Vector Creation & Basic Types

1. **Numeric Basics:** Create a numeric vector named x containing the values 10.5, 20, and 30.
2. **Zero Vectors:** Use the numeric() function to create a vector of 15 zeros.
3. **Combining Vectors:** Create two vectors, v1 <- c(1, 2) and v2 <- c(3, 4). Combine them into a single vector named v3.
4. **Sequences:** Generate a sequence of consecutive integers from 10 to 20 using the : operator.
5. **Step Sequences:** Use the seq() function to create a vector from 1 to 5 with an increment of 0.5.
6. **Logical Creation:** Create a logical vector that stores the results of checking if the numbers in c(1, 5, 8) are greater than 4.
7. **Character Vectors:** Create a character vector containing the strings "R", "Programming", and "Vectors".

Subsetting & Extraction

8. **Position Subsetting:** Given v <- c(10, 20, 30, 40, 50), extract the 2nd and 4th elements.

9. **Exclusion:** Using the same vector v, create a new vector that includes all elements *except* the 3rd one.

10. **Range Extraction:** Extract a subset from v containing elements from index 2 to 5.

11. **Logical Filtering:** Create a vector num <- 1:10. Extract all elements from num that are even (hint: use num %% 2 == 0).

12. **Named Vectors:** Create a named vector prices <- c(apple = 1.2, banana = 0.5, orange = 0.8). Extract the price of the "banana" by its name.

13. **Extraction vs. Subsetting:** Explain the difference in output between prices["apple"] and prices[["apple"]].

Vector Operations & Math

14. **Element-wise Arithmetic:** Create two numeric vectors of length 3. Add them together and observe if the operation is element-wise.
15. **Recycling Rule:** Predict the result of c(1, 2) + c(1, 2, 3, 4) based on the recycling rule.
16. **Power Operations:** Create a vector 1:5 and calculate the square of each element.

Class & Conversion

17. **Checking Class:** Use a function to verify if c("1", "2") is a character vector.
18. **Numeric Coercion:** Convert the character vector c("10", "20", "30") into a numeric vector.
19. **Logical Coercion:** Convert the numeric vector c(0, 1, 2) into a logical vector. Which value becomes FALSE?.
20. **Handling NAs:** What happens when you try to convert c("1", "two", "3") to numeric? Create this vector and perform the conversion.