Problem 1 (40 points) Choose the answers in the following question.

**(a) What is the class of the object defined be vec <-c(5,TRUE) ?**

**• Numeric**

• Integer

• Matrix

• Logical

**Answer: The Class of the object is Numeric.**

**(b) Suppose I have vectors x <- 1:4 and y <- 1:2. What is the result of the**

**expression x + y?**

• A numeric vector with the values 1, 2, 5, 7

• A numeric vector with the values 2, 4, 2, 4

**• An integer vector with the values 2, 4, 4, 6**

• An error

**Answer: • An integer vector with the values 2, 4, 4, 6**

**(c) Suppose I define the following function in R:**

**fsin<-function(x) sin(pi\*x)**

**What will be returned by fsin(1) ?**

• The number 0 is returned

• The number 1 is returned

• A warning is given with no value returned

• An error is returned because 'pi' is not specified in the call to 'fsin’.

**Answer: the value returned is 1.224606e-16. This value sin(pi) is 0.**

**(d) What is returned by the R command c(1,2) %\*% t(c(1,2)) ?**

• The number 5

• A one by two matrix

**• A two by two matrix**

• An error is returned because the dimensions mismatch

**Answer: • A two by two matrix**

**(e) Suppose I define the following function in R:**

**f <- function(x) {**

**g <- function(y) {**

**y + z**

**}**

**z <- 4**

**x + g(x)**

**}**

**If I then run in R the following statements**

**z <- 15**

**f(3)**

**What value is returned?**

• 16

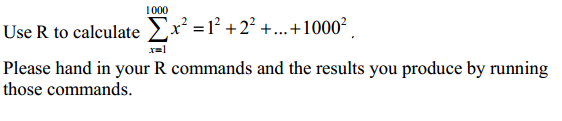
• 7

**• 10**

• 4

**Answer: the value returned is 10**

**Problem 2 (20 points)**



**Answer**: > x=1:1000

> y<-sum(x^2)

[1] 333833500

**Question 3 (40 points)**

Write an R script that does all of the following:

**a) Create a vector X of length 20, with the kth element in X = 2k, for**

**k=1…20. Print out the values of X.**

Answer:

v=(1:20)

k<-v

X<-(2\*k)

print(X)

**b) Create a vector Y of length 20, with all elements in Y equal to 0. Print**

**out the values of Y**

Answer:

Y<-rep(0,20)

print (Y)

**c) Using a for loop, reassigns the value of the k-th element in Y, for k =**

**1…20. When k < 12, the kth element of Y is reassigned as the cosine**

**of k. When the k ≥ 12, the kth element of Y is reassigned as the value**

**of integral **

Answer:

integrand<-function(t)sqrt(t)

for(K in 1:20){

if (k < 12) {

Y[k] = cos(k)}

else {

Y[k]<-integrate(integrand, lower=0, upper=k)

}

}

print (Y)