Practical 3

Calculation of Mean, Median, Mode, Quartile, Range, interquartile range and Histogram

Ex. 1 Find mean, median, mode, quartiles, interquartile range, range, variance and standard deviation of the following data set

x = (2,1,2,3,1,2,3,4,1,5,5,3,2,3)

```
x = c(2,1,2,3,1,2,3,4,1,5,5,3,2,3)
mean(x)
median(x)
mode = function(x) {
uniqv =unique(x)
uniqv[which.max(tabulate(match(x, uniqv)))]
}
mode(x)
quantile(x)
IQR(x)
max(x)-min(x)
var(x)
sd(x)
```

Ex 2. A car travels 25 miles at 25 miles per hour (mi/h), 25 miles at 50 mph, and 25 miles at 75 mph. Write a program to find the arithmetic mean of the three velocities and the harmonic mean of the three velocities.

```
x=c(25,50,75)
x
n=length(x)
n
am=mean(x)
am
hm=n/sum(1/x)
hm
```

Ex 3. Monthly sales (in ’00 Rs.) of 20 small shops are given below.
120,115,130,140,180,210,180,120,130,150,100,190,210,160,150,160,
190,200,170,152
Calculate arithmetic mean, median, mode, geometric mean, harmonic mean, range, coefficient of range, Q1, Q3, quartile deviation, coefficient of quartile deviation, mean deviation about mean, variance, standard deviation and coefficient of variation.

```
x=c(120,115,130,140,180,210,180,120,130,150,100,190,210,160,150,
160,190,200,170,152)
x
n=length(x)
n
am=mean(x)
am
me=median(x)
me
```

```
getmode = function(x) {
uniqv = unique(x)
uniqv[which.max(tabulate(match(x, uniqv)))]
}
getmode(x)

lx=log(x)
gm=exp(mean(lx))
gm
hm=n/sum(1/x)
hm

min=min(x)
max=max(x)
range=max-min
range
cr=r/(max+min)
cr
```

```
q1=quartile(x,0.25)
q1
q3=quartile(x,0.75)
q3
qd=(q3-q1)/2
qd
cqd=(q3-q1)/(q3+q1)
cqd
md=sum(abs(x-am))/n
md
v1=var(x)
v1
sd=sd(x)
sd
cv=sd*100/am
cv
hist(x, xlab = "x", col = "green", border = "red")
```

4. Calculate arithmetic mean, geometric mean, harmonic mean, mode, median, Q1, Q3, quartile deviation, coefficient of quartile deviation, mean deviation about median, variance, standard deviation and coefficient of variation for the following data:

x	1	2	3	4	5	6	7	8
f	7	11	10	8	5	4	3	2

```
x=1:8
x
f=c(7,11,10,8,5,4,3,2)
f
N=sum(f)
N
# Replicate numeric values
y=rep(x,f)
y
am=mean(y)
am
ly=log(y)
```

```
gm=exp(mean(ly))
gm
hm=N/sum(f/x)
hm
m=which(f==max(f))
m
mo=x[m]
mo
me=median(y)
me
v=var(y)
v
q1=quantile(y,0.25)
q1
q3=quantile(y,0.75)
q3
qd=(q3-q1)/2
qd
```

```
cqd=(q3-q1)/(q3+q1)

cqd

md=sum(f*abs(x-me))/N

md

v=sum(f*(x-am)^2)/N

v

sd=v^0.5
sd
cv=sd*100/am
cv
hist(y, xlab = "x", col = "green", border = "red", xlim = c(0,8),
ylim = c(0,12), breaks = 7)
```

5. Calculate arithmetic mean, geometric mean, harmonic mean, mode, median, quartile deviation, coefficient of quartile deviation, standard deviation and coefficient of variation for the following data:

classes	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	4	8	15	24	16	14	12	7

```
lc=seq(0,70,10)
lc
uc=seq(10,80,10)
uc
h=10
f=c(4,8,15,24,16,14,12,7)
f
N=sum(f)
N
x=(lc+uc)/2
x
```

```
am=sum(f*x)/N
am
gm=exp((sum(f*log(x))/N))
gm
hm=N/sum(f/x)
hm
lcf=cumsum(f)
lcf
mc=min(which(lcf>=N/2))
mc
me=lc[mc]+(N/2-lcf[mc-1])*h/f[mc]
me
moc=which(f==max(f))
moc
mo=lc[moc]+h*((f[moc]-f[moc-1])/(2*f[moc]-f[moc-1]-f[moc+1]))
mo
q1c=min(which(lcf>=N/4))
q1c
```

```
q1=lc[q1c]+((N/4)-lcf[q1c-1])*h/f[q1c]
q1
q3c=min(which(lcf>=3*N/4))
q3c
q3=lc[q3c]+((3*N/4)-lcf[q3c-1])*h/f[q3c]
q3
qd=(q3-q1)/2
qd
cqd=(q3-q1)/(q3+q1)
cqd
v=sum(f*(x-am)^2)/N
v
sd=v^0.5
sd
cv =sd*100/am
cv
```

```
x = c(2,1,2,3,1,2,3,4,1,5,5,3,2,3)
mean(x)
median(x)

mode = function(x) {
uniqv =unique(x)
uniqv[which.max(tabulate(match(x, uniqv)))]
}
mode(x)
quantile(x)
IQR(x)
max(x)-min(x)
var(x)
sd(x)
```