Your student ID:

If you have any concern about some questions of the exam, please discuss it in the box below and send your instructors an email after the exam.

Below are some statistical tables. Please click [+] for more details.

Statistical Tables

2. (25 pts)

Glass tubes are shipped in the laboratory, each was shipped in one of three boxes: small, medium, and large. Assume that there were 2% , 3% , 1% glass tubes broken during transportation corresponding to the above three types of boxes. It is known that there were 49% tubes shipped in small boxes and 35% shipped in medium boxes.

a) If we choose a tube randomly, find the probability that this tube was shipped in a large box.

Answer: .

b) Find the probability that there was a broken tube during the transportation.

Answer: .

c) Find the probability that a tube was shipped in a medium box given that this tube was broken.

Answer: .

3. (20 pts)

The joint probability distribution of two discrete random variables X and Y is given by $f(x,y)=c\,x\,y$, where $x=2,4,5$, $y=2,3,4$ and $f(x,y)=0$ for any others pairs of (x,y) .

a) Find the constant c .

Answer:

b) Compute $P(X=4\mid Y=2)$

Answer:

c) Compute $E(XY)$.

Answer:

4. (30 pts)

Assume that the number of cars that cross a walking line in each one second is a Poisson random variable with an average of 0.37. A person reaches the walking line at the time $t0$. Assume that this person can only cross the street if no cars crosses the walking line for at least 6 seconds, otherwise he must wait.

1. Find the probability that this person must wait.

Answer:

2. Let T be the duration (seconds) between two successive cars that crossed the walking line. It is known that T follows an exponential distribution with $\lambda=¿\ 0.37$. Compute the mean and the standard deviation of T.

Answer: $E(T)=¿$ (seconds); $V(T)=¿$ ($second^2$)

3. Compute the average number of cars that had crossed the walking line until this person can cross the street.

Hint: $\sum_{k=0}^{\infty} k\,a^{k-1}=\dfrac{1}{(1-a)^2}$, with $a<1$.

Answer: (cars)

5. (25 pts)

Assume that the vitamin C content in each 100g can of tomato juice follows a normal distribution with the mean $\mu=34.1$ (mg) and the standard deviation $\sigma=2.4$ (mg).

a) Find the probability that a randomly selected can contains vitamin C greater than 36.2 mg .
Answer:

b) Find the vitamin C content threshold (mg) that 24% of the tomato juice cans has the vitamin C content greater than this threshold.

Answer:

c) Suppose that the vitamin C contents are independent between cans. Find the probability that, in 10 randomly selected cans, there are exactly 3 cans that contain vitamin C greater than 36.2 mg.

Answer:

++++++++++++++

Key - Form 1

1. ~ ~ ~
2. 0.16 ~ 0.0219 ~ 0.47945205479452
3. 0.01010101010101 ~ 0.36363636363636 ~ 13.181818181818
4. 0.89139089117504 ~ 2.7027027027027 ~ 7.3046018991965 ~ 8.2073308658822
5. [0.18,0.2] ~ [35.78,35.804] ~ [0.174,0.202] ~ ~

	Midterm Exam	Semester/Acad. year	1	2022-2023
		Date		October 23rd, 2022
UNIVERSITY OF TECHNOLOGY - VNUHCM	Course title	Probability and Statistics		
Faculty of Applied Science	Course ID	MT2013		
	Duration	50 minutes	Question sheet code	2211

Instructions to students:

- *You are allowed to use your OWN materials and calculator.   Total available score: 10.*
- *At the beginning of the working time, you MUST fill in your full name and student ID on this question sheet. There are 20 questions on 2 pages. Do not round between steps. Round your final answers to 4 decimal places.*

Student's full name: ....   Invigilator 1: ....

Student Id: ....   Invigilator 2: ....

Questions 1 through 4. We load on a plane 39 packages whose weights are independent random variables that are uniformly distributed between 5.9 and 23.3 pounds.

1. Find the mean of the total weight which is loaded by this plane.

   (A) 564.8   (B) 565.3   (C) 573.2   (D) 560.2   (E) 569.4

2. Find the standard deviation of the total weight which is loaded by this plane.

   (A) 22.1869   (B) 31.3683   (C) 35.6333   (D) 26.883   (E) 29.9387

3. What is the probability that the total weight will exceed 588.5 pounds?

   (A) 0.2713   (B) 0.0429   (C) 0.7374   (D) 0.5699   (E) 0.7519

4. Suppose that the weight of packages loaded on all planes are independent and normally distributed with the mean of 26.9 (pound) and the variance of 44.93 (pound^2). Determine a weight value such that 20 percent of packages loaded on all planes are heavier than this value.

   (A) 32.5305   (B) 43.8766   (C) 39.4636   (D) 48.6691   (E) 28.3621

Questions 5 through 8.

Quizzes at the end of each lecture in a Calculus course contain either 1 or 2 questions with equal probability. Suppose that student A gives an incorrect answer for a question with probability 0.69, independently of other questions.

5. What is the probability that student A gives incorrect answers to all questions of a quiz?

   (A) 0.7677   (B) 0.7275   (C) 0.5831   (D) 0.7075   (E) 0.457

6. If student A gave incorrect answers to all the questions of a quiz, what is the probability that the quiz contains 2 questions?

   (A) 0.7723   (B) 0.3771   (C) 0.5917   (D) 0.5161   (E) 0.7757   (F) 0.4082

7. Let X be the number of questions in a quiz and Y be the number of questions answered incorrectly by student A in that quiz. Compute $E(XY)$.

   (A) 1.725   (B) 1.48   (C) 0.74   (D) 1.2   (E) 2.75

8. What is the variance of Y?   Ⓐ 1.1678   Ⓑ 0.7051   Ⓒ 1.7112   Ⓓ 0.9877   Ⓔ 0.4399

Questions 9 through 12.

The duration of the independent interval times between two successive cars on the Trans-Australian Highway is modeled by an exponential distribution with the mean of 0.9 minutes.

9. Find the average number of cars passing the Highway within 5 minutes.

   Ⓐ 0.4   Ⓑ 6.6   Ⓒ 4.6   Ⓓ 5.5556   Ⓔ 4.5

10. It is known that the duration of time between two successive cars on the Highway is at least 20 **seconds**. Find the probability that the duration of time between two successive cars on the Highway is less than 21 **seconds**.

    Ⓐ 0.0183   Ⓑ 0.8395   Ⓒ 0.1364   Ⓓ 0.7955   Ⓔ 0.678

11. Determine the duration of time (second) in which there is no car passing the Highway with probability 0.5.

    Ⓐ None of the others   Ⓑ 38.3733   Ⓒ 37.3271   Ⓓ 37.5355   Ⓔ 37.4299

12. An old wombat requires 28 seconds to cross the highway, and he starts out immediately after a car goes by. What is the probability that he will survive?

    Ⓐ 0.7851   Ⓑ None of the others   Ⓒ 0.6565   Ⓓ 0.5954   Ⓔ 0.0306

Questions 13 through 16.

The diameter of a particle of contamination (in micrometers) is modeled by the cumulative distribution function: $F(x) = \begin{cases} 0, & \text{if } x < 4, \\ k(1/4 - 1/x), & \text{if } 4 \le x \le 10, \\ 1, & \text{if } x > 10. \end{cases}$

13. Find the constant k.   Ⓐ 6.6667   Ⓑ 8.6667   Ⓒ 9.1667   Ⓓ 1.6667   Ⓔ None of the others

14. Find the median diameter of the particle.

    Ⓐ 7.4586   Ⓑ 7.2288   Ⓒ 6.9846   Ⓓ 5.7143   Ⓔ None of the others

15. Let $Y = 4X + 10$. Find the standard deviation of Y.

    Ⓐ 5.8943   Ⓑ 3.8123   Ⓒ None of the others   Ⓓ 2.3773   Ⓔ 6.5543

16. Find the probability $P(8.1 < X < 16.9)$.

    Ⓐ None of the others   Ⓑ 0.1276   Ⓒ 0.7864   Ⓓ 0.1564   Ⓔ 0.0803

Questions 17 through 20.

A and B are playing chess. In each match, A wins with probability 0.7 and B wins with probability 0.2. Suppose that the match results are independent.

17. Consider a random match between A and B. Find the probability that the match result is a draw.

    Ⓐ 0.4   Ⓑ None of the others   Ⓒ 0.1   Ⓓ 0.3   Ⓔ 0.2

18. Assuming that A and B play 6 matches, find the probability that A win half of the number of matches.   Ⓐ 0.1369   Ⓑ 0.0998   Ⓒ 0.1852   Ⓓ 0.4293   Ⓔ None of the others

19. Assuming that A and B play 6 matches, find the average number of matches that result in a win or loss.   Ⓐ None of the others   Ⓑ 0.4   Ⓒ 1.4   Ⓓ 3.4   Ⓔ 5.4

20. Assuming that A and B play 5 matches, find the probability that A doesn't lose at all.

    Ⓐ 0.2266   Ⓑ None of the others   Ⓒ 0.3277   Ⓓ 0.0065   Ⓔ 0.0883

Answers Sheet

Question sheet code 2211:
1 E. 2 B. 3 A. 4 A. 5 C. 6 F. 7 A. 8 E. 9 D. 10 A. 11 E. 12 D. 13 A. 14 D. 15 E. 16 D.
17 C. 18 C. 19 E. 20 C.

Question sheet code 2212:
1 B. 2 B. 3 C. 4 C. 5 C. 6 D. 7 B. 8 E. 9 A. 10 E. 11 D. 12 B. 13 B. 14 B. 15 B. 16 A.
17 A. 18 D. 19 D. 20 E.

Question sheet code 2213:
1 C. 2 B. 3 D. 4 C. 5 A. 6 A. 7 E. 8 B. 9 A. 10 D. 11 B. 12 D. 13 A. 14 C. 15 C. 16 B.
17 A. 18 D. 19 B. 20 E.

Question sheet code 2214:
1 E. 2 B. 3 B. 4 B. 5 B. 6 E. 7 E. 8 C. 9 D. 10 C. 11 B. 12 D. 13 B. 14 C. 15 E. 16 B.
17 B. 18 B. 19 D. 20 B.

Question sheet code 2215:
1 C. 2 A. 3 A. 4 E. 5 E. 6 B. 7 C. 8 C. 9 E. 10 B. 11 B. 12 A. 13 E. 14 A. 15 E. 16 B.
17 D. 18 C. 19 B. 20 A.

Question sheet code 2216:
1 C. 2 A. 3 C. 4 C. 5 D. 6 D. 7 C. 8 A. 9 A. 10 B. 11 D. 12 B. 13 B. 14 A. 15 E. 16 B.
17 B. 18 B. 19 E. 20 C.

Question sheet code 2217:
1 B. 2 C. 3 D. 4 E. 5 B. 6 B. 7 C. 8 C. 9 E. 10 C. 11 A. 12 C. 13 B. 14 B. 15 D. 16 D.
17 A. 18 A. 19 A. 20 B.

Question sheet code 2218:
1 C. 2 E. 3 E. 4 E. 5 D. 6 F. 7 E. 8 C. 9 A. 10 E. 11 C. 12 D. 13 C. 14 C. 15 D. 16 A.
17 C. 18 C. 19 A. 20 A.

	Midterm Exam	Semester/Acad. year	1	2022-2023
UNIVERSITY OF TECHNOLOGY - VNUHCM		Date		October 23$^{\text{rd}}$, 2022
	Course title	Probability and Statistics		
Faculty of Applied Science	Course ID	MT2013		
	Duration	50 minutes	Question sheet code	2212

Instructions to students:

- *You are allowed to use your OWN materials and calculator.   Total available score: 10.*
- *At the beginning of the working time, you MUST fill in your full name and student ID on this question sheet. There are 20 questions on 2 pages. Do not round between steps. Round your final answers to 4 decimal places.*

Student's full name: ....

Student Id: ....

Invigilator 1: ....

Invigilator 2: ....

Questions 1 through 4. We load on a plane 30 packages whose weights are independent random variables that are uniformly distributed between 6 and 31.8 pounds.

1. Find the mean of the total weight which is loaded by this plane.
   - (A) 574.8
   - (B) 567
   - (C) 565
   - (D) 574.2
   - (E) 561

2. Find the standard deviation of the total weight which is loaded by this plane.
   - (A) 42.6745
   - (B) 40.7934
   - (C) 43.2463
   - (D) 32.8441
   - (E) 34.1977

3. What is the probability that the total weight will exceed 489.5 pounds?
   - (A) 0.9489
   - (B) 0.4949
   - (C) 0.9713
   - (D) 0.4609
   - (E) 0.0999

4. Suppose that the weight of packages loaded on all planes are independent and normally distributed with the mean of 23.5 (pound) and the variance of 89.37 (pound^2). Determine a weight value such that 35 percent of packages loaded on all planes are heavier than this value.
   - (A) 20.28
   - (B) 23.4535
   - (C) 27.1869
   - (D) 26.2315
   - (E) 30.6395

Questions 5 through 8.

Quizzes at the end of each lecture in a Calculus course contain either 1 or 2 questions with equal probability. Suppose that student A gives an incorrect answer for a question with probability 0.62, independently of other questions.

5. What is the probability that student A gives incorrect answers to all questions of a quiz?
   - (A) 0.7191
   - (B) 0.1284
   - (C) 0.5022
   - (D) 0.0133
   - (E) 0.4426

6. If student A gave incorrect answers to all the questions of a quiz, what is the probability that the quiz contains 2 questions?
   - (A) 0.1804
   - (B) 0.667
   - (C) 0.6467
   - (D) 0.3827
   - (E) 0.2608
   - (F) 0.6173

7. Let X be the number of questions in a quiz and Y be the number of questions answered incorrectly by student A in that quiz. Compute $E(XY)$.
   - (A) 1.89
   - (B) 1.55
   - (C) 3.35
   - (D) 2.58
   - (E) 2.75

8. What is the variance of Y? (A) 1.3489 (B) 0.5015 (C) 0.5406 (D) 0.4219 (E) 0.4495

Questions 9 through 12.

The duration of the independent interval times between two successive cars on the Trans-Australian Highway is modeled by an exponential distribution with the mean of 1 minutes.

9. Find the average number of cars passing the Highway within 2 minutes.

   (A) 2   (B) 1   (C) 4   (D) 3.6   (E) 2

10. It is known that the duration of time between two successive cars on the Highway is at least 14 **seconds**. Find the probability that the duration of time between two successive cars on the Highway is less than 24 **seconds**.

   (A) 0.3991   (B) 0.5924   (C) 0.4205   (D) 0.0853   (E) 0.1535

11. Determine the duration of time (second) in which there is no car passing the Highway with probability 0.5.

   (A) 41.6864   (B) 41.3442   (C) 42.3803   (D) 41.5888   (E) None of the others

12. An old wombat requires 28 seconds to cross the highway, and he starts out immediately after a car goes by. What is the probability that he will survive?

   (A) 0.487   (B) 0.6271   (C) 0.3416   (D) None of the others   (E) 0.8353

Questions 13 through 16.

The diameter of a particle of contamination (in micrometers) is modeled by the cumulative distribution function: $F(x) = \begin{cases} 0, & \text{if } x < 4, \\ k(1/4 - 1/x), & \text{if } 4 \leq x \leq 8, \\ 1, & \text{if } x > 8. \end{cases}$

13. Find the constant k. (A) 6   (B) 8   (C) 6.5   (D) 4.5   (E) None of the others

14. Find the median diameter of the particle.

   (A) 5.3955   (B) 5.3333   (C) 4.4799   (D) None of the others   (E) 6.3153

15. Let $Y = 4X + 8$. Find the standard deviation of Y.

   (A) 3.3639   (B) 4.4739   (C) 1.0229   (D) 1.4659   (E) None of the others

16. Find the probability $P(6.2 < X < 12.9)$.

   (A) 0.2903   (B) 0.0121   (C) None of the others   (D) 0.7407   (E) 0.2279

Questions 17 through 20.

A and B are playing chess. In each match, A wins with probability 0.3 and B wins with probability 0.6. Suppose that the match results are independent.

17. Consider a random match between A and B. Find the probability that the match result is a draw.

   (A) 0.1   (B) None of the others   (C) 0.2   (D) 0.3   (E) 0.4

18. Assuming that A and B play 14 matches, find the probability that A win half of the number of matches. (A) 0.1763   (B) 0.3903   (C) 0.559   (D) 0.0618   (E) None of the others

19. Assuming that A and B play 14 matches, find the average number of matches that result in a win or loss. (A) 13.6   (B) 9.6   (C) 7.6   (D) 12.6   (E) None of the others

20. Assuming that A and B play 3 matches, find the probability that A doesn't lose at all.

   (A) 0.1489   (B) None of the others   (C) 0.3467   (D) 0.4264   (E) 0.064

	Midterm Exam	Semester/Acad. year	1	2022-2023
		Date		October 23rd, 2022
UNIVERSITY OF TECHNOLOGY - VNUHCM	Course title	Probability and Statistics		
	Course ID	MT2013		
Faculty of Applied Science	Duration	50 minutes	Question sheet code	2213

Instructions to students:

- *You are allowed to use your OWN materials and calculator.   Total available score: 10.*
- *At the beginning of the working time, you MUST fill in your full name and student ID on this question sheet. There are 20 questions on 2 pages. Do not round between steps. Round your final answers to 4 decimal places.*

Student's full name: ....   Invigilator 1: ....

Student Id: ....   Invigilator 2: ....

Questions 1 through 4. We load on a plane 39 packages whose weights are independent random variables that are uniformly distributed between 8.8 and 49.8 pounds.

1. Find the mean of the total weight which is loaded by this plane.
   Ⓐ 1140.3   Ⓑ 1144.2   Ⓒ 1142.7   Ⓓ 1144.5   Ⓔ 1143

2. Find the standard deviation of the total weight which is loaded by this plane.
   Ⓐ 82.352   Ⓑ 73.9138   Ⓒ 71.0909   Ⓓ 66.0274   Ⓔ 70.5353

3. What is the probability that the total weight will exceed 1106 pounds?
   Ⓐ 0.2033   Ⓑ 0.3453   Ⓒ 0.6083   Ⓓ 0.6902   Ⓔ 0.9363

4. Suppose that the weight of packages loaded on all planes are independent and normally distributed with the mean of 39.9 (pound) and the variance of 167.08 (pound^2). Determine a weight value such that 35 percent of packages loaded on all planes are heavier than this value.
   Ⓐ 49.1082   Ⓑ 61.4757   Ⓒ 44.9411   Ⓓ 48.2107   Ⓔ 57.4187

Questions 5 through 8.

Quizzes at the end of each lecture in a Calculus course contain either 1 or 2 questions with equal probability. Suppose that student A gives an incorrect answer for a question with probability 0.27, independently of other questions.

5. What is the probability that student A gives incorrect answers to all questions of a quiz?
   Ⓐ 0.1715   Ⓑ 0.1921   Ⓒ 0.6497   Ⓓ 0.4102   Ⓔ 0.3235

6. If student A gave incorrect answers to all the questions of a quiz, what is the probability that the quiz contains 1 question?
   Ⓐ 0.7872   Ⓑ 0.6374   Ⓒ 0.1685   Ⓓ 0.6463   Ⓔ 0.2125   Ⓕ 0.1781

7. Let X be the number of questions in a quiz and Y be the number of questions answered incorrectly by student A in that quiz. Compute $E(XY)$.
   Ⓐ 1.85   Ⓑ 0.63   Ⓒ 0.01   Ⓓ 1.14   Ⓔ 0.675

8. What is the variance of Y?   Ⓐ 0.7136   Ⓑ 0.3139   Ⓒ 1.4981   Ⓓ 0.8492   Ⓔ 1.0778

Questions 9 through 12.

The duration of the independent interval times between two successive cars on the Trans-Australian Highway is modeled by an exponential distribution with the mean of 0.7 minutes.

9. Find the average number of cars passing the Highway within 5 minutes.

   Ⓐ 7.1429   Ⓑ 13   Ⓒ 1.6   Ⓓ 3.5   Ⓔ 8.4

10. It is known that the duration of time between two successive cars on the Highway is at least 19 **seconds**. Find the probability that the duration of time between two successive cars on the Highway is less than 21 **seconds**.

    Ⓐ 0.5257   Ⓑ 0.6391   Ⓒ 0.4433   Ⓓ 0.0465   Ⓔ 0.8664

11. Determine the duration of time (second) in which there is no car passing the Highway with probability 0.5.

    Ⓐ None of the others   Ⓑ 29.1122   Ⓒ 28.6541   Ⓓ 28.6357   Ⓔ 28.2479

12. An old wombat requires 24 seconds to cross the highway, and he starts out immediately after a car goes by. What is the probability that he will survive?

    Ⓐ 0.7047   Ⓑ 0.9445   Ⓒ None of the others   Ⓓ 0.5647   Ⓔ 0.0579

Questions 13 through 16.

The diameter of a particle of contamination (in micrometers) is modeled by the cumulative distribution function: $F(x) = \begin{cases} 0, & \text{if } x < 6, \\ k(1/6 - 1/x), & \text{if } 6 \le x \le 8, \\ 1, & \text{if } x > 8. \end{cases}$

13. Find the constant k.   Ⓐ 24   Ⓑ 26.5   Ⓒ None of the others   Ⓓ 28   Ⓔ 27.5

14. Find the median diameter of the particle.

    Ⓐ 5.5414   Ⓑ 5.3032   Ⓒ 6.8571   Ⓓ 11.2275   Ⓔ None of the others

15. Let $Y = 6X + 8$. Find the standard deviation of Y.

    Ⓐ None of the others   Ⓑ 3.6921   Ⓒ 3.4451   Ⓓ 1.6661   Ⓔ 4.4071

16. Find the probability $P(6.8 < X < 12.6)$.

    Ⓐ None of the others   Ⓑ 0.5294   Ⓒ 0.8671   Ⓓ 0.7033   Ⓔ 0.4205

Questions 17 through 20.

A and B are playing chess. In each match, A wins with probability 0.1 and B wins with probability 0.6. Suppose that the match results are independent.

17. Consider a random match between A and B. Find the probability that the match result is a draw.

    Ⓐ 0.3   Ⓑ 0.4   Ⓒ 0.2   Ⓓ 0.5   Ⓔ None of the others

18. Assuming that A and B play 16 matches, find the probability that A win half of the number of matches.   Ⓐ 0.2403   Ⓑ 0.3585   Ⓒ None of the others   Ⓓ 0.0001   Ⓔ 0.117

19. Assuming that A and B play 16 matches, find the average number of matches that result in a win or loss.   Ⓐ 9.2   Ⓑ 11.2   Ⓒ None of the others   Ⓓ 8.2   Ⓔ 7.2

20. Assuming that A and B play 4 matches, find the probability that A doesn't lose at all.

    Ⓐ 0.1551   Ⓑ 0.5174   Ⓒ 0.2247   Ⓓ None of the others   Ⓔ 0.0256

	Midterm Exam	Semester/Acad. year	1	2022-2023
		Date		October 23rd, 2022
BK TP.HCM		Course title	Probability and Statistics	
UNIVERSITY OF TECHNOLOGY - VNUHCM		Course ID	MT2013	
Faculty of Applied Science		Duration	50 minutes	Question sheet code	2214

Instructions to students:

- *You are allowed to use your OWN materials and calculator.   Total available score: 10.*
- *At the beginning of the working time, you MUST fill in your full name and student ID on this question sheet. There are 20 questions on 2 pages. Do not round between steps. Round your final answers to 4 decimal places.*

Student's full name: ....

Student Id: ....

Invigilator 1: ....

Invigilator 2: ....

Questions 1 through 4. We load on a plane 33 packages whose weights are independent random variables that are uniformly distributed between 8.9 and 27.7 pounds.

1. Find the mean of the total weight which is loaded by this plane.

   Ⓐ 596.3   Ⓑ 594.2   Ⓒ 598.8   Ⓓ 608.2   Ⓔ 603.9

2. Find the standard deviation of the total weight which is loaded by this plane.

   Ⓐ 23.2263   Ⓑ 31.1763   Ⓒ 30.8667   Ⓓ 27.8197   Ⓔ 39.3651

3. What is the probability that the total weight will exceed 617.7 pounds?

   Ⓐ 0.4396   Ⓑ 0.329   Ⓒ 0.6021   Ⓓ 0.7256   Ⓔ 0.1001

4. Suppose that the weight of packages loaded on all planes are independent and normally distributed with the mean of 22 (pound) and the variance of 58.75 (pound^2). Determine a weight value such that 10 percent of packages loaded on all planes are heavier than this value.

   Ⓐ 12.6426   Ⓑ 31.811   Ⓒ 33.6346   Ⓓ 26.2401   Ⓔ 34.4926

Questions 5 through 8.

Quizzes at the end of each lecture in a Calculus course contain either 1 or 2 questions with equal probability. Suppose that student A gives an incorrect answer for a question with probability 0.24, independently of other questions.

5. What is the probability that student A gives incorrect answers to all questions of a quiz?

   Ⓐ 0.5355   Ⓑ 0.1488   Ⓒ 0.4769   Ⓓ 0.5403   Ⓔ 0.2939

6. If student A gave incorrect answers to all the questions of a quiz, what is the probability that the quiz contains 1 question?

   Ⓐ 0.3298   Ⓑ 0.1935   Ⓒ 0.149   Ⓓ 0.0234   Ⓔ 0.8065   Ⓕ 0.4241

7. Let X be the number of questions in a quiz and Y be the number of questions answered incorrectly by student A in that quiz. Compute $E(XY)$.

   Ⓐ 1.04   Ⓑ 2.12   Ⓒ 0.81   Ⓓ 0.66   Ⓔ 0.6

8. What is the variance of Y? (A) 1.4779　(B) 1.3471　(C) 0.288　(D) 0.3374　(E) 0.0407

Questions 9 through 12.

The duration of the independent interval times between two successive cars on the Trans-Australian Highway is modeled by an exponential distribution with the mean of 0.1 minutes.

9. Find the average number of cars passing the Highway within 3 minutes.

   (A) 0.3　(B) 10.9　(C) 0.9　(D) 30　(E) 48.9

10. It is known that the duration of time between two successive cars on the Highway is at least 11 **seconds**. Find the probability that the duration of time between two successive cars on the Highway is less than 14 **seconds**.

    (A) 0.6175　(B) 0.3296　(C) 0.3935　(D) 0.5783　(E) 0.4451

11. Determine the duration of time (second) in which there is no car passing the Highway with probability 0.7.

    (A) None of the others　(B) 2.14　(C) 2.8994　(D) 3.1233　(E) 2.1374

12. An old wombat requires 24 seconds to cross the highway, and he starts out immediately after a car goes by. What is the probability that he will survive?

    (A) None of the others　(B) 0.7731　(C) 0.8573　(D) 0.0183　(E) 0.7119

Questions 13 through 16.

The diameter of a particle of contamination (in micrometers) is modeled by the cumulative distribution function:
$$F(x) = \begin{cases} 0, & \text{if } x < 6, \\ k(1/6 - 1/x), & \text{if } 6 \le x \le 10, \\ 1, & \text{if } x > 10. \end{cases}$$

13. Find the constant k. (A) None of the others　(B) 15　(C) 18　(D) 11　(E) 18.5

14. Find the median diameter of the particle.

    (A) 9.285　(B) 6.7651　(C) 7.5　(D) 6.0323　(E) None of the others

15. Let $Y = 6X + 10$. Find the standard deviation of Y.

    (A) 8.9021　(B) 4.3031　(C) None of the others　(D) 9.6741　(E) 6.8091

16. Find the probability $P(6.7 < X < 15.4)$.

    (A) 0.3208　(B) 0.7388　(C) 0.7917　(D) None of the others　(E) 0.0808

Questions 17 through 20.

A and B are playing chess. In each match, A wins with probability 0.6 and B wins with probability 0.1. Suppose that the match results are independent.

17. Consider a random match between A and B. Find the probability that the match result is a draw.

    (A) 0.2　(B) 0.3　(C) 0.5　(D) 0.7　(E) None of the others

18. Assuming that A and B play 10 matches, find the probability that A win half of the number of matches. (A) 0.3244　(B) 0.2007　(C) None of the others　(D) 0.5403　(E) 0.1785

19. Assuming that A and B play 10 matches, find the average number of matches that result in a win or loss. (A) None of the others　(B) 5　(C) 4　(D) 7　(E) 9

20. Assuming that A and B play 5 matches, find the probability that A doesn't lose at all.

    (A) None of the others　(B) 0.5905　(C) 0.9868　(D) 0.4314　(E) 0.497

	Midterm Exam	Semester/Acad. year	1	2022-2023
		Date		October 23rd, 2022
UNIVERSITY OF TECHNOLOGY - VNUHCM	Course title	Probability and Statistics		
	Course ID	MT2013		
Faculty of Applied Science	Duration	50 minutes	Question sheet code	2215

Instructions to students:

- *You are allowed to use your OWN materials and calculator.   Total available score: 10.*
- *At the beginning of the working time, you MUST fill in your full name and student ID on this question sheet. There are 20 questions on 2 pages. Do not round between steps. Round your final answers to 4 decimal places.*

Student's full name: ....   Invigilator 1: ....

Student Id: ....   Invigilator 2: ....

Questions 1 through 4. We load on a plane 36 packages whose weights are independent random variables that are uniformly distributed between 6.4 and 42.7 pounds.

1. Find the mean of the total weight which is loaded by this plane.

   Ⓐ 879.9   Ⓑ 888   Ⓒ 883.8   Ⓓ 880.6   Ⓔ 886.7

2. Find the standard deviation of the total weight which is loaded by this plane.

   Ⓐ 62.8734   Ⓑ 58.1529   Ⓒ 68.558   Ⓓ 61.1877   Ⓔ 66.1942

3. What is the probability that the total weight will exceed 997.5 pounds?

   Ⓐ 0.0353   Ⓑ 0.1784   Ⓒ 0.2224   Ⓓ 0.3194   Ⓔ 0.7339

4. Suppose that the weight of packages loaded on all planes are independent and normally distributed with the mean of 34.95 (pound) and the variance of 206.61 (pound^2). Determine a weight value such that 35 percent of packages loaded on all planes are heavier than this value.

   Ⓐ 33.8114   Ⓑ 21.9239   Ⓒ 19.7904   Ⓓ 51.9744   Ⓔ 40.5558

Questions 5 through 8.

Quizzes at the end of each lecture in a Calculus course contain either 1 or 2 questions with equal probability. Suppose that student A gives an incorrect answer for a question with probability 0.3, independently of other questions.

5. What is the probability that student A gives incorrect answers to all questions of a quiz?

   Ⓐ 0.0903   Ⓑ 0.6142   Ⓒ 0.1143   Ⓓ 0.3185   Ⓔ 0.195

6. If student A gave incorrect answers to all the questions of a quiz, what is the probability that the quiz contains 1 question?

   Ⓐ 0.5561   Ⓑ 0.7692   Ⓒ 0.3139   Ⓓ 0.2308   Ⓔ 0.6772   Ⓕ 0.7226

7. Let X be the number of questions in a quiz and Y be the number of questions answered incorrectly by student A in that quiz. Compute $E(XY)$.

   Ⓐ 0.91   Ⓑ 0.52   Ⓒ 0.75   Ⓓ 2.25   Ⓔ 2.43

8. What is the variance of Y?   Ⓐ 1.499   Ⓑ 1.3047   Ⓒ 0.3375   Ⓓ 0.3802   Ⓔ 0.3674

Questions 9 through 12.

The duration of the independent interval times between two successive cars on the Trans-Australian Highway is modeled by an exponential distribution with the mean of 0.2 minutes.

9. Find the average number of cars passing the Highway within 5 minutes.

    Ⓐ 1   Ⓑ 20.5   Ⓒ 14.3   Ⓓ 33.8   Ⓔ 25

10. It is known that the duration of time between two successive cars on the Highway is at least 16 **seconds**. Find the probability that the duration of time between two successive cars on the Highway is less than 21 **seconds**.

    Ⓐ 0.4828   Ⓑ 0.3408   Ⓒ 0.3787   Ⓓ 0.7323   Ⓔ 0.6891

11. Determine the duration of time (second) in which there is no car passing the Highway with probability 0.5.

    Ⓐ 9.2485   Ⓑ 8.3178   Ⓒ None of the others   Ⓓ 8.0354   Ⓔ 8.1844

12. An old wombat requires 26 seconds to cross the highway, and he starts out immediately after a car goes by. What is the probability that he will survive?

    Ⓐ 0.1146   Ⓑ 0.6273   Ⓒ 0.8968   Ⓓ None of the others   Ⓔ 0.3234

Questions 13 through 16.

The diameter of a particle of contamination (in micrometers) is modeled by the cumulative distribution function: $F(x) = \begin{cases} 0, & \text{if } x < 6, \\ k(1/6 - 1/x), & \text{if } 6 \le x \le 10, \\ 1, & \text{if } x > 10. \end{cases}$

13. Find the constant k.   Ⓐ None of the others   Ⓑ 15.5   Ⓒ 16.5   Ⓓ 14   Ⓔ 15

14. Find the median diameter of the particle.

    Ⓐ 7.5   Ⓑ 9.104   Ⓒ 9.7809   Ⓓ None of the others   Ⓔ 8.2768

15. Let $Y = 6X + 10$. Find the standard deviation of Y.

    Ⓐ 3.1361   Ⓑ None of the others   Ⓒ 6.8951   Ⓓ 3.8101   Ⓔ 6.8091

16. Find the probability $P(9.9 < X < 11.4)$.

    Ⓐ 0.3092   Ⓑ 0.0152   Ⓒ None of the others   Ⓓ 0.3391   Ⓔ 0.9441

Questions 17 through 20.

A and B are playing chess. In each match, A wins with probability 0.3 and B wins with probability 0.2. Suppose that the match results are independent.

17. Consider a random match between A and B. Find the probability that the match result is a draw.

    Ⓐ 0.7   Ⓑ 0.8   Ⓒ 0.6   Ⓓ 0.5   Ⓔ None of the others

18. Assuming that A and B play 16 matches, find the probability that A win half of the number of matches.   Ⓐ None of the others   Ⓑ 0.2463   Ⓒ 0.0487   Ⓓ 0.1877   Ⓔ 0.1976

19. Assuming that A and B play 16 matches, find the average number of matches that result in a win or loss.   Ⓐ 4   Ⓑ 8   Ⓒ 9   Ⓓ 6   Ⓔ None of the others

20. Assuming that A and B play 4 matches, find the probability that A doesn't lose at all.

    Ⓐ 0.4096   Ⓑ 0.4843   Ⓒ None of the others   Ⓓ 0.7515   Ⓔ 0.0772

	Midterm Exam	Semester/Acad. year	1	2022-2023
		Date		October 23rd, 2022
UNIVERSITY OF TECHNOLOGY - VNUHCM	Course title	Probability and Statistics		
Faculty of Applied Science	Course ID	MT2013		
	Duration	50 minutes	Question sheet code	2216

Instructions to students:

- *You are allowed to use your OWN materials and calculator.   Total available score: 10.*
- *At the beginning of the working time, you MUST fill in your full name and student ID on this question sheet. There are 20 questions on 2 pages. Do not round between steps. Round your final answers to 4 decimal places.*

Student's full name: ....   Invigilator 1: ....

Student Id: ....   Invigilator 2: ....

Questions 1 through 4. We load on a plane 33 packages whose weights are independent random variables that are uniformly distributed between 6.7 and 27.3 pounds.

1. Find the mean of the total weight which is loaded by this plane.

    Ⓐ 551.6   Ⓑ 560.7   Ⓒ 561   Ⓓ 568.6   Ⓔ 564.4

2. Find the standard deviation of the total weight which is loaded by this plane.

    Ⓐ 34.1612   Ⓑ 28.3394   Ⓒ 41.2744   Ⓓ 26.2283   Ⓔ 43.5138

3. What is the probability that the total weight will exceed 605.2 pounds?

    Ⓐ 0.9795   Ⓑ 0.5045   Ⓒ 0.0979   Ⓓ 0.4665   Ⓔ 0.3825

4. Suppose that the weight of packages loaded on all planes are independent and normally distributed with the mean of 32.5 (pound) and the variance of 63.26 (pound^2). Determine a weight value such that 10 percent of packages loaded on all planes are heavier than this value.

    Ⓐ 33.4242   Ⓑ 53.5867   Ⓒ 42.6806   Ⓓ 41.0572   Ⓔ 52.1587

Questions 5 through 8.

Quizzes at the end of each lecture in a Calculus course contain either 1 or 2 questions with equal probability. Suppose that student A gives an incorrect answer for a question with probability 0.34, independently of other questions.

5. What is the probability that student A gives incorrect answers to all questions of a quiz?

    Ⓐ 0.0351   Ⓑ 0.2258   Ⓒ 0.2943   Ⓓ 0.2278   Ⓔ 0.5712

6. If student A gave incorrect answers to all the questions of a quiz, what is the probability that the quiz contains 1 question?

    Ⓐ 0.1089   Ⓑ 0.2537   Ⓒ 0.68   Ⓓ 0.7463   Ⓔ 0.3965   Ⓕ 0.3831

7. Let X be the number of questions in a quiz and Y be the number of questions answered incorrectly by student A in that quiz. Compute $E(XY)$.

    Ⓐ 2.31   Ⓑ 1.82   Ⓒ 0.85   Ⓓ 0.83   Ⓔ 0.81

8. What is the variance of Y?   Ⓐ 0.3655   Ⓑ 0.6716   Ⓒ 0.7033   Ⓓ 1.4408   Ⓔ 0.8006

Questions 9 through 12.

The duration of the independent interval times between two successive cars on the Trans-Australian Highway is modeled by an exponential distribution with the mean of 0.9 minutes.

9. Find the average number of cars passing the Highway within 2 minutes.

   Ⓐ 2.2222   Ⓑ 4.3   Ⓒ 3.4   Ⓓ 1.8   Ⓔ 3.3

10. It is known that the duration of time between two successive cars on the Highway is at least **7 seconds**. Find the probability that the duration of time between two successive cars on the Highway is less than 17 **seconds**.

    Ⓐ 0.7618   Ⓑ 0.169   Ⓒ 0.7689   Ⓓ 0.6266   Ⓔ 0.2035

11. Determine the duration of time (second) in which there is no car passing the Highway with probability 0.7.

    Ⓐ 19.6934   Ⓑ 19.8739   Ⓒ None of the others   Ⓓ 19.2604   Ⓔ 19.0519

12. An old wombat requires 23 seconds to cross the highway, and he starts out immediately after a car goes by. What is the probability that he will survive?

    Ⓐ 0.5473   Ⓑ 0.6532   Ⓒ 0.2339   Ⓓ 0.6587   Ⓔ None of the others

Questions 13 through 16.

The diameter of a particle of contamination (in micrometers) is modeled by the cumulative distribution function: $F(x) = \begin{cases} 0, & \text{if } x < 2, \\ k(1/2 - 1/x), & \text{if } 2 \le x \le 6, \\ 1, & \text{if } x > 6. \end{cases}$

13. Find the constant k.   Ⓐ 2   Ⓑ 3   Ⓒ None of the others   Ⓓ 5   Ⓔ 7

14. Find the median diameter of the particle.

    Ⓐ 3   Ⓑ 5.1578   Ⓒ None of the others   Ⓓ 4.3163   Ⓔ 2.4924

15. Let $Y = 2X + 6$. Find the standard deviation of Y.

    Ⓐ 0.636   Ⓑ 5.814   Ⓒ None of the others   Ⓓ 2.825   Ⓔ 2.133

16. Find the probability $P(2.6 < X < 10.5)$.

    Ⓐ 0.728   Ⓑ 0.6538   Ⓒ 0.4657   Ⓓ 0.7595   Ⓔ None of the others

Questions 17 through 20.

A and B are playing chess. In each match, A wins with probability 0.4 and B wins with probability 0.3. Suppose that the match results are independent.

17. Consider a random match between A and B. Find the probability that the match result is a draw.

    Ⓐ 0.5   Ⓑ 0.3   Ⓒ 0.1   Ⓓ None of the others   Ⓔ 0.2

18. Assuming that A and B play 16 matches, find the probability that A win half of the number of matches.   Ⓐ 0.3927   Ⓑ 0.1417   Ⓒ None of the others   Ⓓ 0.3237   Ⓔ 0.3975

19. Assuming that A and B play 16 matches, find the average number of matches that result in a win or loss.   Ⓐ 10.2   Ⓑ 12.2   Ⓒ 14.2   Ⓓ None of the others   Ⓔ 11.2

20. Assuming that A and B play 4 matches, find the probability that A doesn't lose at all.

    Ⓐ None of the others   Ⓑ 0.395   Ⓒ 0.2401   Ⓓ 0.3669   Ⓔ 0.0614

	Midterm Exam	Semester/Acad. year	1	2022-2023
		Date		October 23rd, 2022
	Course title	Probability and Statistics		
UNIVERSITY OF TECHNOLOGY - VNUHCM	Course ID	MT2013		
Faculty of Applied Science	Duration	50 minutes	Question sheet code	2217

Instructions to students:

- *You are allowed to use your OWN materials and calculator.   Total available score: 10.*
- *At the beginning of the working time, you MUST fill in your full name and student ID on this question sheet. There are 20 questions on 2 pages. Do not round between steps. Round your final answers to 4 decimal places.*

Student's full name: ....   Invigilator 1: ....

Student Id: ....   Invigilator 2: ....

Questions 1 through 4. We load on a plane 33 packages whose weights are independent random variables that are uniformly distributed between 6.9 and 22.1 pounds.

1. Find the mean of the total weight which is loaded by this plane.

   (A) 479.7   (B) 478.5   (C) 469.4   (D) 478.4   (E) 481.9

2. Find the standard deviation of the total weight which is loaded by this plane.

   (A) 18.2756   (B) 19.2898   (C) 25.2063   (D) 21.2344   (E) 32.6447

3. What is the probability that the total weight will exceed 466.5 pounds?

   (A) 0.4511   (B) 0.2776   (C) 0.2856   (D) 0.683   (E) 0.2071

4. Suppose that the weight of packages loaded on all planes are independent and normally distributed with the mean of 21.4 (pound) and the variance of 27.15 (pound^2). Determine a weight value such that 35 percent of packages loaded on all planes are heavier than this value.

   (A) 41.0227   (B) 7.9867   (C) 15.9577   (D) 13.5797   (E) 23.4321

Questions 5 through 8.

Quizzes at the end of each lecture in a Calculus course contain either 1 or 2 questions with equal probability. Suppose that student A gives an incorrect answer for a question with probability 0.44, independently of other questions.

5. What is the probability that student A gives incorrect answers to all questions of a quiz?

   (A) 0.7196   (B) 0.3168   (C) 0.1352   (D) 0.4222   (E) 0.0591

6. If student A gave incorrect answers to all the questions of a quiz, what is the probability that the quiz contains 1 question?

   (A) 0.1313   (B) 0.6944   (C) 0.3056   (D) 0.7811   (E) 0.1011   (F) 0.5353

7. Let X be the number of questions in a quiz and Y be the number of questions answered incorrectly by student A in that quiz. Compute $E(XY)$.

   (A) 2.66   (B) 3.01   (C) 1.1   (D) 2.09   (E) 1.5

8. What is the variance of Y? Ⓐ 0.4528   Ⓑ 0.8094   Ⓒ 0.418   Ⓓ 0.7778   Ⓔ 0.6558

Questions 9 through 12.

The duration of the independent interval times between two successive cars on the Trans-Australian Highway is modeled by an exponential distribution with the mean of 1 minutes.

9. Find the average number of cars passing the Highway within 2 minutes.

   Ⓐ 2   Ⓑ 1.7   Ⓒ 1.4   Ⓓ 3.5   Ⓔ 2

10. It is known that the duration of time between two successive cars on the Highway is at least 10 **seconds**. Find the probability that the duration of time between two successive cars on the Highway is less than 21 **seconds**.

    Ⓐ 0.0287   Ⓑ 0.0855   Ⓒ 0.1675   Ⓓ 0.3079   Ⓔ 0.8911

11. Determine the duration of time (second) in which there is no car passing the Highway with probability 0.6.

    Ⓐ 30.6495   Ⓑ 30.4488   Ⓒ 30.479   Ⓓ None of the others   Ⓔ 31.6282

12. An old wombat requires 28 seconds to cross the highway, and he starts out immediately after a car goes by. What is the probability that he will survive?

    Ⓐ 0.9892   Ⓑ None of the others   Ⓒ 0.6271   Ⓓ 0.965   Ⓔ 0.0027

Questions 13 through 16.

The diameter of a particle of contamination (in micrometers) is modeled by the cumulative distribution function:
$$F(x) = \begin{cases} 0, & \text{if } x < 6, \\ k(1/6 - 1/x), & \text{if } 6 \le x \le 10, \\ 1, & \text{if } x > 10. \end{cases}$$

13. Find the constant k. Ⓐ 20   Ⓑ 15   Ⓒ 11.5   Ⓓ None of the others   Ⓔ 18.5

14. Find the median diameter of the particle.

    Ⓐ 8.6664   Ⓑ 7.5   Ⓒ 8.3101   Ⓓ None of the others   Ⓔ 6.693

15. Let $Y = 6X + 10$. Find the standard deviation of Y.

    Ⓐ None of the others   Ⓑ 4.0071   Ⓒ 7.6501   Ⓓ 6.8091   Ⓔ 6.6641

16. Find the probability $P(6.9 < X < 16.2)$.

    Ⓐ 0.6406   Ⓑ 0.6353   Ⓒ None of the others   Ⓓ 0.6739   Ⓔ 0.1665

Questions 17 through 20.

A and B are playing chess. In each match, A wins with probability 0.5 and B wins with probability 0.4. Suppose that the match results are independent.

17. Consider a random match between A and B. Find the probability that the match result is a draw.

    Ⓐ 0.1   Ⓑ 0.5   Ⓒ 0.2   Ⓓ 0.3   Ⓔ None of the others

18. Assuming that A and B play 10 matches, find the probability that A win half of the number of matches.   Ⓐ 0.2461   Ⓑ None of the others   Ⓒ 0.1448   Ⓓ 0.0778   Ⓔ 0.0857

19. Assuming that A and B play 10 matches, find the average number of matches that result in a win or loss.   Ⓐ 9   Ⓑ 5   Ⓒ 4   Ⓓ 6   Ⓔ None of the others

20. Assuming that A and B play 5 matches, find the probability that A doesn't lose at all.

    Ⓐ 0.0143   Ⓑ 0.0778   Ⓒ 0.4288   Ⓓ 0.1244   Ⓔ None of the others

	Midterm Exam	Semester/Acad. year	1	2022-2023
		Date	October 23rd, 2022	
UNIVERSITY OF TECHNOLOGY - VNUHCM	Course title	Probability and Statistics		
Faculty of Applied Science	Course ID	MT2013		
	Duration	50 minutes	Question sheet code	2218

Instructions to students:

- *You are allowed to use your OWN materials and calculator.   Total available score: 10.*
- *At the beginning of the working time, you MUST fill in your full name and student ID on this question sheet. There are 20 questions on 2 pages. Do not round between steps. Round your final answers to 4 decimal places.*

Student's full name: ....   Invigilator 1: ....

Student Id: ....   Invigilator 2: ....

Questions 1 through 4. We load on a plane 36 packages whose weights are independent random variables that are uniformly distributed between 9.2 and 27.9 pounds.

1. Find the mean of the total weight which is loaded by this plane.

   (A) 676.1   (B) 676.7   (C) 667.8   (D) 666.1   (E) 665.1

2. Find the standard deviation of the total weight which is loaded by this plane.

   (A) 30.0187   (B) 35.0358   (C) 24.5682   (D) 23.232   (E) 32.3894

3. What is the probability that the total weight will exceed 618.6 pounds?

   (A) 0.5417   (B) 0.4387   (C) 0.8227   (D) 0.7547   (E) 0.9356

4. Suppose that the weight of packages loaded on all planes are independent and normally distributed with the mean of 24.05 (pound) and the variance of 40.04 (pound^2). Determine a weight value such that 15 percent of packages loaded on all planes are heavier than this value.

   (A) 35.8384   (B) 27.4449   (C) 37.0634   (D) 14.9989   (E) 30.6308

Questions 5 through 8.

Quizzes at the end of each lecture in a Calculus course contain either 1 or 2 questions with equal probability. Suppose that student A gives an incorrect answer for a question with probability 0.68, independently of other questions.

5. What is the probability that student A gives incorrect answers to all questions of a quiz?

   (A) 0.8505   (B) 0.5182   (C) 0.2304   (D) 0.5712   (E) 0.9242

6. If student A gave incorrect answers to all the questions of a quiz, what is the probability that the quiz contains 2 questions?

   (A) 0.5952   (B) 0.6679   (C) 0.1806   (D) 0.443   (E) 0.8185   (F) 0.4048

7. Let X be the number of questions in a quiz and Y be the number of questions answered incorrectly by student A in that quiz. Compute $E(XY)$.

   (A) 1.15   (B) 1.57   (C) 1.63   (D) 2.91   (E) 1.7

8. What is the variance of Y? Ⓐ 1.448 Ⓑ 0.3526 Ⓒ 0.442 Ⓓ 0.8729 Ⓔ 0.0056

Questions 9 through 12.

The duration of the independent interval times between two successive cars on the Trans-Australian Highway is modeled by an exponential distribution with the mean of 0.2 minutes.

9. Find the average number of cars passing the Highway within 3 minutes.

   Ⓐ 15 Ⓑ 0.6 Ⓒ 24.3 Ⓓ 18.6 Ⓔ 17.9

10. It is known that the duration of time between two successive cars on the Highway is at least 22 **seconds**. Find the probability that the duration of time between two successive cars on the Highway is less than 23 **seconds**.

    Ⓐ 0.9408 Ⓑ 0.3102 Ⓒ 0.6532 Ⓓ 0.8518 Ⓔ 0.08

11. Determine the duration of time (second) in which there is no car passing the Highway with probability 0.5.

    Ⓐ 8.4268 Ⓑ 7.9209 Ⓒ 8.3178 Ⓓ None of the others Ⓔ 9.2415

12. An old wombat requires 29 seconds to cross the highway, and he starts out immediately after a car goes by. What is the probability that he will survive?

    Ⓐ 0.8788 Ⓑ None of the others Ⓒ 0.6756 Ⓓ 0.0892 Ⓔ 0.3063

Questions 13 through 16.

The diameter of a particle of contamination (in micrometers) is modeled by the cumulative distribution function: $F(x) = \begin{cases} 0, & \text{if } x < 2, \\ k(1/2 - 1/x), & \text{if } 2 \leq x \leq 10, \\ 1, & \text{if } x > 10. \end{cases}$

13. Find the constant k. Ⓐ 3.5 Ⓑ 1.5 Ⓒ 2.5 Ⓓ 7 Ⓔ None of the others

14. Find the median diameter of the particle.

    Ⓐ None of the others Ⓑ 3.2265 Ⓒ 3.3333 Ⓓ 7.5233 Ⓔ 4.5328

15. Let $Y = 2X + 10$. Find the standard deviation of Y.

    Ⓐ 2.0902 Ⓑ None of the others Ⓒ 4.5012 Ⓓ 3.9042 Ⓔ 4.8982

16. Find the probability $P(3.6 < X < 18.1)$.

    Ⓐ 0.4444 Ⓑ 0.8632 Ⓒ 0.1823 Ⓓ None of the others Ⓔ 0.6415

Questions 17 through 20.

A and B are playing chess. In each match, A wins with probability 0.7 and B wins with probability 0.1. Suppose that the match results are independent.

17. Consider a random match between A and B. Find the probability that the match result is a draw.

    Ⓐ 0.6 Ⓑ 0.3 Ⓒ 0.2 Ⓓ None of the others Ⓔ 0.1

18. Assuming that A and B play 6 matches, find the probability that A win half of the number of matches. Ⓐ 0.1698 Ⓑ None of the others Ⓒ 0.1852 Ⓓ 0.618 Ⓔ 0.0974

19. Assuming that A and B play 6 matches, find the average number of matches that result in a win or loss. Ⓐ 4.8 Ⓑ 5.8 Ⓒ 3.8 Ⓓ None of the others Ⓔ 0.8

20. Assuming that A and B play 3 matches, find the probability that A doesn't lose at all.

    Ⓐ 0.729 Ⓑ 0.7074 Ⓒ 0.426 Ⓓ 0.784 Ⓔ None of the others