



# PORTAFOLIO DE EVIDENCIAS

2DA OPORTUNIDAD EXTRAORDINARIA

## PROBABILITY AND STATISTICS

**Nombre del estudiante:** \_\_\_\_\_

**Matrícula:** \_\_\_\_\_ **Grupo:** \_\_\_\_\_

**Docente:** \_\_\_\_\_

**Fecha:** \_\_\_\_\_

El presente portafolio forma parte del 50% de tu calificación. Este valor se obtendrá siempre y cuando cumpla con los siguientes requisitos:

1. Escribe tus datos de identificación completos.
2. Adjunta el portafolio en la Plataforma Ms Teams en formato PDF, el día y hora que el docente asigne la tarea correspondiente a la segunda oportunidad; no olvides agregar tu nombre completo en cada hoja.
3. Verifica el envío correcto del portafolio.

**SIGUE LAS INSTRUCCIONES BRINDADAS POR TU MAESTRO PARA EL LLENADO DE ESTE PORTAFOLIO.**

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**El plagio y comercio de material académico contenido en este portafolio será sancionado en los términos de la Legislación Universitaria.**

## **Purpose of the Learning Unit: Probability and Statistics**

The Probability and Statistics Learning Unit aids students in developing probabilistic thinking, which helps in making decisions in situations of uncertainty or chance where it is not possible to predict with certainty what will happen. This type of random thinking directly relies on concepts and procedures from probability theory and the development of statistical thinking using tools, techniques, and methods to develop concepts involving counting techniques, organization, interpretation, and analysis of statistical information. Additionally, it facilitates the development of competencies in other interrelated learning units. For the learning of these studies, the preceding learning units are: Development of Algebraic Thinking, Management of Space Forms, and Functions and Relationships.

The course is structured into four stages: stages 1 and 2 correspond to Descriptive Statistics. In stage 1, students organize, interpret, and analyze statistical information from various contexts through frequency distribution tables and statistical graphs. In stage 2, they obtain measures of central tendency and measures of variation to interpret and analyze statistical information from different contexts, and also analyze the relationship between two variables through correlation. Stages 3 and 4 correspond to Probability. In stage 3, students calculate probabilities using the classical definition and quantify the elements of the event using counting techniques to determine the total number of possible outcomes of an event. In stage 4, they calculate probabilities using rules, axioms, and theorems.

## **Stage 1 Data organization and statistical graphs**

### **Dimension 1: Recuperation**

#### **I Answer the following**

1) Provide the definition of the following concepts:

- a) Statistics: \_\_\_\_\_
- b) Descriptive statistics: \_\_\_\_\_
- c) Inferential statistics: \_\_\_\_\_
- d) Population: \_\_\_\_\_
- e) Finite population: \_\_\_\_\_
- f) Infinite population: \_\_\_\_\_
- g) Sample: \_\_\_\_\_
- h) Probabilistic sample: \_\_\_\_\_
- i) Non-probabilistic sample: \_\_\_\_\_
- j) Statistical unit: \_\_\_\_\_
- k) Variable: \_\_\_\_\_

### **Dimension 2: Understanding**

2) Answer the following questions:

- a) Write an example of probabilistic sample:  
\_\_\_\_\_  
\_\_\_\_\_
- b) Write an example of non-probabilistic sample:  
\_\_\_\_\_

c) Write an example of a situation with a qualitative variable:

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d) Write an example of a situation with a quantitative variable: \_\_\_\_\_

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e) Write an example of a situation with a discrete quantitative variable:

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f) Write an example of a situation with a continuous quantitative variable:

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g) Write an example involving a variable with a nominal scale: \_\_\_\_\_

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h) Write an example involving a variable with a ratio scale: \_\_\_\_\_

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i) Mention the means used as sources of data: \_\_\_\_\_

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### Dimension 3: Analysis

#### II Answer the following

The following table corresponds to the weights in kg of 50 people:

62	46	47	49	49	50	50	50	50	56
48	48	48	45	58	39	63	63	64	66
51	51	51	51	52	59	52	53	53	54
54	55	44	55	56	40	42	43	55	44
52	56	51	56	56	57	59	60	61	46

1) Arrange the data in ascending order (from left to right)

Weights of 50 people (kg)									

2) Arrange the data in a stem-and-leaf plot

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3) Arrange the data in a double stem-and-leaf plot

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### III Explain or define the following concepts:

1) Absolute frequency (  $f$  )

2) Relative frequency (  $fr$  )

3) Percentage frequency (  $f\%$  )

4) Cumulative absolute frequency (  $f_a$  )

5) Cumulative relative frequency (  $f_{ra}$  )

6) Cumulative percentage frequency (  $f\%a$  )

**IV Use the data from the table in section II and answer the following questions:**

1) What is the absolute frequency of people who weighed 52 kg?

2) What is the absolute frequency of people with a weight of 50 kg?

3) What is the relative frequency of people who weighed 50 kg?

4) What is the percentage frequency of people with 48 kg?

5) What is the number of people who weigh less than 56 kg?

- 6) What is the number of people who weigh more than 48 kg?
- 7) What is the relative frequency of people who weigh 50 kg or less?
- 8) What is the percentage of people who weigh 57 kg or less?

**V Answer the following questions**

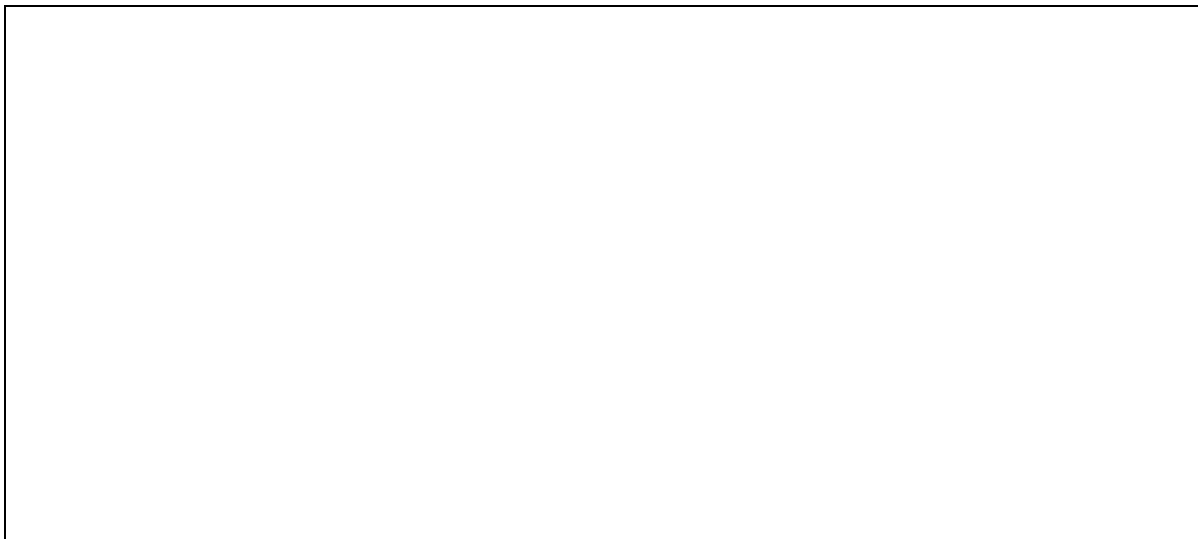
- 1) Write the definition of class interval.
- 2) What is the range of the following data: 5, 8, 8, 9, 10, 10, 15, 16, 17, 18?
- 3) What is the width of a class interval if a table with 7 intervals is to be constructed and the data range is 49 units?
- 4) It is defined as the difference between the midpoints of two continuous intervals.
- 5) If the lower limit of a class interval is 9 and the upper limit is 14, what is the midpoint of that interval?

**VI Based on the formula  $K = 1 + 3.3 \log n$ , determine the number of class intervals needed to group:**

- 1) 30 data points
- 2) 45 data points
- 3) 60 data points
- 4) 80 data points
- 5) 100 data points
- 6) 120 data points
- 7) 140 data points

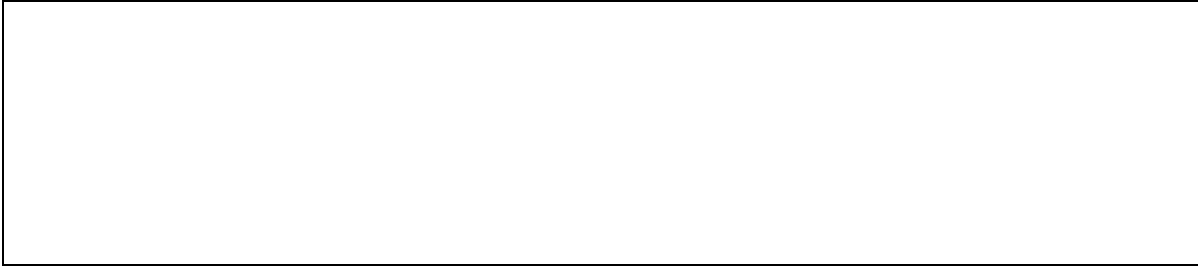
**VII Sketch a hypothetical graph of the following types:**

- 1) Frequency polygon

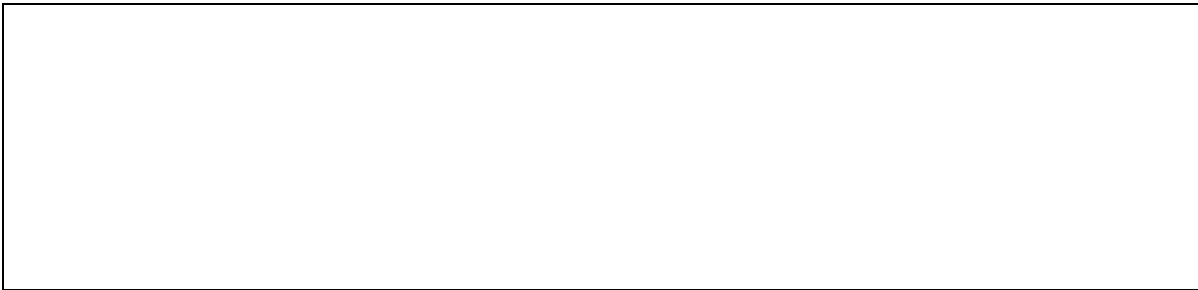




## 2) Histogram



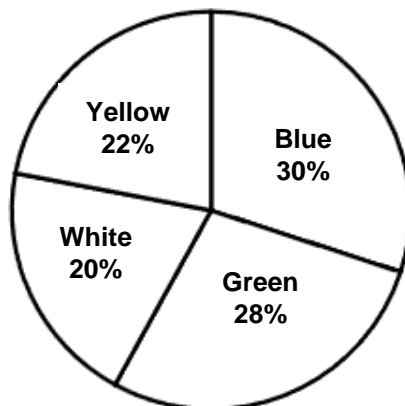
## 3) Bar chart



## 4) Pie chart



**VIII A survey is conducted with 700 people, and the following graph is obtained regarding the preference for the color of a school sports t-shirt.**



- 1) How many people like the color yellow?
- 2) How many people like the color blue?
- 3) How many people like the color green?
- 4) How many people like the color white?

### STAGE 1 EVALUATION

Checklist			
Type of evaluation: heteroevaluation			
Criteria			
		Yes	No
1	Performed procedures in all of the exercises		
2	Legible handwriting and orderly processes were followed		
3	Correct answers were handled		

## Stage 2 Statistical measures

### Dimension1: Recuperation

**I Answer the following questions.**

**1) Write down the definitions of the measures of central tendency:**

a) Mode \_\_\_\_\_

b) Arithmetic mean \_\_\_\_\_

c) Median \_\_\_\_\_

### Dimension 2: Understanding

**II Solve the following problems by writing their formula and procedure as applicable.**

**The following table represents the ages (p) and frequencies (f) of a group of people. Determine the mode.**

p	47	49	50	52	54	55
f	15	20	31	17	37	12

**1 From the following values:**

19, 21, 23, 24, 24, 24 25, 26, 28, 29, 34.

a) Calculate the mode

b) Calculate the median

c) Calculate the mean

2 A frequency table of weights of a sample of 90 people shows that  
 $\sum_{i=1}^n f_i(x_i - \bar{x})^2 = 3328.6$

a) What is the variance?

b) What is the standard deviation?

### Dimension3: Analysis

3. Find the mode of grouped data in a frequency table, with the following specifications: The interval containing the mode has a frequency of 9. The lower limit of the mode-containing interval is 6 units, and the upper limit is 11 units. The frequency before the mode-containing interval is 6, and the frequency after is 5. Consider an interval width of 5 units.

4. Find the median of 30 data points grouped in a frequency table, with the following specifications: The interval containing the median has a frequency of 9. The lower limit of the median-containing interval is 6, and the upper limit is 11. The sum of the frequencies before the median-containing interval is 7. Consider an interval width of 5 units.

5. In a frequency table with grouped data, there are 3 class intervals as follows: 1 - 6 with a frequency of 6; 6 - 11 with a frequency of 9; and 11 - 16 with a frequency of 5. Find the arithmetic mean.

Class interval	Frequency	Class mark
1 – 6	6	
6 – 11	9	
11 – 16	5	

## STAGE 2 EVALUATION

Checklist			
Type of evaluation: heteroevaluation			
Criteria			
		Yes	No
1	Performed procedures in all of the exercises		
2	Legible handwriting and orderly processes were followed		

3	Correct answers were handled		
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### Stage 3 Counting techniques

#### Dimensión1: Recuperation

**I Solve the following problems:**

- 1) Four coins are tossed in the air. In how many different ways can they land?

#### Dimensión 2: Understanding

2) The license plates of certain cars have 3 letters and 4 numbers. How many different plates can you count if letters and numbers can be repeated? Consider 26 letters of the alphabet and numbers from zero to nine.

3) In how many different ways can one eat if they can choose between Restaurant A or B? At Restaurant A, there are four main dishes and three beverages, and at B, there are six main dishes and five beverages.

4) How many arrangements would there be when seating 10 people around a circular table?

5) In how many ways can 8 children playing ring-around-the-rosey be arranged?

6) Eight people compete against each other. In how many different ways can the competition end?

7) In a competition, 4 places are awarded. If there are 18 contestants, in how many ways can the four places be obtained?

8) Trophies will be awarded to the top 3 places in a race. If there are 22 participants, in how many ways can the three places be obtained?

9) Find the number of different signals, each formed of 7 aligned flags, that can be made with a set of 4 red flags and 3 blue flags.

10) How many different signals can be formed by aligning 5 yellow flags and 4 green flags?

### Dimension 3: Analysis

11) In how many ways can a team of 3 people be formed from a group of 25 people?

12) There is a group of 20 people, of which 12 are men and 8 are women. In how many different ways can a team of 7 people be formed, including 4 men and 3 women?

13) Develop the following binomial based on the binomial theorem:  $(a+b)^8$



- 14) In how many different ways can exactly three heads appear when flipping 8 coins? Apply the binomial theorem.

### STAGE 3 EVALUATION

Checklist			
Type of evaluation: heteroevaluation			
Criteria			
		Yes	No
1	Performed procedures in all of the exercises		
2	Legible handwriting and orderly processes were followed		
3	Correct answers were handled		

## **Etapas 4 Probability**

### **Dimension 1: Recuperation**

**I Answer the following questions:**

- 1) Define “probability”
- 2) Define “sample space”

### **Dimension 2: Understanding**

- 3) Write two examples of situations of subjective probability.
- 4) Write two examples of situations of frequency probability.
- 5) Write two examples of situations of classical probability.

### **Dimension 3: Analysis**

**II Solve the following problems:**

1 When rolling a die:

- a) What is the probability of getting a 4?
- b) What is the probability of getting a 2?

c) What is the probability of getting an even number?

d) What is the probability of getting an odd number?

2 An airline provides the following information:

Arrival	Frequency
Ahead of time	93
On time	780
Delayed	70
Cancelled	57
Total	1000

a) What is the probability of arriving early or on time?

b) What is the probability of arriving delayed or cancelled?

c) What is the probability of arriving early or cancelled?

3) Two dice are rolled, one white and one black. Consider their sample space. Find the probability of rolling a two on the white die or a three on the black die.

4) Two dice are rolled, one white and one black. Consider their sample space. Find the probability of rolling a five on the white die or a three on the black die.

5) In an urn, there are 13 balls, of which 8 are black. If two balls are randomly drawn without replacement, what is the probability that both are black?

6) Consider a box with four white balls and five blue balls. If one ball is drawn and then replaced, and another ball is drawn, what is the probability that both are blue?

7) Consider rolling a die and then, without seeing, drawing a ball from a box containing 6 white, 3 red, and 2 green balls. What is the probability of drawing a white ball and rolling a three?

8) Two dice are rolled, one white and one black. What is the probability that the sum of their points is greater than 6, knowing that the white die rolled a number less than 3? (Conditional probability, consider the sample space in your process).

9) Two dice are rolled, one white and one black. What is the probability that the sum of their points is greater than 8, knowing that the white die rolled a number less than 5? (Conditional probability, consider the sample space in your process).

#### STAGE 4 EVALUATION

Checklist			
Type of evaluation: heteroevaluation			
Criteria			No
Yes			
1	Performed procedures in all of the exercises		
2	Legible handwriting and orderly processes were followed		
3	Correct answers were handled		

### **Metacognition Activity (Self-Assessment)**

1. Do you think that after completing this portfolio you have improved your mathematical skills?

A lot ( )

Regular ( )

Nothing ( )

2. Do you feel that you can make further progress in your mathematical skills?

A lot ( )

Regular ( )

Nothing ( )

3. How would you rate your performance in completing the portfolio of evidence?

High ( )

Regular ( )

Low ( )

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