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SCHOOLS DIVISION OF NEGROS ORIENTAL
REGION VII

Kagawasan Ave., Daro, Dumaguete City, Negros Oriental



STATISTICS and PROBABILITY

Quarter 3 – Module 1

Random Variables and Probability Distributions



Statistics and Probability – Grade 11
Alternative Delivery Mode
Quarter 3 – Module 1: Random Variables and Probability Distributions
Second Edition, 2021

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



What I Need to Know

This module was designed to provide you with fun and meaningful opportunities for guided and independent learning at your own pace and time. You will be enabled to process the contents of the learning resource while being an active learner.

The module is intended for you to illustrate a random variable, distinguish between a discrete and a continuous random variable and find the possible values of the variable.

After going through this module, you are expected to illustrate a probability distribution for a discrete random variable and its properties.



What I Know

PRE-ASSESSMENT

Multiple Choice. Answer the following statements by writing the letter of the correct answer on your activity notebook/ activity sheets.

1. Which of the following is NOT a discrete variable?
 - A. The number of coins that match when three coins are tossed at once.
 - B. The number of non-defective I-phone
 - C. The weight of box delivered by the grab driver last December
 - D. The number of vehicles owned by Ambrocio family
2. Which of the following is NOT a continuous variable?
 - A. The number of arrivals at an emergency room between 8am to 8pm
 - B. The temperature of a cup of tea served at a restaurant
 - C. The weight in pounds of a bag of powdered milk as relief good last month
 - D. The average height of “rubber trees” along Rovera Street
3. A variable where the information or data can take infinitely many values and can also be obtained by measuring?
 - A. Qualitative variable
 - B. Quantitative variable
 - C. Continuous variable
 - D. Discrete Variable
4. Which of the following statement describe a continuous variable?
 - A. The average distance travelled by a jeep in a week
 - B. The number of students present in a class
 - C. The number of girls wearing eyeglasses

5. A variable whose value could be a finite and countable number is a
 A. Continuous variable B. Discrete variable C. Qualitative D. Quantitative
6. Which of the following is discrete random variable?
 A. Claire is 165 cm tall C. Claire weighs 68 kilograms
 B. Claire has 5 pets D. Claire ran 500 meters in two minutes
7. Which of the following is NOT a continuous random variable?
 A. The height of the airplane's flight
 B. The amount of liquid on a container
 C. The number of COVID 19 cases each day
 D. The length of time for the check up in the hospital
8. You decided to conduct a survey of families with five children. You are interested in counting the number of girls (out of five children) in each family. Is this a random variable?
 A. Maybe C. Yes, it is a random variable.
 B. Cannot be determined D. No, it is not a random variable.
9. If a coin is tossed, what are the possible values of the random variable for the number of tails?
 A. 0,1,2,3 B. 1,2,3 C. 0,1,2 D. 0,1
10. Suppose 3 scientific calculators are tested. Let D represent the defective scientific calculator and N for the non-defective. How many possible outcomes will occur from the experiment?
 A. 3 B. 4 C. 8 D. 9
11. You decide to conduct a survey of families with two children. You are interested in counting the number of boys (out of two children) in each family. Is the above experiment "counting the number of boys (out of 2 children) in each family a random variable?
 A. Yes, it is a random variable. C. Maybe
 B. No, it is not a random variable. D. It cannot be determined.
12. Which of the following is NOT a true statement.
 A. Each probability (x) must be between or equal to 0 and 1;
 B. that is $0 \leq P(x) \leq 1$.
 C. The sum of all the probabilities is 1.
 D. Random variables can only have one value.
13. Which of the following values is not the value of the probability of the random variable?
 A. 1.05 B. 0.5 C. 0.15 D. 0.05
14. What would be the probability of picking a face card (i.e. a king, queen, or jack)?
 A. $P(\text{Face}) = 4/52 = 1/13$ C. $P(\text{Face}) = 12/52 = 3/13$
 B. $P(\text{Face}) = 6/52 = 3/26$ D. $P(\text{Face}) = 8/52 = 2/13$
15. What is the probability of rolling, on a fair dice "a number greater than 4"?
 A. $P(\text{greater than } 4) = 0$ C. $P(\text{greater than } 4) = P(5 \text{ or } 6) = 2/6 = 1/3$
 B. $P(\text{greater than } 4) = 1/2$ D. $P(\text{greater than } 4) = P(1, 2, 3, 4, 5, 6) = 6/6 = 1$

Lesson 1

Illustrating Random Variables and Distinguishing Between a Discrete and Continuous



What's In

Review

The word “random” is often read and heard from people of different walks of life. Like, “the distribution of relief goods is randomly chosen in our barangay”, “There is a random SWAB testing which will be conducted by our local health unit on Saturday”. But does it tell about a real random event? No, this is a decision that was made on the basis of other variables as desire and the lack of satisfaction with other options.

The word random has a different meaning in the field of statistics. It is random when it varies by chance.



What's New

This module will help you understand the process of illustrating random variable and distinguishing between a discrete and a continuous random variable.

Activity 1: Tossing a coin

As you can see in a one-peso coin, it has Dr. Jose P. Rizal on one side, which we call it as Head (H), and the other side as the Tail (T). Toss your one-peso coin three times and record in your notebook the results of the three tosses. In order to write the result easily, use letter H for the heads and letter T for the tails.

If the results of your three tosses are head, head, head, then you will write HHH on your notebook.

Example 1: How many heads when we toss 3 coins? Continue tossing your coin and record the time. If possible, use mobile phone timer and record up to the last minutes.

Let say in a minute, how many times the heads and tails appeared. Then record all the possible answers on your notebook.

Write all eight possible outcomes. You can do this systematically so that you do not get confused later on.

You have noticed that, there are 0 head, 1 head, 2 heads, or 3 heads. Thus, the sample space is equal to 0,1,2,3.

Then this time the results or outcomes are NOT entirely equally likely. The three coins land in eight possible ways:

$X = \text{Number of Head}$

Looking at the table below, we see just 1 case of Three Heads, but 3 cases of Two Heads, 3 cases of One Head, and 1 case of Zero Head.

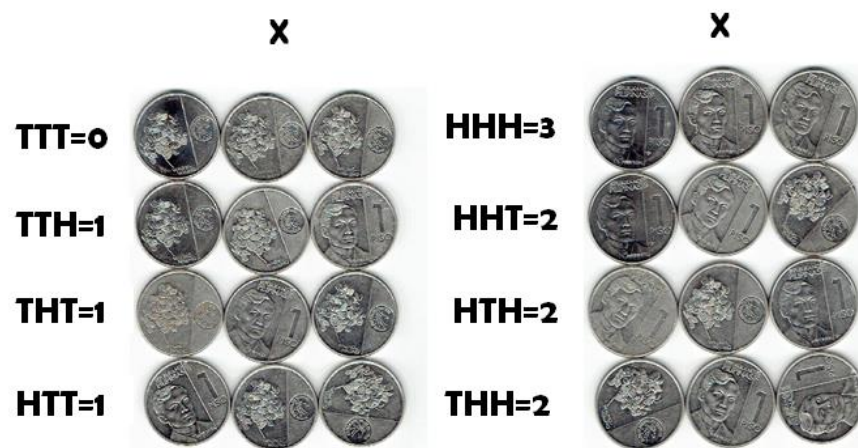


Figure 1. Tossing Coins

So,

$$P(X=3) = 1/8$$

$$P(X=2) = 3/8$$

$$P(X=1) = 3/8$$

$$P(X=0) = 1/8$$

This particular example is a discrete variable. A random variable is called **discrete** if it has either a finite or a countable number of possible values. Thus, a discrete random variable X has possible values x_1, x_2, x_3, \dots . A random variable is called **continuous** if its possible values contain a whole interval of numbers.

From another source, a **random variable** is a numerical quantity that is generated by a random experiment. (Malate, 2018).

We will denote random variables by capital letters, such as X or Z , and the actual values that they can take by lowercase, such as x and z .



What is It

Discussion

To clearly understand, more examples are given in table 1.

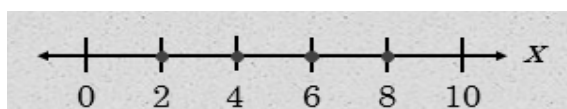
Table 1. Examples of random variables

Experiment	Number X	Possible Values
Roll two fair dice	Sum of the number of dots on the top faces	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Flip a fair coin repeatedly	Number of tosses until the coin lands heads	1,2,3,4,...
Measure the voltage at an electrical outlet	Voltage measured	$118 \leq x \leq 122$
Operate a light bulb until it burns out	Time until the bulb burns out	$0 \leq x < \infty$

The four examples in the table above are random variables. In the second example, the three dots indicate that every counting number is a possible value for X. The set of possible values is infinite, but is still at least countable, in the sense that all possible values can be listed one after another. In the last two examples, by way of contrast, the possible values cannot be individually listed, but take up a whole interval of numbers. In the fourth example, since the light bulb could conceivably continue to light indefinitely, there is no natural greatest value for its lifetime, so we simply place the symbol ∞ for infinity as the right endpoint of the interval of possible values. (Saylor Academy 2012)

About random variables

- That a random variable must take exactly one value for each random outcome.
- That random variables are conceptually different from the mathematical variables that they have met before in math classes. A random variable is linked to observations in the real world, where uncertainty it involved.



- c. Random variables are used to model outcomes of random processes that cannot be predicted deterministically in advance (the range of numerical outcomes may, however be viewed).

Definition

A **random variable** is a numerical quantity that is generated by a random experiment. (*Malate, 2018*)

A **random variable** is discrete if it has a finite or countable number of possible outcomes that can be listed.

A random variable is called **discrete** if it has either a finite or a countable number of possible values. A random variable is called **continuous** if its possible values contain a whole interval of numbers. (*Malate, 2018*)

A **random variable** is continuous if it has an uncountable number of possible outcomes, represented by the intervals on a number line. (*Course Hero n.d.*)

Example:

Discrete Random Variable

1. Number of heads in 4 flips of a coin (possible outcomes are 0, 1, 2, 3, 4)
2. Number of classes missed from March 2020 to December 2020
3. The number of siblings a person has
4. The number of Covid-19 cases in Negros Oriental in 2020
5. The number of students involve in Online classes in Neg. Or. Division during this pandemic time

Continuous Random Variables

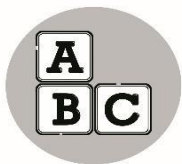
1. Heights of students in a class
2. Time to finish a module
3. Hours spent exercising
4. Distance travelled from Dumaguete to Pamplona

A **continuous variable** is a value that is being acquired by measuring.

Activity 2.

Complete the following table. The first one is done for you.

Experiment	Number X	Possible Value of X
Two cards are drawn from a deck	Sum of the numbers on the card	4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 (since, the least number in the card is 10, therefore, the smallest possible sum of the numbers on the cards when two cards are drawn is 4, while the highest possible sum of the numbers on the cards I 20)
Roll a pair of dice	Sum of the number of dots on the top faces	
Toss a fair coin repeatedly	Number of tosses until the coin lands head	
Height of the members of your family (using a meter stick)	Height of each member	



What's More

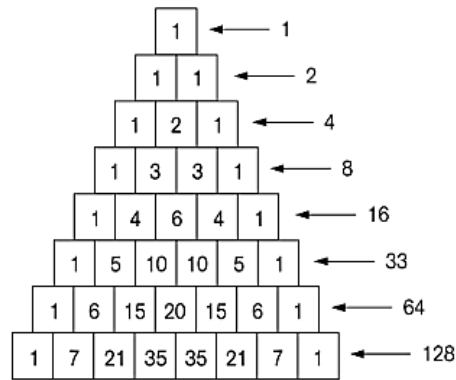
Enrichment Activities

Activity 3

In tossing a coin four times, how many outcomes correspond to each value of the random variable?

What if the coin would be tossed five times? six times? seven times? eight times?

Try to relate the outcomes to the numbers in Pascal's triangle.



For tossing the coin four times, there will be five possible values,

0, 1, 2, 3, 4, with
1, 4, 6, 4, 1 outcomes, respectively.

For five coins there are six possible values,

0, 1, 2, 3, 4, and 5, with
1, 5, 10, 10, 5, 1 outcomes, respectively.

In general, for n tosses of a coin, there are $n+1$ possible values, 0, 1, 2, 3, ..., n . If k is a possible value, then there are

$${}_nC_k = \binom{n}{k} = \frac{n!}{k!(n-k)!} \quad \text{outcomes associated with } x.$$

(Abacea 2016)

Independent Activity 4

Look back and reflect.

1. How do you determine the values of a random variable?
2. How do you know whether a random variable is continuous or discrete?
3. What is the difference between the two types of random variables?

Independent Assessment 1

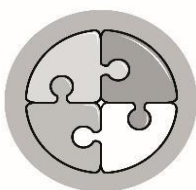
Classify the following variables as discrete or continuous. Write **D** if discrete and **C** if continuous.

1. The speed of bus
2. The number of COVID-19 patients aging 60 and above
3. The average weight of new born babies in the 2020
4. The number of vehicles owned by randomly selected individuals
5. The average temperature of the costumers in a department store last week as reflected in the logbook

Lesson 2

Finding the possible values of a random variable and illustrating a probability distribution for a discrete variable

You are now ready to plunge into this new lesson since you are fully packed with what you have learned from the previous lesson on illustrating a random variable and distinguishing between discrete and continuous random variable.



What's In

Review

Recall that a variable is an attribute that can assume different values. We use letters to denote or represent a variable. In this lesson, we shall discuss variables that are resulted from an experiment by chance, called random variables.

Activity 5

To find out if you are ready to learn this new lesson, try to determine whether each of the following experiments/situations involved discrete or continuous random variable.

1. Choosing an event greater than 25 but less than 50.
2. Recording the number of households in all the towns of Neg Or province who received relief goods last March 2020
3. Gathering information about the monthly load consumption of the Senior High School students of your school
4. Teacher applicants in the Division of Negros Oriental
5. Tallying the number of patients who recovered from COVID-19



What's New

To understand how one finds possible values of random variables, do the activity below.

Situation.

A certain area in the Southern part of Negros Oriental experienced black out. A couple, having a new born baby, found difficulty putting their baby to sleep when there is no electricity. The couple has two (2) Mini 12v rechargeable hybrid car batteries. They thought of using it to at least put up a single light bulb. To make sure that both are functioning well they need to test them randomly first. Thus, to each outcome in the sample space we shall assign a value. These are 0, 1, or 2. If there is no defective, we assign the number 0; if there is 1 defective, we assign the number 1; and 2, if there are two defective batteries. The number of defective batteries is a random variable. The possible values of this random variable are 0, 1, and 2.

Illustration

Let **D** represent the defective battery and **N** for the non-defective. If we let **Y** be the random variable representing the number of defective battery, show the values of the random variable **Y**. Complete the table below to show the values of the random variable. (Matibag 2020).

Possible Outcomes	Value of the Random Variable Y (number of defective battery)

The complete table should look like this.

Possible Outcomes	Value of the Random Variable Y (number of defective battery)
DD	2
NN	0
DN	1
ND	1

Activity 6

Now, it's your turn.

Suppose three laptops are tested at random. We want to find out the number of non-defective laptops. Thus, to each outcome in the sample space we shall assign a value. These are 0, 1, 2, or 3. If there is no defective laptop, we assign the number 0; if there is 1 non-defective, we assign the number 1; if there are 2 non-defective laptops, we assign the number 2; and assign 3 if there are 3 non-defective laptops. If we let X be the random variable representing the number of non-defective laptops, show the values of the random variable X . Complete the table below to show the values of the random variable. Let N be non-defective laptop and D for defective.

Possible Outcomes	Value of the Random Variable X (number of non-defective laptops)

This time, you need to reflect on the following questions because it will help you to understand the appropriate way in finding the possible values of a random variable.

Answer the following questions:

1. How do you find the activity?
2. Were you able to complete the table? If yes, how? If no, why?
3. Will you be able to find the values of a random variable? If yes, how? If no, why?
4. In your own words, how will you describe a random variable?
5. How do you find the possible values of a random variable?



What is It

Discussion

A *random variable* is a numerical quantity that is derived from the outcomes of random experiments.

The random variable in the activity above is a discrete random variable because the set of possible outcomes is countable. The possible values of random variable Y (number of defective batteries) are 0, 1, and 2, while the possible values of random variable X (number non-defective laptops) are 0, 1, 2, and 3.

Independent Activity 7.

Try this example.

Example 1.

Suppose two coins are tossed, let Z be the random variable representing the number of heads that occur. Find the values of the random variable Z .

Steps	Solution	
1. Determine the sample space. Let H represent head and T for tail.		
2. Count the number of heads in each outcome in the sample space and assign this number to this outcome.	Possible Outcomes	Value of the random variable Z (Number of heads)

Your answer might be the same as this.

Steps	Solution	
1. Determine the sample space. Let H represent head and T for tail.	The sample space for this experiment is: $S = \{TT, TH, HH, HT\}$	
2. Count the number of heads in each outcome in the sample	Possible Outcomes	Value of the random variable Z (Number

space and assign this number to this outcome.		of heads)
	TT	0
	TH	1
	HH	2
	HT	1

So, the possible values of the random variable Z are 0, 1, and 2.

Definition:

A probability distribution of a discrete random variable X is a list of each possible value of X and the corresponding probabilities of the values.

A probability distribution has two requirements:

1. Each probability $P(x)$ must be between or equal to 0 and 1; that is $0 \leq P(x) \leq 1$.
2. The sum of all the probabilities is 1.

From the example above in tossing two coins, letting Z be the random variable representing the number of heads that occur. We have the possible values of the random variable Z as 0, 1, and 2.

This time, you do another activity.

Independent Activity 8.

A fair coin is tossed twice. Let Z be the number of heads that are observed.

- a) Construct the probability distributions of Z .
- b) Find the probability that at least one head is observed.

Solutions:

- a. The possible values that X can take are 0,1, and 2. Each of these numbers corresponds to an event in the sample space $S = \{TT, TH, HT, HH\}$ of equally likely outcomes for this experiment: $Z = 0$ to $\{TT\}$, $Z = 1$ to $\{HT, TH\}$, and $Z = 2$ to $\{HH\}$. The probability of each of these events, hence of the corresponding value of Z , can be found simply by counting, to give.

x	0	1	2
P(x)	1/4 or 0.25	2/4 or 0.5	1/4 or 0.25

This table is the probability distribution of X .

- b. “At least one head” is the event $X \geq 1$, which is the union of the mutually exclusive events $X = 1$ and $X = 2$. Thus

$$P(X \geq 1) = P(1) + P(2) = 0.5 + 0.25 = 0.75$$

A histogram that graphically illustrates the probability distribution is given in the figure below.

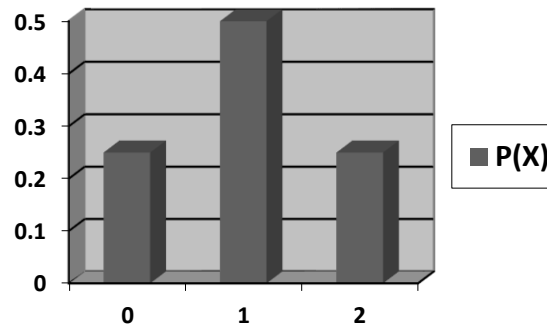


Figure 2. Probability Distribution for Tossing a Fair Coin Twice

Example 2.

A pair of fair dice is rolled. Let X denotes the sum of the number of dots on the top faces.

- Construct the probability distribution of X .
- Find $P(X \geq 9)$.
- Find the probability that X takes an even value.

Solutions:

The sample space of equally likely outcomes is:

(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

- a. The possible values for X are the numbers 2 through 12. $X=2$ the event (1,1), so $P(2) = 1/36$. $X=3$ is the event (1,2), (2,1), so $P(3) = 2/36$. Continuing this way we obtain the table.

x	2	3	4	5	6	7	8	9	10	11	12
P(x)	1/36	2/36	3/36	4/36	5/36	6/36	5/36	4/36	3/36	2/36	1/36

Table on the Probability Distribution of X

- b. The event $X \geq 9$ is the union of the mutually exclusive events $X=9$, $X=10$, $X=11$, and $X=12$. Thus,

$$P(X \geq 9) = P(9) + P(10) + P(11) + P(12) = 5/18$$

$$P(X \geq 9) = 4/36 + 3/36 + 2/36 + 1/36$$

$$P(x \geq 9) = 10/36$$

- c. Before we immediately jump to the conclusion that the probability that X takes an even must be 0.5, note that X takes six different even values but only five different odd values. We compute

$$P(X \text{ is even}) = P(2) + P(4) + P(6) + P(8) + P(10) + P(12)$$

$$P(X \text{ is even}) = 1/36 + 3/36 + 5/36 + 5/36 + 3/36 + 1/36$$

$$P(X \text{ is even}) = 18/36$$

$$P(X \text{ is even}) = 1/2$$

$$P(X \text{ is even}) = 0.5$$

A histogram that graphically illustrates the probability distribution is given in the figure below.

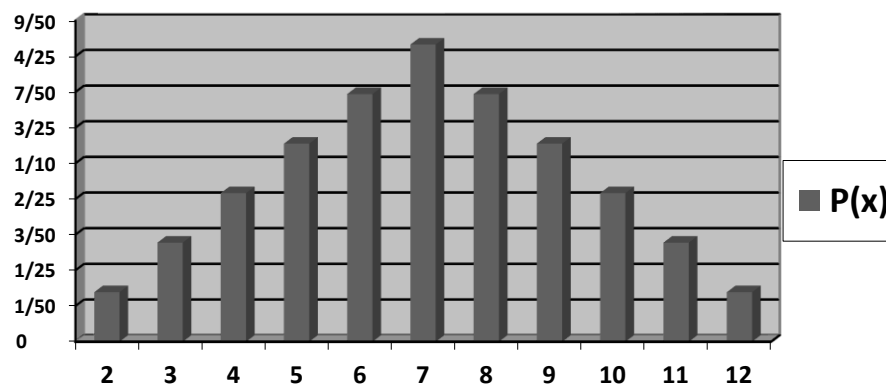
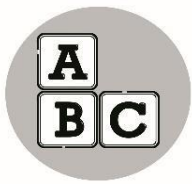


Figure 2. Probability Distribution for Tossing 2 Fair Dice



What's More

Enrichment Activities

Independent Activity 9

Understanding Possible Values of Random Variables.

Answer the following questions.

1. How do you find the values of a random variable?
2. How is this variable, as described in Algebra, similar to a random variable? How do they differ?



What I Have Learned

Generalization

Activity 10

Directions: Reflect the learning that you gained after taking up this lesson on “Illustrating Random Variable (Discrete and Continuous) by completing the given statements below. Do this on your activity notebook. Do not write anything on this module.

What were your thoughts or ideas about the topic before taking up the lesson?

I thought that _____

_____.

\

What new or additional ideas have you had after taking up this lesson?

I learned that _____

_____.

How are you going to apply your learning from this lesson?

I will apply _____

_____.



What I Can Do

Application (Performance Task)

Activity 11

A. Data Collection Activity

Following the template below, supply the data information by interviewing/asking 20 of your neighbours of different ages. Write your answer in a small drawing book/notebook. (*date of submission depends on the subject teacher*).

Name	Sex	Age	No. of siblings	Height(cm)	Weight (kg)	Body temperature	No. of pets at home	No, of hours spent in answering the module (week)
1								
2								
3								
.								
.								
.								
20								

Identify the variables as discrete or continuous?

1. Sex
2. Age
3. Number of Siblings
4. Height
5. Weight
6. Body temperature
7. No. of pets at home
8. No. of hours spent in answering the module

This performance task is worth 30 points. It is based on the Data Analysis Project Rubric below.

	Unsatisfactory (0 point)	Needs Improvement (5points)	Satisfactory (7 points)	Exemplary (10 points)
Survey Completeness	Surveyed 0-5 people only	Surveyed 6-12 people only	Surveyed 13- 19 people only	100% survey completed
Data accuracy	0-25% data accuracy	26-50% data accuracy	51-75% data accuracy	76-100% data accuracy
Neatness	0-25% data neatness	26-50% data neatness	51-75% data neatness	76-100% data neatness

(Note to teacher: The final say as to the number of credit points in each column still depends on you).



Assessment

Instructions: Multiple Choice. Answer the following statements by writing the letter of the correct answer on your activity notebook.

1. A variable whose value could be a finite and countable number is a
 - A. Continuous variable
 - B. Qualitative variable
 - C. Discrete variable
 - D. Quantitative variable
2. Which of the following is discrete random variable?
 - A. Jean's hair color is blue
 - B. Jean weighs 68 kilograms
 - C. Jean ran 350 meters in 3 minutes
 - D. Jean has 6 bags color (blue, green, yellow, red and violet)
3. Which of the following is NOT a continuous random variable?
 - A. The height of the airplane's flight
 - B. The number of COVID 19 cases in Zamboanguita in the month of November
 - C. The amount of liquid on a container
 - D. The length of time for the check up in the hospital
4. Which of the following is NOT a discrete variable?
 - A. The weight of box delivered by the grab driver last December
 - B. The number of non-defective laptops
 - C. The number of vehicles owned by Teves's family
 - D. The number of coins that match when three coins are tossed at once.
5. Which of the following is NOT a continuous variable?
 - A. The number of arrivals at an emergency room between 8am to 8pm
 - B. The temperature of a cup of tea served at a restaurant
 - C. The weight in pounds of a bag of powdered milk as relief good last month
 - D. The average height of "rubber trees" along Rovera Street
6. A variable where the information or data can take infinitely many values and can also be obtained by measuring?
 - A. Continuous variable
 - B. Quantitative variable
 - C. Qualitative variable
 - D. Discrete Variable
7. Which of the following statement describe a continuous variable?
 - A. The number of students who have not returned the modules
 - B. The average speed travelled by a van in a month
 - C. The number of motorists not wearing helmet
 - D. The number of parents who are very cooperative in the Learning Continuity Plan of the DepEd

8. You decided to conduct a survey of families with five children. You are interested in counting the number of girls (out of five children) in each family. Is this a random variable?
 - A. Maybe
 - B. Yes, it is a random variable
 - C. No, it is not a random variable
 - D. Cannot be determined
9. If a coin is tossed, what are the possible values of the random variable for the number of tails?
 - A. 0,1,2,3
 - B. 1,2,3
 - C. 0,1,2
 - D. 0,1
10. Suppose 3 scientific calculators are tested. Let **D** represent the defective scientific calculator and **N** for the non-defective. How many possible outcomes will occur from the experiment?
 - A. 3
 - B. 4
 - C. 8
 - D. 9
11. What would be the probability of picking a face card (i.e. a king, queen, or jack)?
 - A. $P(\text{Face}) = 12/52 = 3/13$
 - B. $P(\text{Face}) = 4/52 = 1/13$
 - C. $P(\text{Face}) = 6/52 = 3/26$
 - D. $P(\text{Face}) = 8/52 = 2/13$
12. What is the probability of rolling, on a fair dice “a number greater than 4”?
 - A. $P(\text{greater than } 4) = 0$
 - B. $P(\text{greater than } 4) = 1/2$
 - C. $P(\text{greater than } 4) = P(5 \text{ or } 6) = 2/6 = 1/3$
 - D. $P(\text{greater than } 4) = P(1,2,3,4,5,6) = 6/6 = 1$
13. You decide to conduct a survey of families with two children. You are interested in counting the number of boys (out of two children) in each family. Is the above experiment “counting the number of boys (out of 2 children) in each family a random variable?
 - A. Yes, it is a random variable.
 - B. No, it is not a random variable.
 - C. Maybe
 - D. It cannot be determined.
14. Which of the following is NOT a true statement:
 - A. Each probability (x) must be between or equal to 0 and 1; that is $0 \leq P(x) \leq 1$.
 - B. The sum of all the probabilities is 1.
 - C. Random variables can only have one value.
 - D. The value of a random variable could be zero.
15. Which of the following values is not the value of the probability of the random variable?
 - A. 1.05
 - B. 0.5
 - C. 0.15
 - D. 0.05



Answer Key

PRETEST:

1. C 4. A 7. C 10. C 13. A
2. A 5. B 8. C 11. A 14. C
3. C 6. B 9. D 12. C 15. C

Independent Activity 4 (answers may vary)

Independent Assessment 1
1. C 3. C 5. C
2. D 4. D

Activity 5

1. C 2. D 3. C 4. D 5. C

Activity 6

Possible Outcomes	Value of the Random Variable X (number of non-defective laptops)
NNN	3
NND	2
NDN	2
NDD	1
DNN	2
DND	1
DDN	1
DDD	0

1-5. Answers may vary

Activity 9

1 & 2. Answers may vary

Activity 10 – Answers may vary

Activity 11 Performance Task. – Answers may vary.

1. C 6. A 11. A
2. D 7. B 12. C
3. B 8. B 13. A
4. A 9. D 14. C
5. A 10. C 15. A

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