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19BCB0025

DIGITAL ASSIGNMENT 1

(MAT2001-ELA DA1)

Question:

Given is the record of marks obtained by 50 students:

(80, 70, 0, 20, 20, 45, 50, 65, 30, 50, 70, 20, 4, 90, 49, 40, 45, 30, 30, 50, 20, 80, 39, 30, 50, 50, 70, 70, 20, 40, 90, 30, 40, 50, 65, 45, 70, 79, 20, 4, 30, 50, 20, 45, 50, 45, 90, 30, 4, 50)

Find the following:

- **Mean**
- **Median**
- **Mode**
- **Range**
- **Variance**
- **Standard deviation**
- **Quartile deviation**
- **Coefficient of quartile deviation**
- **Mean deviation about mean**
- **Mean deviation about median**
- **Skewness**
- **Kurtosis, for given distribution of data.**

R code:

```
x=c(80, 70, 0, 20, 20, 45, 50, 65, 30, 50, 70, 20, 4, 90, 49, 40, 45,
30, 30, 50, 20, 80, 39, 30, 50, 50, 70, 70, 20, 40, 90, 30, 40, 50,
65, 45, 70, 79, 20, 4, 30, 50, 20, 45, 50, 45, 90, 30, 4, 50)
```

```
> x
 [1] 80 70  0 20 20 45 50 65 30 50 70 20  4 90 49 40 45 30 30 50 20 80
39 30 50
[26] 50 70 70 20 40 90 30 40 50 65 45 70 79 20  4 30 50 20 45 50 45 90
30  4 50
> mean(x)
[1] 44.68
> median(x)
[1] 45
> xr=table(x)
> mode=which(xr==max(xr))
> mode
50
 9
```

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```
> summary(x)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
   0.00   30.00   45.00   44.68   61.25   90.00
> range=90-0
> range
[1] 90
> #variance
> var(x)
[1] 550.4261
> #standard deviation
> #standard deviation=square root of variance
> sd=sqrt(var(x))
> sd
[1] 23.46116
> #quartile deviation=(3rd quartile - 1st quartile)/2
> qd=(61.25-30)/2
> qd
[1] 15.625
> #coefficient of quartile deviation=(3rd quartile - 1st
quartile)/(3rd quartile + 1st quartile)
> cqd=(61.25-30)/(61.25+30)
> cqd
[1] 0.3424658
> #mean deviation about mean=(sum of absolute difference of class mark
and mean)/total number of observations
> y=x-mean(x)
> y
 [1]  35.32  25.32 -44.68 -24.68 -24.68   0.32   5.32  20.32 -14.68
5.32  25.32 -24.68 -40.68  45.32   4.32  -4.68   0.32 -14.68 -14.68
5.32 -24.68  35.32  -5.68 -14.68   5.32   5.32
[27]  25.32  25.32 -24.68  -4.68  45.32 -14.68  -4.68   5.32  20.32
0.32  25.32  34.32 -24.68 -40.68 -14.68   5.32 -24.68   0.32   5.32
0.32  45.32 -14.68 -40.68   5.32
> y=abs(y)
> y
 [1] 35.32 25.32 44.68 24.68 24.68  0.32  5.32 20.32 14.68  5.32 25.32
24.68 40.68 45.32  4.32  4.68  0.32 14.68 14.68  5.32 24.68 35.32
5.68 14.68  5.32  5.32 25.32 25.32 24.68  4.68
[31] 45.32 14.68  4.68  5.32 20.32  0.32 25.32 34.32 24.68 40.68 14.68
5.32 24.68  0.32  5.32  0.32 45.32 14.68 40.68  5.32
> mdx=sum(y)/length(y)
> mdx
[1] 18.4784
> #mean deviation about median
> z=abs(x-median(x))
> z
 [1] 35 25 45 25 25  0  5 20 15  5 25 25 41 45  4  5  0 15 15  5 25 35
6 15  5  5 25 25 25  5 45 15  5  5 20  0 25 34 25 41 15  5 25  0  5  0
45 15 41  5
> mdm=sum(z)/length(z)
> mdm
```

```
[1] 18.44
> #central moment for order 2
> mu2=(sum((x-mean(x))^2))/length(x)
> mu2
[1] 539.4176
> #central moment for order 3
> mu3=(sum((x-mean(x))^3))/length(x)
> mu3
[1] 1763.154
> #central moment for order 4
> mu4=(sum((x-mean(x))^4))/length(x)
> mu4
[1] 693691.3
> #skewness=((central moment for order 3)^2)/((central moment for
order 2)^3)
> beta1=((mu3)^2)/((mu2)^3)
> beta1
[1] 0.01980637
> #kurtosis=central moment for order 4/((central moment for order
2)^2)
> beta2=mu4/((mu2)^2)
> beta2
[1] 2.384054
```