LEARNING AS ONE NATION

Expanded Project

Stat & Prob_6

SHS LEARNING ACTIVITY

Name: _____ **Score/Mark:** _____

Grade and Section: _____ **Date:** _____

Strand: ☐ STEM ☐ ABM ☐ HUMSS ☐ ICT (*TVL Track*)

Subject: ***Statistics & Probability***

Type of Activity: ☐ Concept Notes ☐ Skills: Exercise/Drill ☐ Illustration ☐ Performance Task ☐ Essay/Report ☐ Others: _____

Activity Title: Mean of a Discrete Random Variable

Learning Target: To define and calculate the mean of a discrete random variable.

References: *(Author, Title, Pages)* L.A. Sajulga, CVIF Learning Activities

The **mean** or **expected value** of a discrete random variable X describes the average or central value of its probability distribution. It is denoted by the symbol μ or E(X) and its defining equation is given by:

$$\boxed{\mu = E(X) = \sum_x xf(x)}$$

Example: Suppose an ice cream vendor wants to find out the average income he gets between 4:00 p.m. to 5:00 p.m. on any fair-weathered Sunday. Given the probability distribution of X as the random variable for the amount of money earned for that period; find his expected earnings.

x (Php)	700	900	1,100	1,300	1,500
$f(x)$	$\frac{1}{12}$	$\frac{5}{12}$	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{12}$

Solution:

$$\mu = E(X) = \sum_x xf(x) =$$

$$= \left[\frac{1}{12}(700) + \frac{5}{12}(900) + \frac{1}{4}(1100) + \frac{1}{6}(1300) + \frac{1}{12}(1500)\right]$$

$$\boxed{= \mathbf{1{,}050.00}\ \text{Php}}$$ expected earnings for any sunny Sunday.

Note that although the mean of a random variable will give you the possible average value, it does not necessarily describe the possible outcome for a statistical experiment.

Exercises:

1. Suppose an antique dealer wants to sell a box containing seven (7) vintage bracelets. However, three (3) bracelets are made of pure gold (not known by the antique dealer). Given the probability mass function, what is the expected value of the number of pure gold bracelets if you bought three (3) pieces from that box?

$$f(x) = \frac{\binom{3}{x}\binom{4}{3-x}}{\binom{7}{3}}, for\ x = 0, 1, 2, 3.$$

2. The probability distribution of X ~ number of a newly discovered species of starfish found in every square meter of a certain bay area is given in the table below. Find the average number of this species in every square meter of that particular bay.

x	0	1	2	3	4
$f(x)$	0.41	0.37	0.16	0.05	0.01