LEARNING AS ONE NATION

Expanded Project

Stat & Prob_11

S H S L E A R N I N G A C T I V I T Y

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: Area under the Standard Normal Curve I

Learning Target: To identify the regions under a standard normal curve.
To compute for probabilities using the standard normal table.

References: *(Author, Title, Pages)*
1) Walpole, R. E. et al. "Probability and Statistics for Engineers & Scientists, 9th Ed", pp. 192-203;
2) L.A. Sajulga, CVIF Learning Activities

From the previous activity, we learned that the *shaded area bounded between two points under a normal curve is equal to the* ***probability*** *of a random variable* X. On one hand, in Figure A, the bounded region from the X-curve represents the probability of a normal random variable X assumed between $x = x_1$ and $x = x_2$. Figure B, on the other hand, illustrates the standardized normal Z-curve obtained from the converted X-curve using the formula: $Z = \frac{X-\mu}{\sigma}$. Due to this transformation formula, the shaded region under the X-curve **is equal** to the shaded area in the Z-curve.

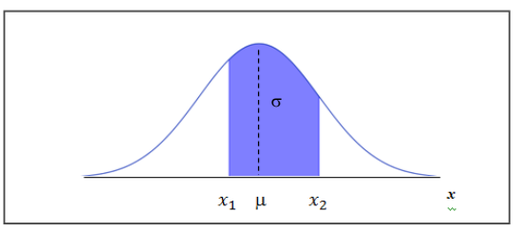


Figure A: $P(x_1 < x < x_2) = area\ of\ the\ shaded\ region$

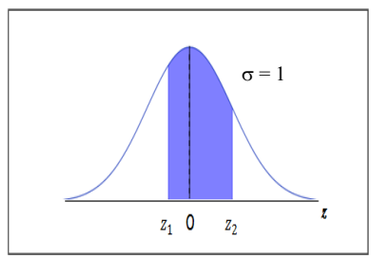
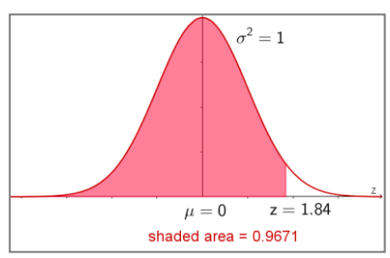


Figure B: $P(z_1 < z < z_2) = area\ of\ the\ shaded\ region$

The probability $P(x_1 < x < x_2) = P(z_1 < z < z_2)$ can be determined using the *standard normal distribution table or z-table*.

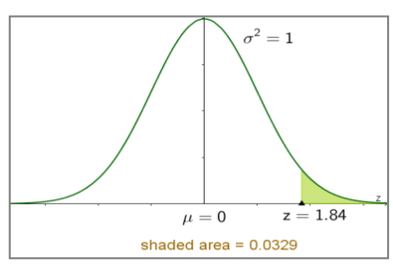
Example 1: Find $P(z < 1.84)$.
Solution: Using z-table, locate $z = 1.8$ in the first column of values and $z = 0.04$ in the first row. The intersection will give us a value of 0.9671, thus:

$$P(z < 1.84) = 0.9671 = \boxed{96.71\%}.$$



Example 2: Find $P(z > 1.84)$.
Solution: Since the total area under a normal curve is 1, then the probability can be computed as:

$$1 - P(z < 1.84) = 1 - 0.9671 = 0.0329 = \boxed{3.29\%}.$$



Exercises: Given a standard normal distribution, find the probabilities for the following then illustrate with a graph:

1. $P(z < 0.52)$
2. $P(z < -1.97)$
3. $P(z \geq 0.95)$
4. $P(z \geq -1.74)$