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Sol. 5

(a) To generate Random sample of size 30 from N(40,9) and arranging in Increasing order of magnitude

(b) To computer summary statistics of above data

```
sp = rnorm(30,mean=40, sd=3) # random sample from N(40,9)
sort(sp) # arranging in increasing order of magnitude
```

```
##  [1] 32.73907 34.21310 35.77132 35.98526 36.12092 36.15868 36.38854 36.82277
##  [9] 37.66252 37.72847 38.61932 39.69018 39.98725 40.00614 40.32675 40.40439
## [17] 40.71882 41.37793 41.59591 41.94855 42.32055 42.37288 42.46724 42.96152
## [25] 43.52372 43.52601 44.39643 44.41134 44.46750 45.52300
```

```
#(b) Summary statistics
summary(sp)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   32.74   37.03   40.37   40.01   42.44   45.52
```

(c) To carry out correlation and regression analysis using R

```
rba = c(3,5,8,4,7,10,2,1,6,9) #Judge A
rbb = c(6,4,9,8,1,2,3,10,5,7) #Judge B
cor(rba, rbb, method = "spearman") # Spearman's rank correlation
```

```
## [1] -0.2969697
```

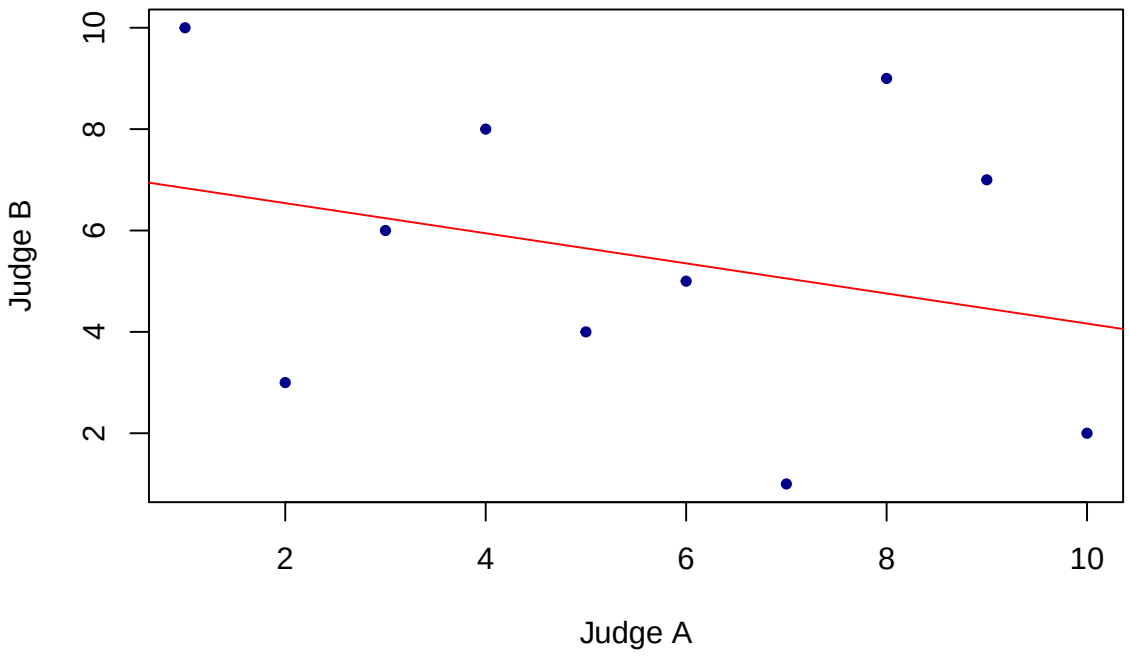
```
plot(rba,rbb, pch=20,col="blue4", xlab = "Judge A", ylab = "Judge B") #scatter plot
model = lm(rba~rbb) # Linear Regression model
summary(model)
```

```
##
## Call:
## lm(formula = rba ~ rbb)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -4.242 -2.000 -0.297  2.683  3.946
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   7.1333     2.0948   3.405  0.00929 **
## rbb          -0.2970     0.3376  -0.880  0.40470
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.066 on 8 degrees of freedom
## Multiple R-squared:  0.08819,    Adjusted R-squared:  -0.02579
## F-statistic: 0.7738 on 1 and 8 DF,  p-value: 0.4047
```

```
coef(model)  # Coefficients
```

```
## (Intercept)         rbb
##   7.1333333  -0.2969697
```

```
abline(model, col="red") # drawing regression equation
```



(d) To apply t test in case of equal but unknown variances.

```
dietA = c(10,6,16,17,13,12,8,14,14)
dietB = c(7,22,15,13,14,8,21,10,16,18)
#(i) and (ii)
t.test(dietA, dietB, var.equal = TRUE, conf.level=0.99)
```

```
##
##  Two Sample t-test
##
## data:  dietA and dietB
## t = -1.0599, df = 17, p-value = 0.304
## alternative hypothesis: true difference in means is not equal to 0
## 99 percent confidence interval:
##  -8.132686  3.777131
## sample estimates:
## mean of x mean of y
##  12.22222  14.40000
```

(e) To compute pdfs, cdfs, inverse cdfs and plots of distributions using R

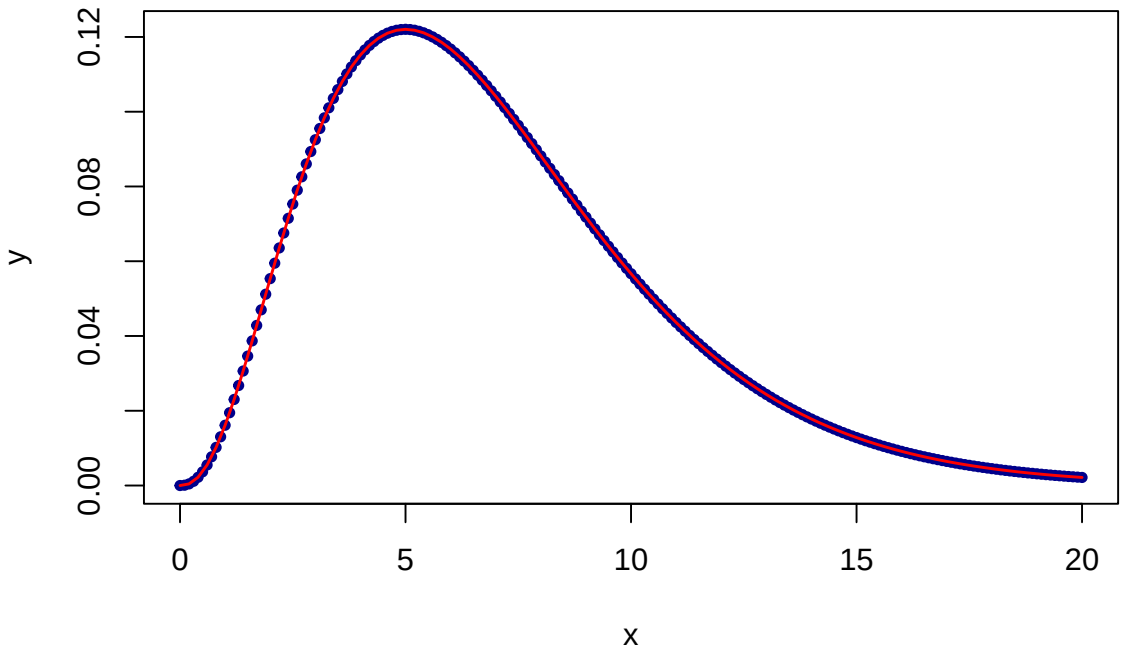
```
# pdf of chi-square
#(i)
dchisq(3,9)
```

```
## [1] 0.03964637
```

```
#(ii)
dchisq(5,10)
```

```
## [1] 0.06680094
```

```
x = seq(0,20,by=0.1)
y = dchisq(x,7)
plot(x,y, pch=20, col="blue4")
curve(dchisq(x,7),lwd=1.5,col="red",add=T)
```




```
# cdf of t distribution
#(i)
pt(3,5)
```

```
## [1] 0.9849504
```

```
#(ii)
pt(0,7)
```

```
## [1] 0.5
```

```
# inverse cdf of t distribution
#(i)
qt(0.3,8)
```

```
## [1] -0.5459338
```

```
#(ii)
qt(0.6,8)
```

```
## [1] 0.2619211
```

(f) To solve Que 2(a) with R commands

```
library(grid)
library(vcd)
mp = 0:5
```

```r
f = c(139,76,28,4,2,1)
data = rep(mp,f)
gf = goodfit(data, type = "poisson", method = "MinChisq")
gf # fitting Poisson distribution
```

```
##
## Observed and fitted values for poisson distribution
## with parameters estimated by `MinChisq'
##
##  count observed      fitted pearson residual
##      0      139 127.3612906        1.0313026
##      1       76  85.8966652       -1.0678266
##      2       28  28.9657755       -0.1794459
##      3        4   6.5118255       -0.9843240
##      4        2   1.0979476        0.8608767
##      5        1   0.1480984        2.0427100
```

```r
summary(gf) # Testing goodness of fit
```

```
##
##   Goodness-of-fit test for poisson distribution
##
##              X^2 df   P(> X^2)
## Pearson 8.118706  4 0.08732536
```