VIGNAN'S NIRULA
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(Approved by AICTE, New Delhi & Affiliated to JNTU Kakinada)
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Department of Information Technology

Innovative Teaching Practice

Faculty Name : Mrs.V.Sasikala, Mrs.Dhrakshayani
Course Name : Statistics with R Programming
Class : II B.Tech II Semester
Academic Year : 2021-2022
Title of the Topic : Basic Math Functions
Activity Name : Think-pair-share

Objective of the Activity:

To help students understand and practice the basic math functions available in R programming. The activity encourages active participation, peer discussion, and hands-on application of mathematical functions, thereby improving students' problem-solving and coding skills.

- **Goals:**
    1. Introduce the basic math functions in R.
    2. Enhance students' ability to use functions like sum(), mean(), median(), sqrt(), and others.
    3. Promote peer learning and collaborative problem-solving through the Think-Pair-Share method.
    4. Improve computational thinking by practicing math operations in R.

Method to Implement:

Introduction (Think Phase):

1. **Explain the Importance of Math Functions in R:**

    1. R is widely used for data analysis, and mathematical functions are fundamental for performing tasks such as data manipulation, analysis, and transformation.
    2. Discuss common mathematical operations (e.g., addition, subtraction, square roots) and their applications in real-world problems.
    3. Key Functions to Introduce:
        - sum(): Calculates the sum of elements in a vector or data frame.
        - mean(): Finds the average value of a set of numbers.
        - median(): Returns the median (middle value) of a set of numbers.
        - sqrt(): Calculates the square root.

- abs(): Returns the absolute value.
- round(): Rounds numbers to a specified number of digits.

2. **Demonstrate Example Code:**

   1.Show students a few examples in R where they can apply the functions.

   # Example: Basic math functions in R

   numbers <-c(5,10,15,20,25)sum(numbers)# Sum of numbers

   mean(numbers)# Mean of numbers

   median(numbers)# Median of numberssqrt(25)# Square root of 25abs(-15)# Absolute value of -15round(3.14159,2)# Round Pi to 2 decimal places

Activity Structure:

Step 1: Think Phase

- **Duration:** 5-10 minutes
- **Task:** Ask students to individually explore basic math functions in R. They should use a set of numbers or data and try to apply at least 3 different math functions (e.g., sum, mean, and median). Encourage students to write their code and check the outputs.
- **Example Task for Students:**
  - Create a vector of numbers and apply the functions sum(), mean(), and sqrt() on those numbers.
  - Write a short note about what each function does.

Step 2: Pair Phase

- **Duration:** 10-15 minutes
- **Task:** Students pair up with a partner to compare their work, discuss the results, and help each other with any issues. They can also attempt more advanced math functions together, such as log(), exp(), and min() or max().
- **Guiding Questions for Discussion:**
  - How do you interpret the results from the mean() or sum() function?
  - What happens when you apply sqrt() to a negative number in R?
  - How can you modify the round() function to round to different decimal places?
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Step 3: Share Phase

- **Duration:** 10-15 minutes
- **Task:** Ask each pair to share their observations, challenges, and key learnings with the rest of the class. They can demonstrate their R code and explain how they used the functions.
- **Discussion Points:**

    - Any interesting observations or patterns discovered while working with the math functions.
    - Challenges faced and solutions discovered during peer discussions.
    - How can they use these math functions in data analysis tasks?

Key Concepts to Explore:

1. **Sum and Mean**: Basic statistical calculations.

    - sum(): Adds up all elements in a vector or list.
    - mean(): Averages the numbers in a vector or data frame.

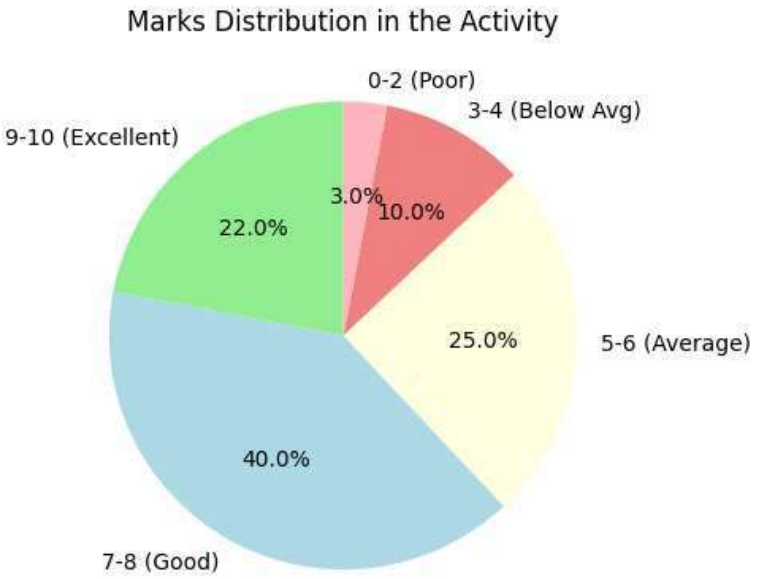
2. **Median**: The middle value of a dataset.
3. **Square Root**: Used in various mathematical and statistical computations.
4. **Absolute Value**: Useful for making negative numbers positive.
5. **Rounding**: Important for simplifying results to a desired precision.
6. **Other Functions (Optional)**:

    - min(): Finds the smallest number.
    - max(): Finds the largest number.
    - log(): Calculates logarithms.
    - exp(): Calculates the exponential of a number.

Screenshot of the Practice

Assessment Marks:

Marks Range	Number of Students	Percentage
9-10 (Excellent)	22	22.04%
7-8 (Good)	30	40.09%
5-6 (Average)	25	25.08%
3-4 (Below Avg)	10	10.09%
0-2 (Poor)	3	3.00%
Total	90	100%



Conclusion of Think-Pair-Share

The **Think-Pair-Share** activity on basic math functions in R was a productive way to engage students in both individual and collaborative learning. By applying mathematical functions like sum(), mean(), and sqrt(), students not only learned how to use them but also discovered their significance in data analysis. Peer discussions allowed for deeper insights, making the activity both educational and interactive.

Signature of the Faculty **Head of the Department**