Lab 1: R review

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Exercise 1

1. Create a code chunk and set the header parameter to TRUE and print out the top rows of the table with `head()` as above.

```
fpath <- "http://www2.stat.duke.edu/~pdh10/FCBS/Exercises/azdiabetes.dat"

data <- read.table(file = url(fpath), header = TRUE)
head(data)
```

```
##   npreg glu bp skin  bmi   ped age diabetes
## 1     5  86 68   28 30.2 0.364  24       No
## 2     7 195 70   33 25.1 0.163  55      Yes
## 3     5  77 82   41 35.8 0.156  35       No
## 4     0 165 76   43 47.9 0.259  26       No
## 5     0 107 60   25 26.4 0.133  23       No
## 6     5  97 76   27 35.6 0.378  52      Yes
```

Exercise 2

2. Generate a sequence of 100 equispaced real numbers from 0 to 1 and store it in a variable called `seq2`.

```
seq2 <- seq(1, 100, by = 1)
seq2
```

```
##   [1]   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18
##  [19]  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36
##  [37]  37  38  39  40  41  42  43  44  45  46  47  48  49  50  51  52  53  54
##  [55]  55  56  57  58  59  60  61  62  63  64  65  66  67  68  69  70  71  72
##  [73]  73  74  75  76  77  78  79  80  81  82  83  84  85  86  87  88  89  90
##  [91]  91  92  93  94  95  96  97  98  99 100
```

Exercise 3

3. Sort the entries in `seq3` from greatest to least.

```
seq3 <- seq(from = -3, to = 3, by = .5)
sort(seq3, decreasing = TRUE)
```

```
##  [1]  3.0  2.5  2.0  1.5  1.0  0.5  0.0 -0.5 -1.0 -1.5 -2.0 -2.5 -3.0
```

Exercise 4

4. Find the variance of each row of `mat5`

```r
mat5 <- matrix(seq(1, 100, 1), nrow = 4, ncol = 25, byrow = T)

mat5 %>%
  apply(MARGIN = 1, FUN = var)
```

```
## [1] 54.16667 54.16667 54.16667 54.16667
```

Exercise 5

5. Generate 500 samples from a Beta distribution with shape parameter $[a, b] = [0.5, 0.5]$ and store the samples in a variable called `W`

```r
W <- rbeta(500, shape1=0.5, shape2=0.5)
W
```

```
##   [1] 0.9549169436 0.9384902072 0.8386518017 0.0008968920 0.9857154952
##   [6] 0.1782975337 0.7763197963 0.7010542842 0.8499070392 0.4219459723
##  [11] 0.1550274198 0.7222002643 0.0841177150 0.2806053098 0.4682243571
##  [16] 0.9824453659 0.3218434787 0.3489700510 0.9322530900 0.8143512196
##  [21] 0.7511698904 0.1926277373 0.5452218959 0.0596504830 0.3498086454
##  [26] 0.4996423563 0.0469928288 0.9286646803 0.8410624070 0.9924072247
##  [31] 0.4494563777 0.4547845255 0.6111529681 0.9081104533 0.9660810286
##  [36] 0.0899645362 0.0019069299 0.2385135671 0.9999371624 0.9939118250
##  [41] 0.2939040340 0.2004778451 0.0528710337 0.7416325339 0.2627694756
##  [46] 0.0493146546 0.9859176075 0.2776876727 0.9450940104 0.0224616074
##  [51] 0.5102648245 0.3141328960 0.6608726449 0.1442762108 0.1972741706
##  [56] 0.4504384014 0.1120565147 0.3131851167 0.1114719666 0.5097496116
##  [61] 0.4982775589 0.4860307952 0.1375322055 0.4092333399 0.8773238233
##  [66] 0.9030173158 0.1635631009 0.0355994671 0.0469440877 0.2585737378
##  [71] 0.0161241359 0.1782277530 0.8003410566 0.9996934823 0.0967208526
##  [76] 0.3043388591 0.0140551650 0.6895974216 0.1810885728 0.9730985445
##  [81] 0.2847238880 0.1180817490 0.7882812635 0.0751467838 0.1988642345
##  [86] 0.3530637989 0.2489768272 0.4995264817 0.0708452221 0.9932803998
##  [91] 0.7517182090 0.7979989679 0.0648725484 0.3633127006 0.9922328165
##  [96] 0.8464797474 0.9660001088 0.4775140951 0.2513659081 0.3909317583
## [101] 0.2261960976 0.0079666764 0.0165239954 0.0004953028 0.5419505319
## [106] 0.9480510450 0.9212968531 0.9945900841 0.9241309168 0.9766505267
## [111] 0.2876878937 0.7458958541 0.7533617585 0.3047190866 0.1639800535
## [116] 0.0694181727 0.0202624011 0.5358550344 0.1553043974 0.1889248634
## [121] 0.4610717085 0.8708682842 0.9213219032 0.0461028873 0.9833901800
## [126] 0.2866825450 0.8838757789 0.2926995112 0.5116866265 0.2873744864
## [131] 0.2079951853 0.9729175021 0.9992875793 0.9763582384 0.0216911766
## [136] 0.0281874489 0.2654545265 0.3971354821 0.7685187632 0.9405808297
## [141] 0.1077130843 0.7392983022 0.6293839752 0.5058823423 0.9392243207
## [146] 0.6981503564 0.2325690984 0.0435731714 0.6612756886 0.0102153947
## [151] 0.1739865763 0.9825670195 0.1384358918 0.0001997435 0.9581317893
## [156] 0.0863211080 0.9416837570 0.9012576959 0.9698467003 0.0022949093
## [161] 0.6908072309 0.6088521505 0.0037846563 0.0266840707 0.7889816777
## [166] 0.0123576345 0.6066135454 0.0158593464 0.0059900108 0.7604204725
## [171] 0.9799422643 0.8904415329 0.1324528786 0.8202846714 0.0006614987
## [176] 0.8396177836 0.8118766165 0.9383868717 0.6012943723 0.6831428063
## [181] 0.9975904672 0.8601700770 0.7057132981 0.2660591053 0.9955525560
## [186] 0.2232745199 0.4470472588 0.0064152811 0.6787023499 0.2184408101
## [191] 0.5254598826 0.1722584412 0.2652484418 0.3072811382 0.8675412526
## [196] 0.5470680535 0.7082197644 0.8238337379 0.9858428790 0.9733445869
```

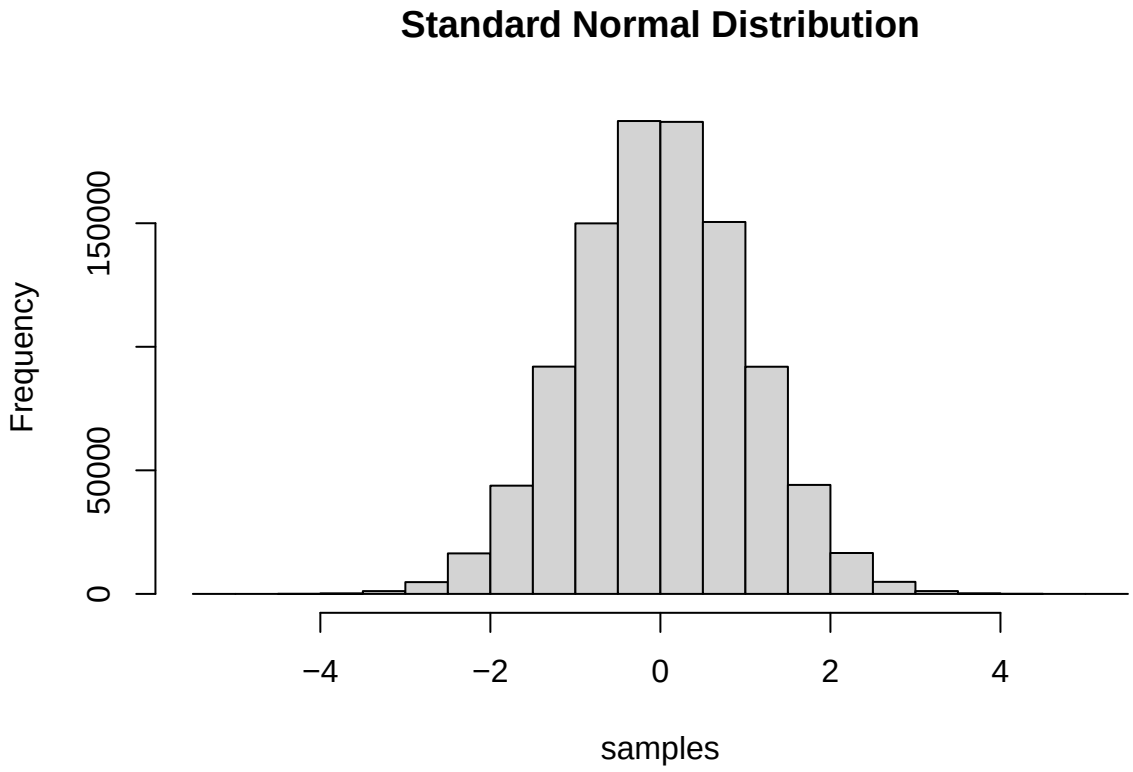
```
## [201] 0.8823826097 0.0977507030 0.8025499366 0.0390002502 0.2664888485
## [206] 0.5854645522 0.9235414831 0.9506397282 0.6051694146 0.0303096795
## [211] 0.1070641449 0.8821432327 0.6212835646 0.3199956763 0.9894208514
## [216] 0.3585192291 0.8543642754 0.7403905649 0.6329761354 0.9988354785
## [221] 0.9779348507 0.8747554326 0.0819769042 0.4649150397 0.1330653768
## [226] 0.6353394084 0.9165761123 0.2286473908 0.1700358749 0.5669054302
## [231] 0.5866287941 0.0725367445 0.7900750971 0.9695726814 0.0110131553
## [236] 0.0168957083 0.9977738930 0.0623703730 0.9590401672 0.9289089149
## [241] 0.9444056243 0.5911470966 0.8048596524 0.5519924537 0.9352852015
## [246] 0.9461190860 0.0951235906 0.9993325176 0.3535966175 0.1048262399
## [251] 0.7535526413 0.9948075972 0.6509559606 0.3492327843 0.2026047669
## [256] 0.1595499899 0.2739955423 0.6404686216 0.0739881920 0.9341842037
## [261] 0.7616010826 0.9194651939 0.9913446052 0.0041803782 0.9971104905
## [266] 0.2285121384 0.7406846628 0.9968338236 0.0031634618 0.9813268645
## [271] 0.1621027609 0.0169140638 0.8033744715 0.1007061968 0.5665818706
## [276] 0.6132476136 0.9378198125 0.1631082157 0.7208850189 0.8525616750
## [281] 0.7895992877 0.9718207314 0.1311716296 0.8478450520 0.7475632064
## [286] 0.2971786117 0.9066915693 0.3000030635 0.9998499709 0.8253869480
## [291] 0.1142774780 0.0528474201 0.8990706220 0.9622839255 0.0363972378
## [296] 0.4598335705 0.9847849371 0.9176874322 0.1802274012 0.9797339962
## [301] 0.0998846784 0.8950115373 0.0033707379 0.5947153789 0.3035578194
## [306] 0.8523119512 0.5209202788 0.0106197803 0.2278161950 0.0060868852
## [311] 0.0406149340 0.4567534248 0.1266385444 0.0188138718 0.1728853905
## [316] 0.0366709423 0.0506262063 0.9260410814 0.3109447528 0.3439049374
## [321] 0.0121957913 0.6467101890 0.6541497258 0.0836991425 0.0627696464
## [326] 0.9189942302 0.7500397397 0.6155749341 0.0198774724 0.5038139959
## [331] 0.9684888248 0.7629672479 0.4079040823 0.5539523370 0.1069076542
## [336] 0.1157897062 0.9301297011 0.9567842795 0.2747332405 0.1329863287
## [341] 0.9368661528 0.0400263692 0.9120926268 0.8595054243 0.8928306742
## [346] 0.9091099127 0.1055910032 0.0786598370 0.5081293923 0.9475865914
## [351] 0.4876732829 0.9144736068 0.0026554940 0.6867984227 0.0211334298
## [356] 0.0578797524 0.6453351960 0.1644323009 0.7544765342 0.0096211439
## [361] 0.3772048968 0.1397877204 0.0245280179 0.0097551743 0.5907968638
## [366] 0.6084678345 0.1309529514 0.9658910817 0.3773247260 0.2522330649
## [371] 0.9649728365 0.9999544148 0.9864096694 0.9991305382 0.8183765646
## [376] 0.4222739382 0.0181472931 0.7039266635 0.0763616509 0.5371460697
## [381] 0.0200870090 0.0258255325 0.4812126409 0.0902373712 0.4732362377
## [386] 0.9857139322 0.0882951605 0.2703817894 0.4095313188 0.0013638884
## [391] 0.0587852228 0.8681748259 0.8761908108 0.0936217113 0.2308798839
## [396] 0.9670909245 0.9124126138 0.8837872095 0.0897820091 0.9534554982
## [401] 0.1575702142 0.1395139714 0.4314990482 0.8180042972 0.4220587857
## [406] 0.9998864018 0.0965498495 0.7238490510 0.9572351916 0.1485871339
## [411] 0.0378981559 0.0144958306 0.3014942345 0.6867091843 0.0205171997
## [416] 0.9863320515 0.0015081230 0.0026288368 0.8534172434 0.0834842604
## [421] 0.1993654585 0.0552562295 0.5646439388 0.0170774366 0.9962561964
## [426] 0.4053422729 0.9231733863 0.6645006715 0.3967650331 0.5910830523
## [431] 0.3323920165 0.6715837646 0.1544121293 0.0392580205 0.3284413274
## [436] 0.7442239160 0.7285307496 0.8392561517 0.9541859525 0.0156980787
## [441] 0.0008506387 0.3585887261 0.0201952669 0.9809349918 0.0093365857
## [446] 0.7356962878 0.5818569319 0.9369654114 0.9982901900 0.8733147885
## [451] 0.0514232249 0.9933351619 0.1576973510 0.8961370800 0.0118280849
## [456] 0.0167850512 0.0099209220 0.9973525706 0.9977169536 0.0230548617
## [461] 0.2044962628 0.0073515204 0.0010277571 0.8032720195 0.9124579016
## [466] 0.0407766238 0.0258123257 0.9998102859 0.0834294924 0.8770027176
```

```
## [471] 0.5258172791 0.1462771319 0.8924864284 0.9021096145 0.6259418889
## [476] 0.6763107218 0.9821597105 0.2366612138 0.7330417850 0.0892681775
## [481] 0.0248856939 0.9696909039 0.7353116983 0.8508139901 0.8452514674
## [486] 0.9875838110 0.0196358406 0.0572302385 0.0604810353 0.2123736191
## [491] 0.9876192912 0.8747993863 0.8445946113 0.0293000414 0.0195679238
## [496] 0.1368749880 0.0118263061 0.3464233151 0.7106336015 0.6161433727
```

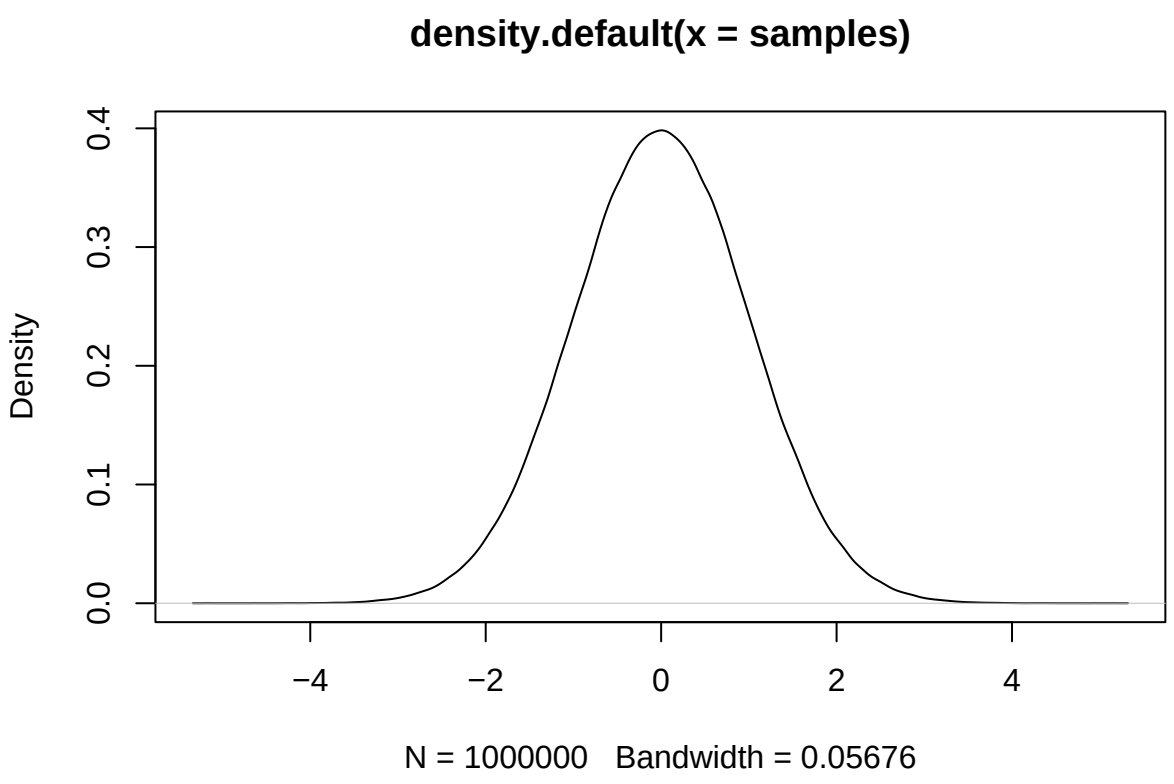
Exercise 6

6. Browse online resources (some below), or use code from above to make a few plots of your own.

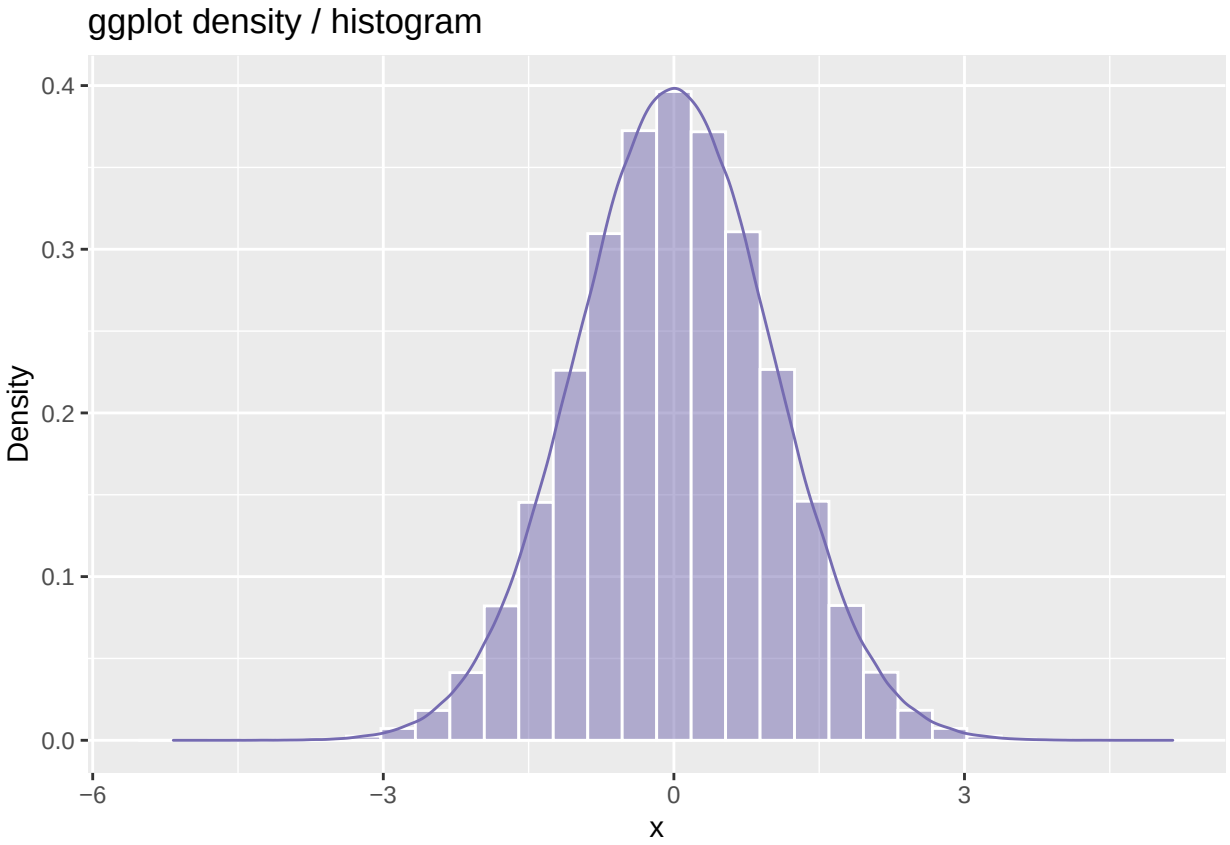
```
samples <- rnorm(1000000, mean = 0, sd = 1)

hist(samples, main = "Standard Normal Distribution")
```




```
plot(density(samples))
```




```
samples %>%
  data.frame(x = .) %>%
  ggplot2::ggplot() +
  geom_histogram(aes(x = x, y = ..density..),
                 fill = "#756bb1", colour = "white",
                 alpha = 0.5, bins = 30) +
  geom_density(aes(x = x), colour = "#756bb1") +
  labs(x = "x", y = "Density", title = "ggplot density / histogram")
```


ggplot density / histogram
Density
0.4
0.3
0.2
0.1
0.0
−6
−3
0
3
x