SHS LEARNING ACTIVITY

Name: _____ **Score/Mark:** _____
Grade and Section: _____ **Date:** _____
Strand: ☐STEM ☐ABM ☐HUMSS ☐ICT (*TVL Track*)
Subject: *Statistics and Probability*
Type of Activity ☐ Concept Notes ☐ Skills: Exercise / Drill ☐ Illustration ☐ Laboratory Report ☐ Essay/Task Report ☐ Others: _____

Activity Title: Probability Distribution
Learning Target: To define and illustrate a probability distribution of a discrete random variable.
To enumerate the properties of a probability distribution.

References: *(Author, Title, Pages)*
1) Walpole, R. E. et al. "Probability and Statistics for Engineers & Scientists, 8th Ed", pp. 83-96;
2) L.A. Sajulga, CVIF Learning Activities

The set of ordered pairs $(x, f(x))$ is called the **probability distribution** of the discrete random variable X where $f(x) = P(X = x)$ satisfies the following characteristics:

i. $0 \le f(x) \le 1$, (The value of each probability is between 0 and 1.)
ii. $\sum_x f(x) = 1$, (The total or summation of all probabilities is equal to 1.)

The probability distribution is also referred to as the **probability function**.

Suppose a supplier delivers laptop computers to a store. If each box delivered can either be a defective or a non-defective unit, give the *probability distribution* for the number of defective computers delivered if a school randomly purchases 4 boxes from this store.

Solution: Let D represent the defective computers and g those units which are in good condition.

Sample space: $\Omega = \{D_1D_2D_3D_4, g_1g_2g_3g_4, D_1g_2g_3g_4, g_1D_2g_3g_4, g_1g_2D_3g_4, g_1g_2g_3D_4, D_1D_2g_3g_4, g_1D_2D_3g_4, g_1g_2D_3D_4, D_1g_2D_3g_4, g_1D_2g_3D_4, D_1g_2g_3D_4, D_1D_2D_3g_4, D_1D_2g_3D_4, g_1D_2D_3D_4, D_1g_2D_3D_4\}$ $\rightarrow n(\Omega) = 16$

X ~ is the number of defective computers purchased

$X = \{0, 1, 2, 3, 4\}$ $\rightarrow$ the possible numbers of defective computers in purchasing 4 boxes of this unit

Using the definition of probability of a random variable: $(X = x) = \frac{n(E)}{n(\Omega)}$:

i) $f(0) = P(X = 0) = \frac{1}{16}$	iii) $f(2) = P(X = 2) = \frac{6}{16}$	v) $f(4) = P(X = 4) = \frac{1}{16}$
ii) $f(1) = P(X = 1) = \frac{4}{16}$	iv) $f(3) = P(X = 3) = \frac{4}{16}$	

Hence, the probability distribution of X above is,

x	0	1	2	3	4
$f(x)$	$\frac{1}{16}$	$\frac{4}{16}$	$\frac{6}{16}$	$\frac{4}{16}$	$\frac{1}{16}$

Exercise: Ingga takes the bus to go to school everyday. If there are only two buses (a yellow bus and a white bus) that pass by her house to her school, give the probability distribution that for three consecutive days, the bus that will pass by at the moment she is waiting in front of her house is a yellow-colored bus.

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