

**Question 1) Write a R program using control operators to test whether following values are prime numbers or not by providing a PRIME or NOT PRIME message as output :**

A. 103 B. 82 C. 179

**Ans 1**

```
x<-c(103, 82, 179)
for(z in x){
  if((z %% 2 != 0) && (z %% 3 != 0)){
    cat(z, ": PRIME NUMBER \n")
  }else{
    cat(z, ": Not PRIME NUMBER \n")
  }
}
```

**Question 2) Write a R program using control operators to identify letter u and a both occur in the following words: 1. above 2. unit 3. Under**

**Answer 2**

```
library(stringr)
library(dplyr)
words<-c("above", "unit", "Under", "argument")
for(alphabet in words){
  if((str_detect(alphabet, "a"))==TRUE && ((str_detect(alphabet, "u"))==TRUE)){
    cat(alphabet, ": both u and a appear in each words \n")
  }else{
    cat(alphabet, ": both u and a doesn't appear in each words \n")
  }
}
```

**Question 3) Write a function that to calculate BMI (Body Mass Index): BMI for a person is defined #as their body mass divided by the square of their height The weight is in kilograms and**

**#the height in meters or (The weight can be in pounds and the height in inches)\* 703**

**Answer 3**

```
BMI <- function(weight, height){  
  BMI = (weight/(height^2))*703  
  # weight in Kilogram and height in inches  
  return(BMI)  
  # 1kilogram = 2.20462262185, so weight(pound) = weight(kilogram)/ 0.45359237  
}  
BMI(50, 1.75)  
BMI(72, 1.65)
```

**Question 4**

Write a function called `sum_of_cubes`, that calculates the sum of cubes of the first `n` natural numbers :  
if we have two numbers : 1, 2 then sum of squares is 9 (  $1^3 + 2^3$ ) if we have three numbers : 1, 2, 3  
then sum of squares is 36 (  $1^3 + 2^3 + 3^3$ )

**Answer 4**

```
sum_of_cubes <- function(x){  
  cubes <- x^3  
  sum <- sum(cubes)  
  return(sum)  
}  
  
sum_of_cubes(6)
```

**Question 5) Write a function to calculate the mode (highest frequency) of the following vector: `x = c(2,3,3,4,4,5,6,7,9,10)`**

**Answer 5**

```
get <- function(x){  
  Mode <- unique(x)
```

```
Mode[which.max(tabulate(match(x, Mode)))]

}

x = c(2,3,3,4,4,5,6,7,9,10)

get(x)
```

### Question 6)

Write a function to calculate the no. of prime numbers of the following vector : x = c(2,2,3,3,4,5,7,11,15,19,24,29)

### Answer 6

```
install.packages("numbers")

library(numbers)

x <- c(2,2,3,3,4,5,7,11,15,19,24,29)

calculate_no_primes <- function(x){

  for(i in x){

    if(isPrime(i)){

      cat(i, ": Prime \n")

    }else{

      cat(i, ": Not Prime \n")

    }

  }

}

calculate_no_primes(x)
```