R stats

1. Calculating Mean

```
data <- c(10, 20, 30, 40, 50)
mean_value <- mean(data)
print(mean_value)
```

2. Calculating Median

```
data <- c(10, 20, 30, 40, 50)
median_value <- median(data)
print(median_value)
```

3. Calculating Mode (Custom Function)

```
data <- c(10, 20, 20, 30, 30, 30, 40, 50)
mode_value <- function(x) {
  uniq_vals <- unique(x)
  uniq_vals[which.max(tabulate(match(x, uniq_vals)))]
}
print(mode_value(data))
```

4. Calculating Standard Deviation

```
data <- c(10, 20, 30, 40, 50)
std_dev <- sd(data)
print(std_dev)
```

5. Calculating Variance

```
data <- c(10, 20, 30, 40, 50)
variance <- var(data)
print(variance)
```

6. Calculating Quantiles

```
data <- c(10, 20, 30, 40, 50)
quantiles <- quantile(data)
print(quantiles)
```

7. Calculating IQR (Interquartile Range)

```
data <- c(10, 20, 30, 40, 50)
iqr_value <- IQR(data)
print(iqr_value)
```

8. Calculating Correlation

```
x <- c(10, 20, 30, 40, 50)
y <- c(15, 25, 35, 45, 55)
correlation <- cor(x, y)
print(correlation)
```

9. Performing Linear Regression

```
x <- c(1, 2, 3, 4, 5)
y <- c(2, 4, 5, 4, 5)
model <- lm(y ~ x)
summary(model)
```

10. Performing Multiple Linear Regression

```
data <- mtcars
model <- lm(mpg ~ wt + hp, data = data)
summary(model)
```

11. Calculating t-test

```
group1 <- c(20, 21, 19, 22, 23)
group2 <- c(30, 29, 31, 28, 32)
t_test <- t.test(group1, group2)
print(t_test)
```

12. Performing ANOVA (Analysis of Variance)

```
data <- mtcars
anova_result <- aov(mpg ~ factor(cyl), data = data)
summary(anova_result)
```

13. Performing Chi-Square Test

```
observed <- c(50, 30, 20)
expected <- c(40, 40, 20)
chi_square <- chisq.test(observed, p = expected / sum(expected))
print(chi_square)
```

14. Calculating Confidence Interval

```
data <- c(10, 20, 30, 40, 50)
mean_value <- mean(data)
std_err <- sd(data) / sqrt(length(data))
conf_interval <- mean_value + c(-1, 1) * qt(0.975, df = length(data) -
1) * std_err
print(conf_interval)
```

15. Performing Shapiro-Wilk Normality Test

```
data <- rnorm(100)
shapiro_test <- shapiro.test(data)
print(shapiro_test)
```

16. Calculating Skewness

```
install.packages("e1071")
library(e1071)
data <- c(10, 20, 30, 40, 50)
skewness_value <- skewness(data)
print(skewness_value)
```

17. Calculating Kurtosis

```
library(e1071)
data <- c(10, 20, 30, 40, 50)
kurtosis_value <- kurtosis(data)
print(kurtosis_value)
```

18. Calculating a Z-Score

```
data <- c(10, 20, 30, 40, 50)
z_scores <- scale(data)
print(z_scores)
```

19. Performing Logistic Regression

```
data <- mtcars
data$am <- factor(data$am)
model <- glm(am ~ mpg + wt, data = data, family = binomial)
summary(model)
```

20. Performing Principal Component Analysis (PCA)

```
data <- mtcars[, c("mpg", "hp", "wt")]
pca <- prcomp(data, scale. = TRUE)
summary(pca)
```

21. Performing K-Means Clustering

```
data <- mtcars[, c("mpg", "hp", "wt")]
set.seed(123)
kmeans_result <- kmeans(data, centers = 3)
print(kmeans_result)
```

22. Calculating Covariance

```
x <- c(10, 20, 30, 40, 50)
y <- c(15, 25, 35, 45, 55)
covariance <- cov(x, y)
print(covariance)
```

23. Calculating the Binomial Probability

```
n <- 10
p <- 0.5
k <- 5
binom_prob <- dbinom(k, n, p)
print(binom_prob)
```

24. Performing Wilcoxon Signed-Rank Test

```
group1 <- c(20, 21, 19, 22, 23)
group2 <- c(30, 29, 31, 28, 32)
wilcox_test <- wilcox.test(group1, group2)
print(wilcox_test)
```

25. Performing Kruskal-Wallis Test

```
data <- mtcars
kruskal_test <- kruskal.test(mpg ~ factor(cyl), data = data)
print(kruskal_test)
```