Computer Literacy SSCM 1303 Assignment 4

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1) (a) **Command:**

integrand<-function(x){sqrt(4-(x^2))}

integrate(integrand,lower=-2,upper=2)

**Output:**

6.283185 with absolute error < 4e-09

**Command:**

2\*pi

**Output:**

[1] 6.283185

(b) **Command:**

integrand<-function(x){1/(3+5\*sin(x))}

integrate(integrand,lower=0,upper=pi/2)

**Output:**

0.2746531 with absolute error < 6.5e-13

**Command:**

> (1/4)\*log(3)

**Output:**

[1] 0.2746531

2) (a) **Command:**

>diff<-deriv(~(x\*\*2),"x")

>diff

**Output:**

expression({

.value <- x^2

.grad <- array(0, c(length(.value), 1L), list(NULL, c("x")))

.grad[, "x"] <- 2 \* x

attr(.value, "gradient") <- .grad

.value

})

Ans: 2\*x

(b) **Command:**

> trigo.diff<-expression((exp(-x))/(sinh(2\*x)))

> (D.sc<-D(trigo.diff,"x"))

**Output:**

-(exp(-x)/(sinh(2 \* x)) + (exp(-x)) \* (cosh(2 \* x) \* 2)/(sinh(2 \*

x))^2)

3) **Command:**

babies.q3<-read.table("babies.txt",header=T,as.is=T)

babies.q3[1:5,]

**Output:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | id | pluralty | outcome | | date | | gestation | | | sex | | wt | | parity | | race | | age | ed | ht |  |
| 1 | 15 | 5 | 1 | | 1411 | | 284 | | | 1 | | 120 | | 1 | | 8 | | 27 | 5 | 62 |
| 2 | 20 | 5 | 1 | | 1499 | | 282 | | | 1 | | 113 | | 2 | | 0 | | 33 | 5 | 64 |
| 3 | 58 | 5 | 1 | | 1576 | | 279 | | | 1 | | 128 | | 1 | | 0 | | 28 | 2 | 64 |
| 4 | 61 | 5 | 1 | | 1504 | | 999 | | | 1 | | 123 | | 2 | | 0 | | 36 | 5 | 69 |
| 5 | 72 | 5 | 1 | | 1425 | | 282 | | | 1 | | 108 | | 1 | | 0 | | 23 | 5 | 67 |
|  | wt1 | drace | dage | ded | | dht | | dwt | marital | | inc | | smoke | | time | | number | |
| 1 | 100 | 8 | 31 | 5 | | 65 | | 110 | 1 | | 1 | | 0 | | 0 | | 0 | |
| 2 | 135 | 0 | 38 | 5 | | 70 | | 148 | 1 | | 4 | | 0 | | 0 | | 0 | |
| 3 | 115 | 5 | 32 | 1 | | 99 | | 999 | 1 | | 2 | | 1 | | 1 | | 1 | |
| 4 | 190 | 3 | 43 | 4 | | 68 | | 197 | 1 | | 8 | | 3 | | 5 | | 5 | |
| 5 | 125 | 0 | 24 | 5 | | 99 | | 999 | 1 | | 1 | | 1 | | 1 | | 5 | |

4) **Command:**

x<-rnorm(100,0,1)

mean(x)

sd(x)

signif.100<-x[x>1.96]

signif.100

**Output:**

x<-rnorm(100,0,1)

> mean(x)

[1] 0.1240596

> sd(x)

[1] 1.268534

> signif.100<-x[x>1.96]

> signif.100

[1] 2.286902 2.166823 2.278352 2.084884 2.748993 3.080054 2.447415 2.596094

5)**Command:**

gamma<-function(shape,scale)

{gamma=rnorm(100,shape,scale)

gamma}

gamma(1,0.5)

hist(gamma(1,0.5),

xlab="values",

ylab="frequency",

col="lightblue")

**Output:**

[1] 1.71591449 0.02402988 0.82400184 1.45757900 0.04192177

[6] 1.75100765 0.50386562 0.37853481 0.46063698 0.70774390

[11] 1.47312461 1.19685889 1.45386229 1.42914159 1.23603305

[16] 0.50930467 0.91232678 0.66725926 0.61996299 -0.07736067

[21] 1.33198379 -0.01293176 1.13922593 1.43322927 0.75353412

[26] 0.40690699 0.99908128 0.50809600 0.97986147 0.18071138

[31] 1.59009640 0.80693084 1.29977448 1.41546355 1.56027102

[36] 0.77107232 1.02584161 0.35856724 0.86187604 0.69327292

[41] 0.70393184 0.80438845 0.19937644 1.38822987 1.22235230

[46] 1.04545345 1.13666330 2.22586971 0.77274325 1.21295470

[51] 1.36411435 0.41215796 1.57792296 0.92389047 1.07858079

[56] 0.47383364 0.96706956 1.38033410 1.47893205 0.76326020

[61] 1.46934443 1.51894626 1.32772044 1.17804350 1.98027981

[66] -0.01591364 0.95559262 1.45035583 1.27499841 1.23484992

[71] 0.90615396 0.90336837 0.34020321 0.64456567 2.10530954

[76] 0.65836001 0.52937822 1.60575642 1.23019921 1.53853439

[81] 0.92297001 0.96990623 0.62120874 0.74428758 1.60469020

[86] 0.78774305 0.49290876 1.01825525 0.59932350 0.58183849

[91] 0.89468268 1.53001296 -0.05411940 1.70046255 1.07357356

[96] 1.88514750 0.89827101 -0.32427866 0.01975585 0.64026756



6)

(a) **Command:**

A<-matrix(c(3,-4,1,2),ncol=2,byrow=TRUE)

A

**Output:**

[,1] [,2]

[1,] 3 -4

[2,] 1 2

(b) **Command:**

t(A)

**Output:**

[,1] [,2]

[1,] 3 1

[2,] -4 2

(c) **Command:**

solve(A)

**Output:**

[,1] [,2]

[1,] 0.2 0.4

[2,] -0.1 0.3

Addition question, **command:**

b<-matrix(c(6,-3),nrow=2)

c<-solve(A)

d<-c%\*%b

d

**output:**

[,1]

[1,] -2.775558e-16

[2,] -1.500000e+00