21BDS0340

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Probability and Statistics Lab

Lab Assessment – I

**Question 1**

Code: Graph 1

t = seq(0, 8\*pi, 0.01)

y = (1 - cos(t)) / 2

plot(t, y, type="l", col="red", ylim=c(-1.1, 1.1), lwd=2)

grid(nx=NULL, ny= NULL, lty=1, col="gray", lwd=2)

Output: Graph 1

Chart, line chart

Description automatically generated

Code: Graph 2

t = seq(-3\*pi, 3\*pi, 0.01)

y = cos(t)

x = sin(t)

plot(t, x, type="l", col="red", lwd=2, ylim=c(-2, 2), xlim=c(-2.1\*pi, 2.1\*pi))

lines(t, y, type="l", col="green", lwd=2)

legend(2, legend=c("sinx", "cosx"), lty=1, lwd=2, col=c("red", "green"))

grid(nx=NULL, ny=NULL, lty=1, lwd=1)

Output: Graph 2



Code: Graph 3

x = seq(0, 5.9, 0.01)

y = 10 + 10 \* floor(x)

plot(x, y, lty=1, lwd=1, col="red", xlab="Hours Worked", ylab="Amount Charged")

Output: Graph 3

Chart, line chart, box and whisker chart

Description automatically generated

Code: Graph 4

x = seq(-5, 5, 0.1)

y = abs(x)

plot(x, y, type="l", lwd=2, col="blue", ylim=c(-5, 5))

grid(nx=NULL, ny=NULL, lty=1)

lines(x, rep(0, length(x)), lwd=2, col="black")

lines(rep(0, length(x)), x, lwd=2, col="black")

Output: Graph 4

Chart, line chart

Description automatically generated

Code: Graph 5

x = seq(-2, 2, 0.01)

y = x \* x

plot(x, y, type="l", col="red")

Output: Graph 5

A picture containing histogram

Description automatically generated

**Question 2**

Code:

n = readline()

n = as.integer(n)

x = 0

a = 0

b = 1

while(x < n){

print(a)

b = a + b

a = b - a

x = x + 1

}

Output:

Background pattern

Description automatically generated with low confidence

**Question 3**

Code:

A = matrix(c(1, 2, -8, 14, 7, 13, 24, 17, 5, 9, 7, 32, 10, 14, 5, 3, 4, 53, 34, 43, 9, 11, 14, -10, 4), 5, 5)

B = matrix(c(-10, 12, 11, 4, 2, 9, 21, 7, 13, 8, 17, 2, 1, 17, -19, 2, 7, 5, 3, 4, 15, 1, 4, -31, 14), 5, 5)

print("A: ")

print(eigen(A))

print("B: ")

print(eigen(B))

if(all.equal(solve(A %\*% B), solve(B) %\*% solve(A))){

print("Inverse of AB is equal to inverse of B \* inverse of A")

}

print("The dimension of 4\*A^5 - 5\*A^3 + A^2 is 5 x 5")

A[4, ] = c(5, -4, 6, 3, 2)

print(A)

B[, 5] = c(14, 9, 43, 4, 26)

print(B)

Output:

