**Measures of Central Tendency(average)**

**AVERAGE**

MODE

MEDIAN

ARTHEMETIC MEAN(AM)

**SERIES**

EX: X = 0-10,10-20,20-30, F = 1,2,3 (X,F)

EX: X=1,2,3 F=1,2,3 (X,F)

EX: 1,2,3,4,5(X)

CONTINOUS SERIES

DISCRETE SERIES

INDIVIDUAL SERIES

**EX1. CALCULATE AM FOR FOLLOWING DETAILS**

**12,10,9,8,6**

**X̄= (ΣX/N) = 45/5**

**X̄ = 9**

**ASSUMED MEAN CALCULATION(SHORTCUT METHOD)**

**X̄ = A + Σd/n**

**d = x-A A=250**

**WORKERS INCOME (X) D = X-A**

**A 120 =120-250 =-130**

**B 150 =150-250 = -100**

**C 180 =180-250 =-70**

**D 200 =200-250 = -50**

**E 250 =250-250 = 0**

**F 300 =300-250 = 50**

**G 220 =220-250 =-30**

**H 350 =350-250=100**

**I 370 =370-250=120**

**J 260 =260-250 =10**

**X̄ = 250 + -100/10 =240**

**INDIVIDUAL SERIES STEP DEVIATIONS METHOD**

**X̄ = A + (Σd/n)\*C C = COMMON FACTOR; A=850**

**WORKERS INCOME (X) D = X-A**

**A 850 =850 -850 =0**

**B 700 =700-850 = -150**

**C 100 =100-850 =-750**

**D 750 =750-850 = -100**

**E 5000 =5000-850=4150**

**F 80 =80-850 = -770**

**G 420 =420-850 =-430**

**H 2500 =2500-850=1650**

**I 400 =400-850=-450**

**J 360 =360-850 =-490**

**d= x-a/c =here c =10**

**d=266**

**x̄ = 850 + (266/10)\*10 = 850+266**

**x̄ = 1116**

**DISCRETE SERIES**

DIRECT METHOD

X̄ = ΣFX/F

STEP DEVIATION METHOD

ASSUMED MEAN METHOD

**X̄ = A+ (ΣFd/f)**

**D=X-A**

**X̄ = A+ (ΣFd/f)\*c**

**D=X-A/C**

**DIRECT METHOD:**

**PLOT SIZE(X) NO OF PLOTS(F) F\*X**

**100 200 20,000**

**200 50 10,000**

**300 10 3,000**

**260 33,000**

**X̄ = ΣFX/F = 33000/260 =126.92**

**ASSUMED MEAN METHOD:**

**PLOT SIZE(X) NO OF PLOTS(F) d=x-a**

**100 200 100-200=-100**

**200 50 200-200=0**

**300 10 300-200=100**

**Fd x̄= 200-19000/260 =126.92**

**-20000**

**0**

**1000**

**STEP DEVIATION METHOD**

**X̄ = A+ (ΣFd/f)\*c d=x-a/c**

**PLOT SIZE(X) NO OF PLOTS(F) d=x-a/c**

**100 200 100-200/100=-1**

**200 50 200-200/100=0**

**300 10 300-200/100=1**

**X̄ = 200 –(190/260)\*100 =126.92**

**CONTINOUS SERIES**

STEP DEVIATION METHOD

DIRECT METHOD

ASSUMED MEAN METHOD

X̄ = A + (ΣFD/ΣF)\*C

D = M-A/C

X̄ = A + ΣFD/ΣF

D= M-A

X̄ = ΣFM/F

M=MIDPOINT

**DIRECT METHOD**

**MARKS(X) STUDENT(F) MIDVALUE(M) FM D=M-A**

**0-10 5 5 25 -30**

**10-20 12 15 180 -20**

**20-30 15 25 375 -10**

**30-40 25 35 875 0**

**40-50 8 45 360 10**

**50-60 3 55 165 20**

**60-70 2 65 130 30**

**X̄ = 2110/70=30.14**

**ASSUMED MEAN METHOD:**

**X̄ = A + ΣFD/ΣF**

**D= M-A**

**X̄ = 35 +-340/70 =30.14**

**STEP DEVIATION METHOD**

**X̄ = A + (ΣFD/ΣF)\*C C=10**

**D = M-A/C**

**X̄ = 35 -34/70\*10 =30.14**

**COMINED MEAN**

X̄12 = N1X̄1 + N2X̄2/N1+N2

**60\*40+40\*35/100 =3800/100 = 38**

**WEIGHTED MEAN**

X̄W = ΣWX/ΣW

**WX=2380 W=17 =2380/17 = 140**

**MODE**

**MODE IS TO FIND FREQUENCY OCCURING VALUE**

**INDIVIDUAL SERIES**

**DISCRETE SERIES**

**CONTINIOUS SERIES**

MODE = L + F1-F0/(F1-F0 + F1-F2)\*CI

**L = LOWER LIMIT**

**F1=CURRENT LIMIT**

**F0-PRECEEDING LIMIT**

**F2-SUCCEEDING LIMIT**

**CI-CLASS INTERVAL**

**CI = 0-5 5-10 10-15 15-20 20-25**

**F = 7 18 25 30 20**

**=15 +30-25/30-25 +30-20 \*5**

**=15+1.67=16.67**

**EMPIRICAL FORMULA**

**MEAN-MODE = 3MEAN-3MEDIAN**

**-MODE= 2MEAN-3MEDIAN**

**MODE =3MEDIAN-2MEAN**

**EX:2,2,3,5,5,5,6,8,9 MEAN=5;MODE=5;MEDIAN=5**

**5=15-10 =5=5**

**MEDIAN**

**INDIVIDUAL SERIES =SIZEOF(N+1)/2 TH TERMS**

**DISCRETE SERIES = SIZEOF(N+1)/2 TH TERMS**

**= HERE CUMULATIVE FREQUENCY =CF**

**CONTINOUS SERIES = L + N/2-C.F/F\*CI**

**MEASURES OF DISPERSION/VARIATION**

**1.RANGE**

**2.QUARTILE DERVIATION**

**3.MEAN DEVIATION**

**4.STANDARD DEVIATION**

**RANGE**

L-S

L-S

L-S

INDIVIDUAL SERIES

CONTINOUS SERIES

DISCRETE SERIES

**RANGE COEFFECIENT = L-S/L+S**

**L=LARGEST VALUE, S= SMALLEST VALUE**

**QUARTILE DERVIATION**

**INDIVIDUAL SERIES**

**QD = Q3-Q1 /2**

**Q3 = SIZE OF 3(N+1/4)TH TERMS**

**Q1= SIZE OF (N+1/4)TH TERMS**

**COEFFICENT OF QD = Q3-Q1/Q3+Q1**

**DISCRETE SERIES:**

**SAME FORMULA BUT WE USE CUMULATIVE FREQUENCY TO CALCULATE Q VALUE**

**CONTINOUS SERIES:**

**Q3 = 3N/4 ;Q1=N/4**

**Q3 = L + ((3N/4-CF)/F)\*CI Q1= L +((N/4-CF)/F)\*CI**

**N=TOTAL NO OF FREQUENCY**

**MEAN DEVIATION**

**INDIVIDUAL SERIES**

**= Σ|d|/n**

**|d| = x-mean (OR) X-MEDIAN**

**MEAN = AVERAGE ;;MEDIAN = SIZEOF(N+1)/2TH TERMS**

**DISCRETE SERIES**

**MEAN**

**MD ABOUT MEAN = ΣF|D|/n**

**|D| =( X- X̄)**

**X̄ = ΣFX/N**

**COEFFIECENT OF MD = MD/MEAN**

**MEDIAN**

**MEAN DEVIATION ABOUT MEDIAN = ΣF|D|/ΣF**

**|D| = X -MEDIAN**

**COEFFIECENT OF MD = MD/MEDIAN**

**CONTINOUS SERIES**

**MEAN**

**=ΣF|D|/N**

**|D| = M-X̄**

**X̄=ΣFM/ΣF**

**COEFFIECENT OF MD = MD/MEAN**

**MEDIAN**

**=ΣF|D|/N**

**|D| = M-MEDIAN**

**MEDIAN=L+((N/2-CF)F)\*CI**

**COEFFIECENT OF MD = MD/MEDIAN**

**STANDARD DEVIATION**

**INDIVIDUAL SERIES**

**DIRECT METHOD**

**σ =√Σx²/n-(Σx/n)²**

**coeffiecent value = σ/x̄ \*100**

**x̄=Σx/n**

**ASSUMED MEAN METHOD**

**σ =√ΣD²/n-(ΣD/n)²**

**D=X-A**

**coeffiecent value = σ/x̄ \*100**

**X̄=A +ΣD/N**

**COMBINED STANDARD DEVIATION**

**σ12=√n1σ² + n2σ² + n1d1² + n2d2²/n1+n2**

**d1= x̄1 – x̄12**

**d2 = x̄2- x̄12**

**X̄12 = N1X̄1 + N2X̄2/N1+N2**

**DISCRETE SERIES**

**σ =√Σfd²/n-(Σfd/n)²**

**coeffiecent value = σ/x̄ \*100**

**σ =√Σ(X-x̄)²/n**

**CORRELATION**

**CORRELATION TECHNIQUE EXPLAIN RELATIONSHIP BETWEEN TWO OR MORE VARIABLE BUT IT DOESN’T TELL CAUSE OR EFFECT IN RELATIONSHIP**

**TYPES OF CORRELATION**

**1,POSITIVE AND NEGATIVE**

**2,SIMPLE, PARTIAL,MULTIPLE**

**3,LINEAR AND NON-LINEAR**

**KARL PEARSON METHOD FOR COEFFIECENT OF CORRELATION**

**r = Σxy/√Σx²\*Σy²**

**x=x-x̄**

**y=y-ȳ**

**x̄ = Σx/n**

**COEFFIECENT OF CORRELATION DIRECT METHOD FOR SMALL NUMBERS**

**r = nΣxy-ΣxΣy/√nΣx²-(Σx)²\* √nΣy²-(Σy)²**

**COEFFIECENT OF CORRELATION DIRECT METHOD FOR LARGE NUMBERS(>20)**

**r = NΣdxdy-Σdx\*Σdy/√NΣdx²-(Σdx)²\* √NΣdy²-(Σdy)²**

**CORRELATION OF COEFFIECENT FORMULA**

**=ΣXY/NσXσY**

**SPEARMANN’S RANK CORRELATIONS**

**WHEN RANKS ARE GIVEN FORMULA ρ=1-6ΣD²/N(N²-1)**

**WHEN RANK IS NOT GIVEN WE NEED TO CHANGE DATA TO RANKED WISE IF X,Y DATA GIVEN WE NEED TO CHANGE(RX,RY) THEN D =RX-RY**

**WHEN RANK IS REPEATED HERE IT IS**

**Spearman's Rank Correlation Coefficient Formula with Repeated Ranks:**

**ρ=1−6(∑d²+1/12∑(tj³−tj))/n(n²−1)**

**d=rx-ry and t for repeated ties values**

**REGRESSION**

**IT’S A STATISTICS METHOD TO FIND ESTIMATE VALUE OF UNKNOWN VARIABLE BY KNOWN VARIABLE TWO NUM SHOULD CORRELATED**

**REGRESSION OF X ON Y FORMULA**

**x-x̄ =bxy(y-ȳ)**

**bxy= rσx/σy**

**when deviation are taken as actual mean**

**bxy=Σxy/Σy² x=x-x̄ y =y-ȳ**

**when deviation are not taken**

**bxy= NΣxy-ΣxΣy/NΣy²-(Σy)²**

**REGRESSION OF Y ON X FORMULA**

**(y-ȳ)= bxy(x-x̄)**

**byx= rσy/σx**

**when deviation are taken as actual mean**

**byx=Σxy/Σx² x=x-x̄ y =y-ȳ**

**when deviation are not taken**

**byx= NΣxy-ΣxΣy/NΣx²-(Σx)²**

**r=√byx\*bxy**