R Midterm Exam

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Statistics 5193

*Note: this document was created using R Markdown.

Question 1

```
rm(list = ls())
ls()
```

```
## character(0)
```

Question 2

```
FRA <- read.table("clipboard", header = T))
row.names(FRA) <- 1:35
```

Question 3

```
FRA[c(3,5),]
```

```
##   Gender    Class HSClass TxtSent TxtRec Fbtime Pinterest Snapchat
## 3      M STAT2023      65     150    150     80         N        Y
## 5      F STAT2023     130      30     30     20         N        Y
##   Introvert
## 3         1
## 5         4
```

Question 4

```
FRA_sort <- FRA[order(FRA$Gender, FRA$Introvert),]
FRA_sort[1:3,]
```

```
##    Gender    Class HSClass TxtSent TxtRec Fbtime Pinterest Snapchat
## 32      F STAT5063     160       5      5     15         N        N
## 9       F STAT2023     200     150    150     20         Y        Y
## 17      F STAT2023     760      20     40     10         Y        Y
##    Introvert
## 32         2
## 9          3
## 17         3
```

1

Question 5

```
small_index <- FRA$HSClass <= 100
large_index <- FRA$HSClass > 100

HSClass.cat <- vector('character', length(35))

HSClass.cat[small_index] <- 'Small'
HSClass.cat[large_index] <- 'Large'

summary(HSClass.cat)
```

```
##    Length     Class      Mode
##        35 character character
```

Question 6

```
HSClass.cat <- factor(HSClass.cat, ordered = T, levels = c('Small', 'Large'))
summary(HSClass.cat)
```

```
## Small Large
##     9    26
```

Question 7

```r
Texts <- matrix(FRA$TxtSent, FRA$TxtRec, nrow = 35, ncol = 2)

summary(Texts[,1])
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    1.00   10.00   25.00   47.89   87.50  200.00
```

```r
mean(Texts[,1])
```

```
## [1] 47.88571
```

```r
summary(Texts[,2])
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    1.00   10.00   25.00   47.89   87.50  200.00
```
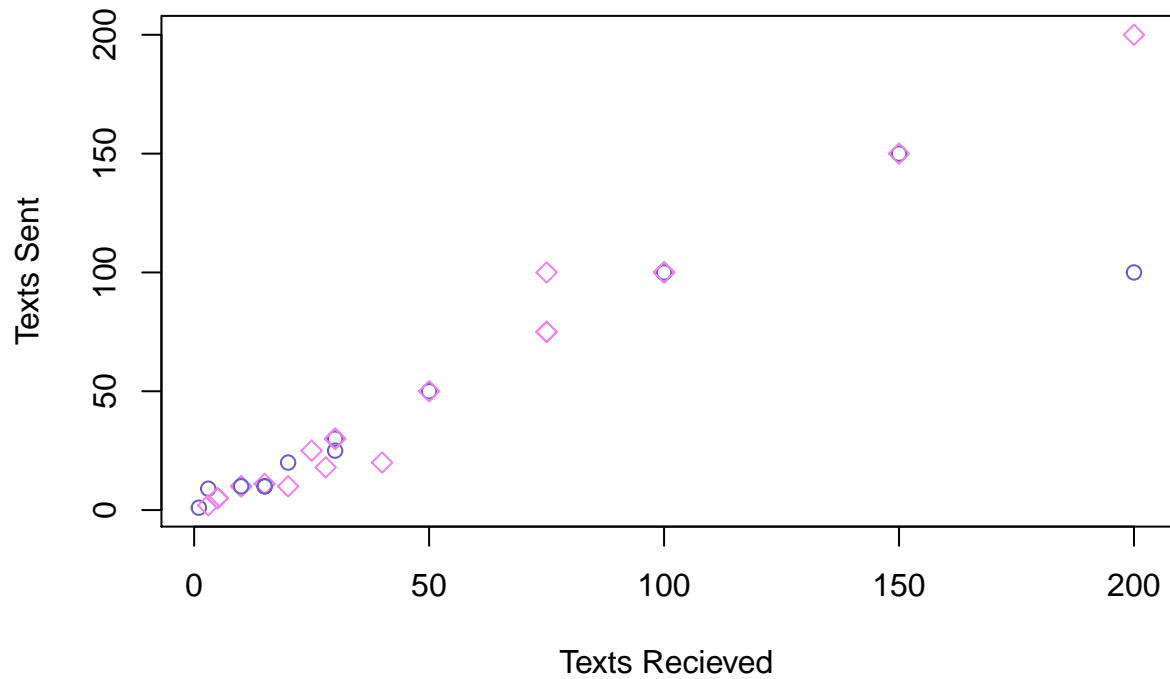
```r
mean(Texts[,2])
```

```
## [1] 47.88571
```
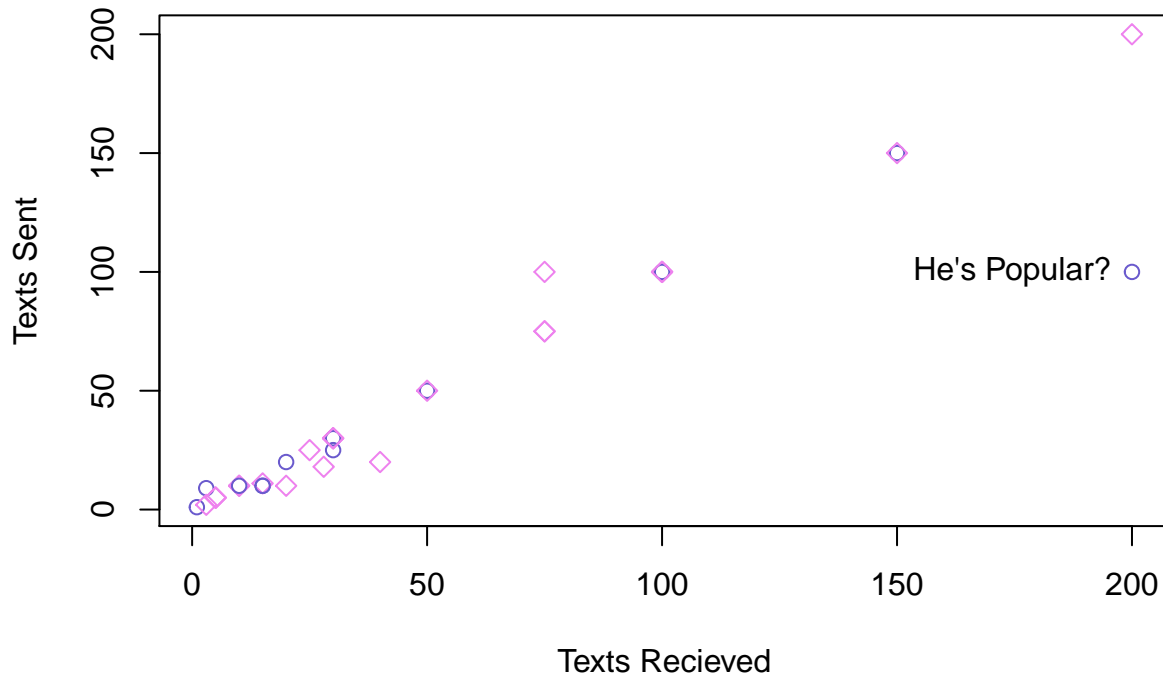
Question 8

```
gender <- as.factor(FRA$Gender)

plot(FRA$TxtRec, FRA$TxtSent,
     xlab = 'Texts Recieved',
     ylab = 'Texts Sent',
     pch = c(5,1)[gender],
     col = c('violet', 'slateblue')[gender])
```

Question 9

```r
plot(FRA$TxtRec, FRA$TxtSent,
     xlab = 'Texts Recieved',
     ylab = 'Texts Sent',
     pch = c(5,1)[gender],
     col = c('violet', 'slateblue')[gender])

popular_guy <- FRA[FRA$TxtSent == 100 & FRA$TxtRec == 200,]


text(popular_guy$TxtRec,
     popular_guy$TxtSent,
     label = "He's Popular?",
     pos = 2
      )
```

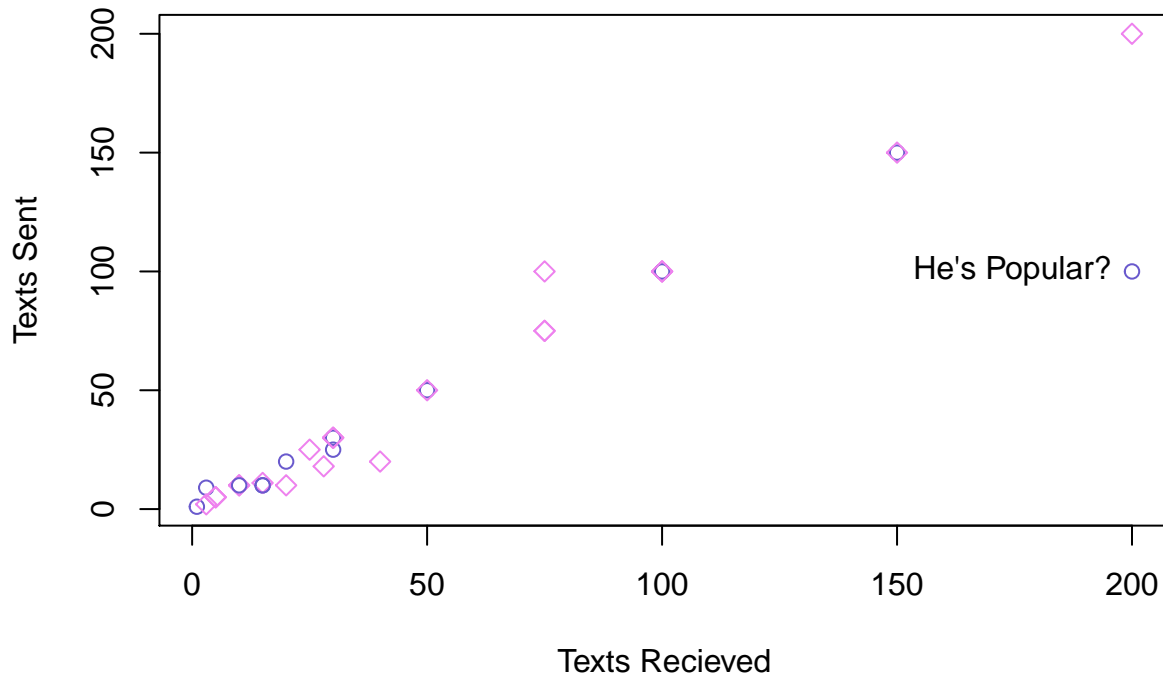**Question 10**

```r
plot(FRA$TxtRec, FRA$TxtSent,
     xlab = 'Texts Recieved',
     ylab = 'Texts Sent',
     pch = c(5,1)[gender],
     col = c('violet', 'slateblue')[gender])

popular_guy <- FRA[FRA$TxtSent == 100 & FRA$TxtRec == 200,]


text(popular_guy$TxtRec,
     popular_guy$TxtSent,
     label = "He's Popular?",
     pos = 2
      )

title(main = "Texting vs. Gender",
      cex.main = 2,
      col.main = 'blue')
```

Question 11

```r
plot(FRA$TxtRec, FRA$TxtSent,
     xlab = 'Texts Recieved',
     ylab = 'Texts Sent',
     pch = c(5,1)[gender],
     col = c('violet', 'slateblue')[gender])

popular_guy <- FRA[FRA$TxtSent == 100 & FRA$TxtRec == 200,]


text(popular_guy$TxtRec,
     popular_guy$TxtSent,
     label = "He's Popular?",
     pos = 2
      )

title(main = "Texting vs. Gender",
      cex.main = 2,
      col.main = 'blue')

legend('bottomright',
       c('male','female'),
       col=c('slateblue', 'violet'),
       pch=c(1,5),
       inset = 0.05)
```
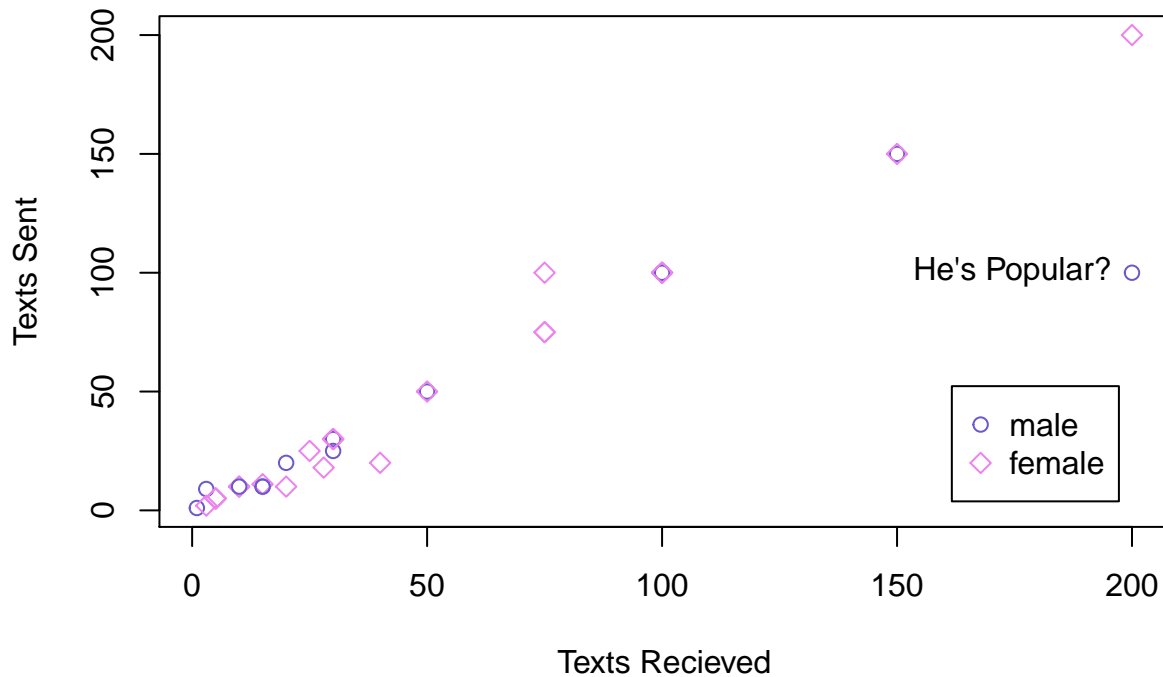
Quetion 12

```r
males <- FRA[FRA$Gender == 'M',]
females <- FRA[FRA$Gender == 'F',]

male_reg <- lm(males$TxtRec ~ males$TxtSent)
female_reg <- lm(females$TxtRec ~ females$TxtSent)

plot(FRA$TxtRec, FRA$TxtSent,
     xlab = 'Texts Recieved',
     ylab = 'Texts Sent',
     pch = c(5,1)[gender],
     col = c('violet', 'slateblue')[gender])

popular_guy <- FRA[FRA$TxtSent == 100 & FRA$TxtRec == 200,]


text(popular_guy$TxtRec,
     popular_guy$TxtSent,
     label = "He's Popular?",
     pos = 2
      )

title(main = "Texting vs. Gender",
      cex.main = 2,
      col.main = 'blue')

legend('bottomright',
       c('male','female'),
       col=c('slateblue', 'violet'),
       pch=c(1,5),
       inset = 0.05)

lines(abline(male_reg, col = 'slateblue'))
lines(abline(female_reg, col = 'violet'))
```
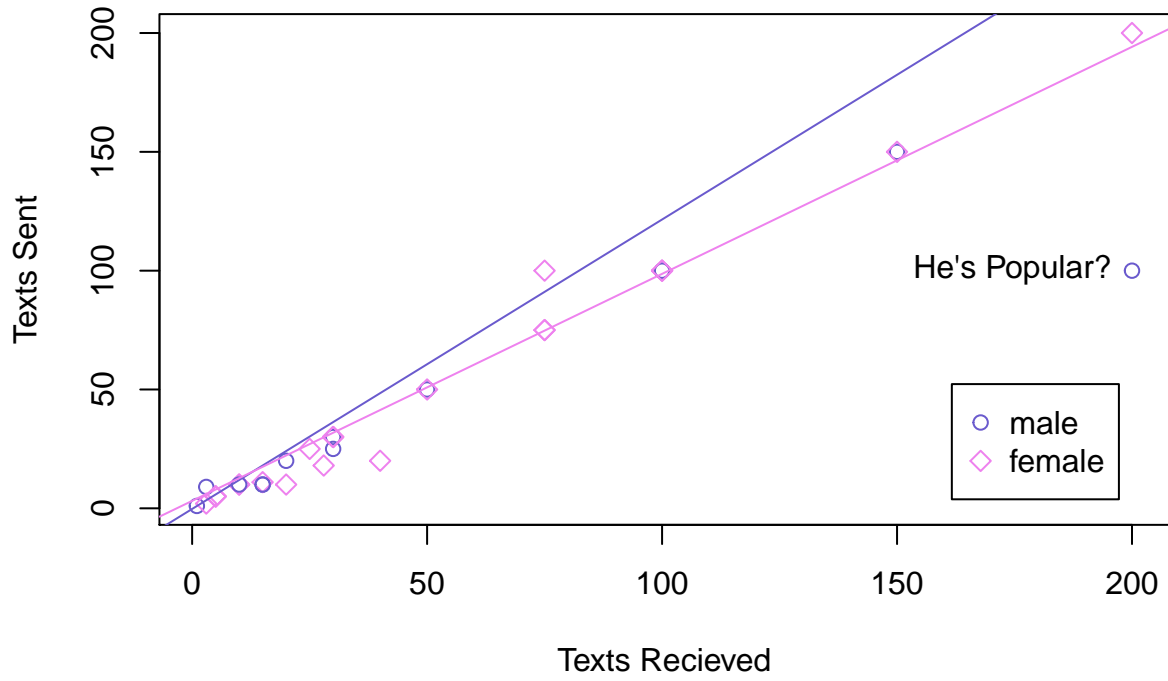
Texting vs. Gender

Texts Sent (y-axis)

Texts Recieved (x-axis)

He's Popular? ○

○ male
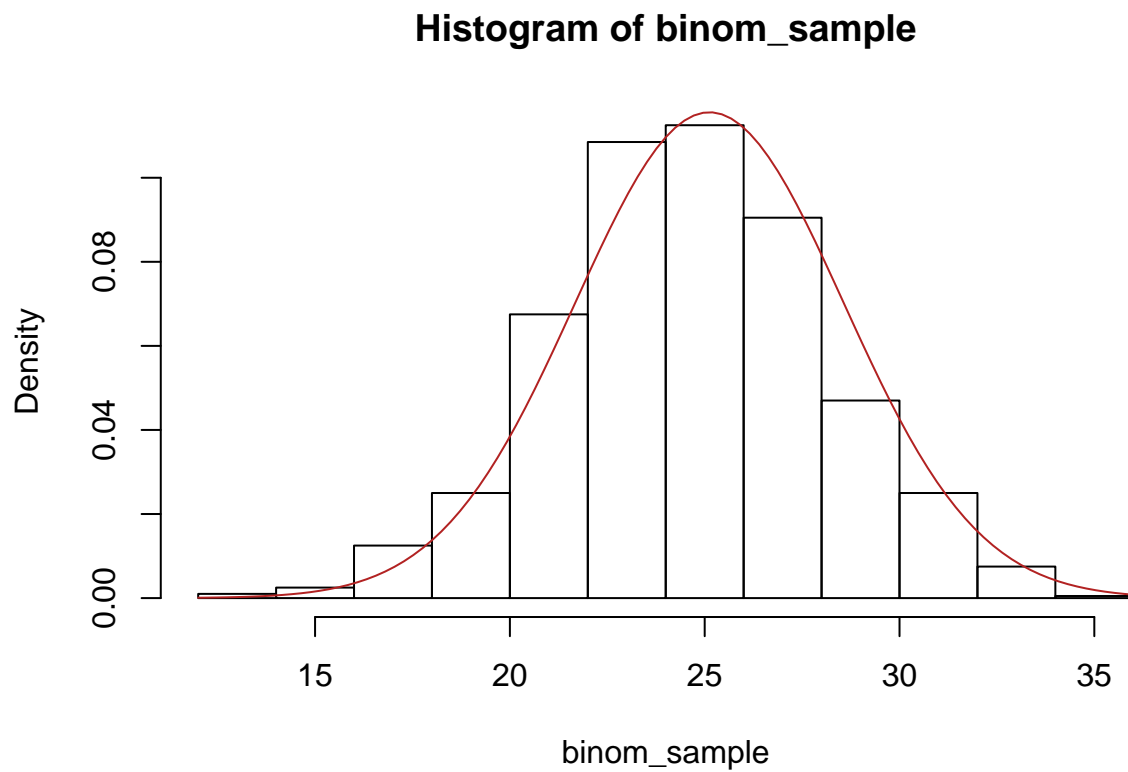◇ female

Question 13

```
binom_sample <- rbinom(1000, size = 50, prob = .5)

hist(binom_sample, probability = T)

curve(dnorm(x,
            mean(binom_sample),
            sd(binom_sample)),
      add = T,
      col='firebrick')
```

Histogram of binom_sample

Question 14

```r
of.age <- function(name, age = 21) {

if (age >= 21) {
    output <- paste(substitute(name), 'is at least 21')
    return(output)
  } else {
    output <- paste(substitute(name), 'is not at least 21')
    return(output)
  }

}

of.age(Fisher, 25)
```

```
## [1] "Fisher is at least 21"
```

Question 15

```r
data <- 0:99

results_vector <- vector('double', length(1000))

for (i in 1:1000) {
  results_vector[i] <- mean(sample(data, 10, replace = T))
}

hist(results_vector,
     main = 'The distribution of the sample mean')
```

The distribution of the sample mean