R Notebook

Code

Lab Test

Question 1

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```
#a)
#Differentiate the expressions
D(expression(exp(2 * x) + 2 * log(3 * x)),"x")
```

```
exp(2 * x) * 2 + 2 * (3/(3 * x))
```

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```
#b)
#Show area of curve
result <- integrate(function(x) 9 - x^2, 0, 3)
result
```

```
18 with absolute error < 2e-13
```

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```
area <- result$value
area
```

```
[1] 18
```

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```
#c)
#Show the values by 2 decimal places
distance <- function(x1, y1, x2, y2){
d <- sqrt((x1 - x2)^2 + (y1 - y2)^2)
rounded_d <- round(d, 2)
return(rounded_d)}

result <- distance(5, 6, -1, 2)
print(result)
```

```
[1] 7.21
```

Question 2

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```
#a)
#Load the csv file
dt_height <- read.csv("C:\\Users\\user\\Downloads\\weight_height.csv")
dt_height
```

Timestamp <chr>	Section <chr>	ID_No <int>	Gender <chr>	Weight_kg <dbl>
2023/03/22 5:49:05 AM GMT+8	Section 02G	1001	*NA*	50.0
2023/03/22 6:01:52 AM GMT+8	Section 01G	1002	Female	72.0
2023/03/22 6:02:15 AM GMT+8	Section 02G	1003	Female	55.0
2023/03/22 6:22:17 AM GMT+8	Section 01G	1004	Female	53.9
2023/03/22 6:33:07 AM GMT+8	Section 01G	1005	Female	72.0
2023/03/22 6:44:03 AM GMT+8	Section 01G	1006	Female	78.0
2023/03/22 6:47:38 AM GMT+8	Section 02G	1007	Male	71.0
2023/03/22 6:48:52 AM GMT+8	Section 01G	1008	Female	46.0
2023/03/22 6:53:59 AM GMT+8	Section 01G	1009	Male	55.0
2023/03/22 6:55:58 AM GMT+8	Section 01G	1010	Female	57.0

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```
#Show mean by 4 decimal places
result <- mean(dt_height$Height_m)
mean <- round(result,4)
mean
```

```
[1] 1.6294
```

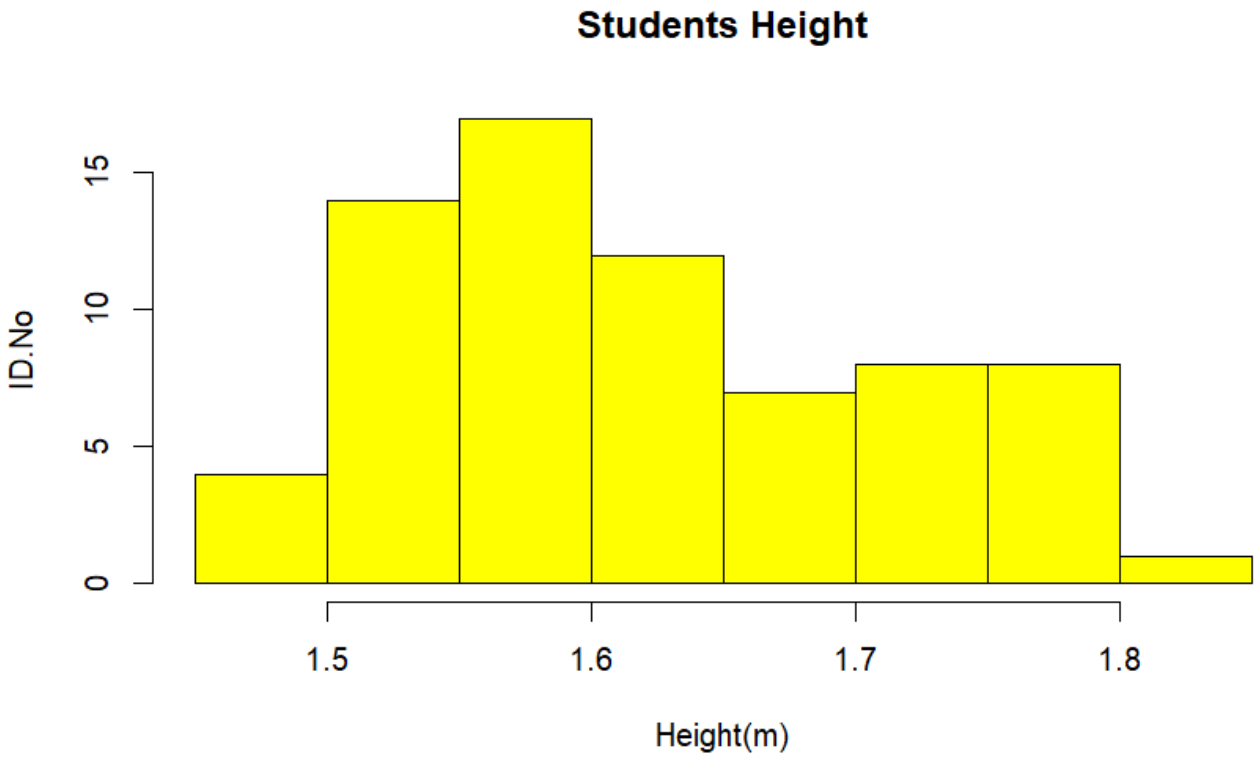
Hide

```
#Show variance by 4 decimal places
result <- var(dt_height$Height_m)
variance <- round(result,4)
variance
```

```
[1] 0.0082
```

Hide

```
#b)
#Histogram of Students Height
hist(dt_height$Height_m,xlab="Height(m)", ylab="ID.No",
main="Students Height", col="yellow")
```



Comment: From the histogram, the height of 1.55m to 1.6m is the highest and the height of 1.8m above is the lowest.

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```
#c)
#Using Shapiro-Wilk
shapiro.test(dt_height$Height_m)
```

```
    Shapiro-Wilk normality test

data:  dt_height$Height_m
W = 0.94884, p-value = 0.005844
```

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```
#null hypothesis for the normality test which is the data follows to the normal distribution.
#reject null hypothesis since p< 0.05
```

Question 3

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```
#a)
mean
```

```
[1] 1.6294
```

Hide

```
variance
```

```
[1] 0.0082
```

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```
shape <- mean^2 / variance
rate <- mean / variance

print(shape)
```

```
[1] 323.7737
```

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```
print(rate)
```

```
[1] 198.7073
```

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```
#b)
# Set the seed for reproducibility
set.seed(1234)

# Generate sample data from gamma distribution
dt_gam <- rgamma(1000, shape = shape, rate = rate)

# Show the first and last parts of the generated data
head(dt_gam)
```

```
[1] 1.519497 1.655453 1.659556 1.561459 1.672996
[6] 1.575295
```

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```
tail(dt_gam)
```

```
[1] 1.714764 1.592928 1.645651 1.685245 1.589937
[6] 1.621545
```

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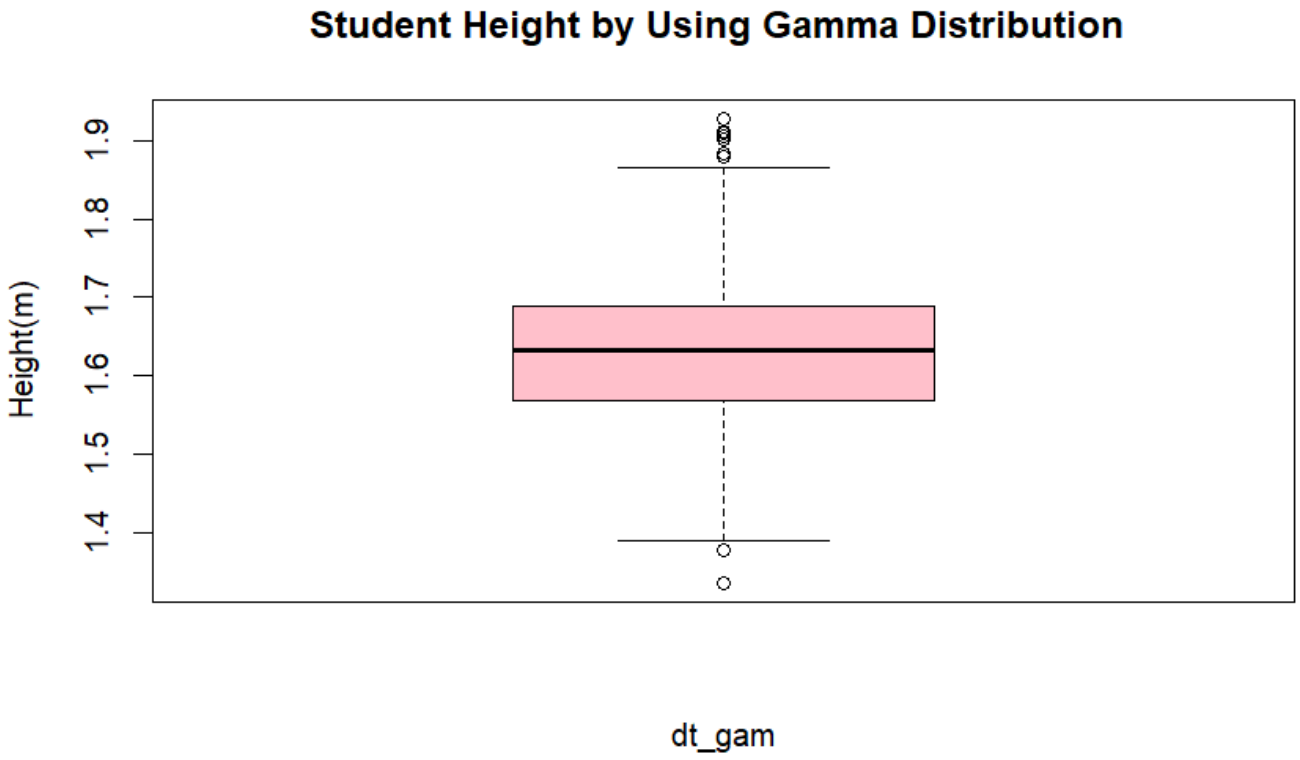
```
#c)
boxplot(dt_gam,xlab="dt_gam",ylab="Height(m)",
main="Student Height by Using Gamma Distribution ", col="pink")
```



Comment: The distribution of the boxplot is symmetrically skewed.