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title: "MAT 471_671 Chapter 7_8_10 Exam 3"
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output: html_document
```

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##### We will use the built-in iris data set#####

#####  
#Chapter 7 Discriminant Analysis  
#####

```
install.packages("MASS")
library(MASS)
```

```
#Q1: Run the below code chunk. What does it do? Briefly describe the data set
"iris."
```{r}
iris
```
```

```
#Q2: Run the below code chunk do. What does it do? Briefly describe the
function "lda."
```{r}
ldaout <- lda(Species~., iris)
ldaout
```
```

```
#Q3: Run the below code chunk do. What does it do? Briefly describe the
function "predict."
```{r}
ldapred <- predict(ldaout, iris)
ldapred
```
```

```
#Q4: Run the below code chunk do. What does it do? Explain
"ldapredict$class."
```{r}
ldaclass <- ldapred$class
ldaclass
```
```

```
#Q5: Run the below code chunk do. What does it do? Describe the "table"
function and Explain "table(ldaclass, iris$Species)." Also, explain and
discuss the output.
```{r}
ldatable <- table(ldaclass, iris$Species)
ldatable
```

```
```
```

```
#Q6: Run the below code chunk do. What does it do? Describe and explain
"sum(diag(ldataable))/sum(ldataable)*100." Also, explain and discuss the output.
```{r}
accur <- sum(diag(ldataable))/sum(ldataable)*100
accur
```
```

```
#####
# Chapter 8 Canonical Correlation Analysis
#####
```

```
attach(iris)
```

```
#Q7: Run the below code chunk. What does it do? Explain the statement
"apply(iris[,-5],2,var)." Explain "sweep(iris[,-5], 2, standarddev, FUN="/")."
Also, explain and discuss the output.
```{r}
iris
variancescolumns <- apply(iris[,-5],2,var)
variancescolumns
standarddev <- sqrt(variancescolumns)
standarddev
iris1.std <- sweep(iris[,-5], 2, standarddev, FUN="/")
iris1.std
```
```

```
#Q8: Run the below code chunk. What does it do? Explain and discuss the
output.
```{r}
sepal.meas <- iris1.std[,1:2]
petal.meas <- iris1.std[,3:4]
sepal.meas
petal.meas
```
```

```
#Q9: Run the code chunk. What does it do? Explain and discuss the output.
```{r}
cancor(sepal.meas, petal.meas)
```
```

```
#####
#Chapter 10 PrincipalComponent Analysis
#Iris Dataset and PCA
#####
```

#Q10: Run the below code chunk. What does it do? Describe the function "prcomp" Also, explain and discuss the output.

```
```{r}
myPr1 <- prcomp(iris[, -5])
myPr1
myPr <- prcomp(iris[, -5], scale = TRUE)
myPr
```
```

#Q11: Run the below code chunk. What does it do? Describe the function "plot"

```
```{r}
plot(iris$Sepal.Length, iris$Sepal.Width)
```
```

```
```{r}
plot(scale(iris$Sepal.Length), scale(iris$Sepal.Width))
```
```

```
```{r}
plot((iris$Sepal.Length - mean(iris$Sepal.Length)) / sd(iris$Sepal.Length))
```
```

#Q12: Run the code chunk. What does it do? Explain and discuss the output.

```
```{r}
summary(myPr)
```
```

#Q13: Run the code chunk. What does it do? Explain and discuss the output.

```
```{r}
plot(myPr, type = "l")
```
```

#Q14: Run the code chunk. What does it do? Explain and discuss the output.

```
```{r}
biplot(myPr)
```
```

#Q15: Run the code chunk. Compare to Question 14 above.

```
```{r}
biplot(myPr, scale = 0)
```
```

#Q16: Run the code chunk. What does it do?

```
```{r}
myPr$x
```
```

```
```\n
```

#Q17: Run the code chunk. What does it do? Explain and discuss the output.

```
```\n{r}\niris2 <- cbind(iris, myPr$x)\niris2\n```\n
```

```
library(ggplot2)\n
```

#Q18: Run the code chunk. What does it do? Explain and discuss the output.

```
```\n{r}\nggplot(iris2, aes(PC1, PC2, col = Species, fill = Species)) +\n  stat_ellipse(geom = "polygon", col = "black", alpha = 0.5) +\n  geom_point(shape = 21, col = "black")\n```\n
```

#Q19: Run the code chunk. What does it do? Explain and discuss the output.

```
```\n{r}\ncor(iris[, -5], iris2[, 6:9])\n```\n
```