

An abstract geometric design on the left side of the slide. It features a dark blue background with various geometric shapes and patterns. A white circle is positioned near the top left. Below it, a light blue semi-circle is visible. To the right of the semi-circle, there is a pink triangle with diagonal lines. Further down, there is a pink square with a pattern of concentric lines. Below the square, there is a pink triangle with a pattern of concentric lines. The design is composed of various shades of blue, pink, and white.

# TASK 8

# RANDOM VARIABLES: DISCRETE AND CONTINUOUS RANDOM VARIABLES.

- **Discrete Random Variables:** Discrete random variables are those that take on a finite or countably infinite number of distinct values. These values usually represent outcomes of processes where there's a clear distinction between each possible outcome. Examples include the number of goals scored in a soccer match, the number of students who pass an exam, or the result of rolling a die. Each of these examples has a finite set of possible outcomes:  $\{0, 1, 2, \dots\}$  for the number of goals,  $\{0, 1, 2, \dots, n\}$  for the number of passing students, and  $\{1, 2, 3, 4, 5, 6\}$  for the result of rolling a fair six-sided die.
- **Continuous Random Variables:** Continuous random variables, on the other hand, can take on any value within a certain range or interval. These variables represent measurements or quantities that can theoretically be infinitely precise. Examples include the height of a person, the time it takes to complete a task, or the temperature of a room. Unlike discrete random variables, continuous random variables don't have a finite set of possible outcomes but instead have a continuous range. For instance, height could range from the smallest measurable unit to infinity, time could range from zero to infinity, and temperature could range from absolute zero to infinity.

Understanding the distinction between discrete and continuous random variables is crucial in various fields, including statistics, probability theory, and data science. Each type of random variable requires different mathematical tools and techniques for analysis and modeling. Discrete random variables are often described using probability mass functions (PMFs), while continuous random variables are described using probability density functions (PDFs). These functions provide insights into the likelihood of different outcomes or ranges of outcomes occurring, enabling researchers and analysts to make informed decisions based on uncertainty.