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 of a Random Variable
Learning Target: To solve for the probability of a random variable.
References: *(Author, Title, Pages)*
1) Walpole, R. E. et al. "Probability and Statistics for Engineers & Scientists, 8th Ed", pp. 48-51;
2) L.A. Sajulga, CVIF Learning Activities

Suppose we go back to the experiment where Chlara has to randomly draw a pen from her bag which has two different colors of pens: a black pen and a red pen. Now, its *random variable* **X** is defined as the "color of the pen drawn randomly" or formally, we can say that:

$$X = \begin{cases} 0, & \textit{if the pen taken is black} \\ 1, & \textit{if the pen taken is red} \end{cases}$$

Suppose we are asked, "What will be the probability of getting a black-colored pen?" This means we need to find the probability that $X = 0$. We can express this problem by finding $P(X = 0)$. Recall in your Math 10 that we can calculate the probability of an **event** (a subset in the sample space) with different equally likely outcomes by using the equation:

$$P(E) = \frac{\textit{Number of event outcomes}}{\textit{Total number of possible outcomes in the sample space}} = \frac{\boldsymbol{n(E)}}{\boldsymbol{n(\Omega)}}$$

Since finding the probability of an event is the same as finding the probability of a random variable, therefore:

$$P(E) = P(X = 0) = \frac{n(E)}{n(\Omega)} = \frac{\mathbf{1}}{\mathbf{2}}$$

The probability of drawing a black pen is $\boldsymbol{P(X = 0)} = \frac{\mathbf{1}}{\mathbf{2}}$ or 50%.

It also follows that the probability of getting the red colored pen is:

$$P(X = 1) = \frac{n(E)}{n(\Omega)} = \frac{\mathbf{1}}{\mathbf{2}}$$

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Exercises: In each item, make sure to construct the corresponding random variable and sample space.

1. If you randomly guess at the answer in a Multiple Choice exam with five letter choices (a, b, c, d, e), what is the probability of getting the right answer? Express your answer in fraction and percentage form.
2. In a Statistics class, there are 14 female regular students, 24 male regular students, 16 female transferees, and 8 male transferees. If a person is randomly chosen by the instructor to answer a question, determine the probability that the student selected is a:
   a) female b) transferee