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:**

>b<-rnorm(100,0,1)

>b

>mean(b)

>sd(b)

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

>signif.100

**Output:**

> b<-rnorm(100,0,1)

> b

[1] -0.464787908 -0.388775747 0.518708844 -0.259515207

[5] -0.157384114 -0.862976260 1.867438092 -1.650953355

[9] 0.889970760 -0.378229308 0.564946530 2.152227164

[13] -0.949924507 -1.282111614 -1.095763334 0.016846579

[17] 1.429556444 1.053447622 -1.528793113 -0.600862004

[21] -0.536184156 0.086132931 -1.394063305 0.332191783

[25] -2.007589720 1.240481065 1.164717926 -0.196286912

[29] 0.006888320 0.596601817 -2.059723930 1.106134777

[33] -0.522933700 -0.837939067 1.364016866 -0.310311841

[37] 0.111918892 -0.633492550 -1.611571964 -0.704866273

[41] -1.038470617 -1.069819741 -0.519626851 0.871261867

[45] 0.199958559 0.136000914 -0.368302484 0.307489462

[49] 0.763176699 0.602430375 -1.121749414 0.359919415

[53] -1.826403023 0.004402785 1.509449568 -0.440122854

[57] 0.691356616 -0.692603185 0.879104615 -0.125459870

[61] -0.028439786 -0.324516903 0.657247381 1.928514344

[65] 0.545132905 -0.048759444 -0.137684872 0.328414403

[69] 0.513350271 -0.186181336 -0.763332649 -0.801628762

[73] -0.569455875 -0.534680624 -0.824729656 -0.960058387

[77] 0.018677953 -0.431810059 -0.145484049 1.056645990

[81] -1.459600185 -0.354465560 1.491674490 1.234466686

[85] 1.083571199 0.934776004 0.127678271 -0.766395929

[89] -0.770690988 0.815960257 0.808607595 0.247367790

[93] -1.497532635 -0.869483451 1.003542679 0.331919386

[97] -1.541483574 0.882628507 -1.435273636 -0.615307880

> mean(b)

[1] -0.0786764

> sd(b)

[1] 0.9408802

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

> signif.100

[1] 2.152227

5)**Command:**

>x<-rgamma(100,1,0.5)

>x

>hist((x),

+xlab="values",

+ylab="frequency",

+col="lightblue")

**Output:**

[1] 0.6617504 3.7527022 0.2885065 0.2452313 4.3698818

[6] 4.2590541 3.8444949 9.7480035 1.9654862 4.5984006

[11] 2.7518571 1.3853541 0.7686468 1.0776454 1.6768142

[16] 0.4254470 2.0170486 0.9589943 1.1268788 1.1302193

[21] 1.3751324 3.6663709 2.6934200 6.2556152 2.2690804

[26] 1.9730632 6.3776854 13.1098407 0.4594263 0.4431323

[31] 5.9738369 3.6697515 4.2182550 0.6249464 1.9010755

[36] 0.6709515 2.1330515 0.3088832 3.4079248 2.0066432

[41] 0.8480884 2.7810765 3.2895942 0.1695428 0.2810871

[46] 1.9915371 2.9883860 0.7732451 2.6526156 0.4335158

[51] 0.5952204 1.9359170 1.0421869 0.7131145 8.8088650

[56] 1.2263332 5.7079095 0.8163230 1.0284361 5.8661564

[61] 2.9394509 3.6026646 0.8627736 2.5534843 2.8254964

[66] 3.9820743 1.3988986 1.2785506 0.8083493 0.8780564

[71] 1.0948938 0.3482726 1.5433556 0.3686898 2.7010474

[76] 0.4101389 7.0006916 0.7115191 2.6343681 1.9131320

[81] 3.8378084 0.2199173 2.0695811 3.6284729 1.4840665

[86] 9.3281828 3.4697417 0.6558420 1.9113803 2.6119021

[91] 2.7410626 0.3801226 2.6088391 2.3869872 0.8378003

[96] 1.1353344 0.7971913 2.2983158 0.5979396 7.6780779



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