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Q1:

x	-1	?	1	4
f	1	1	3	1

A) $\bar{x} = \frac{(-1)(1)+(y)(1)+(1)(3)+(4)(1)}{6}$

$1 = \frac{-1+y+3+4}{6}$

$6 = -1+y+3+4$

$6 = y+6$

$\boxed{y=0}$

B) $\tilde{x} = \bar{x} = \text{mode}$

x	3	4	4	5

C)

x	2	2	2	2	2	3	3	3	3	20

$\bar{x} = \frac{42}{10} = 4.2$

D)

x	1	1	1

$S^2 = 0$

$\bar{x} = 1$

E)

x	2	2	2

rang = 0

$\bar{x} = 2$

F) mean = 5 $\rightarrow \frac{a+b+c}{3} = 5$ $\quad a+b+c = 15$ $\quad \boxed{a+c=7}$

median = 8 $\rightarrow \boxed{b=8}$

range = 11 $\rightarrow c-a = 11$

$a+c = 7$

$-a+c = 11$ +

$2c = 18$

$\boxed{c=9}$

$a+c = 7$

$a+9 = 7$

$\boxed{a=-2}$

Q2:

x	1	2	3	4	5	6	7	8	9	10	Total
f	384	208	98	56	28	12	8	2	3	1	800
x.f	384	416	294	224	140	72	56	16	27	10	1839

mean $= \bar{x} = \frac{\sum x \cdot f}{n}$

$\bar{x} = \frac{1639}{800}$

$= 2.048$

median $= \frac{5+6}{2}$

$= \frac{11}{2}$

$= 5.5$

mode: disadvantage

Q3: $-3, -2, 0, 1, 2, 3, 4, 5, 5, 6, 14$

A) mean: $\bar{x} = \frac{\sum x}{n}$

$= \frac{35}{11}$

$= 3.18$

median: 3

mode: 5

B)

x	$x-\bar{x}$	$(x-\bar{x})^2$
-3	-6.18	38.19
-2	-5.18	26.83
0	-3.18	10.11
1	-2.18	4.75
2	-1.18	1.39
3	-0.18	0.03
4	0.82	0.67
5	1.82	3.31
5	1.82	3.31
6	2.82	7.95
14	10.82	117.07
total		213.61

$s = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}}$

$= \sqrt{\frac{213.61}{10}}$

$= \sqrt{21.361}$

$= 4.62$

C) 0, 1, 3, 4, 5, 6, 7, 8, 8, 9, 17

mean $\bar{x} = \frac{0+1+3+4+5+6+7+8+8+9+17}{11}$

$= \frac{68}{11}$

$= 6.18$

median = 6

mode = 8

Standard:

X	$X - \bar{X}$	$(x-\bar{X})^2$
0	-6.18	38.19
1	-5.18	26.83
3	-3.18	10.11
4	-2.18	4,75
5	-1,18	1.39
6	-0.18	0.03
7	0,82	0,67
8	1,82	3,31
8	1,82	3,31
9	2.82	7,95
17	10,82	117,07
total		213,61

$S = \sqrt{\frac{\Sigma (x-\bar{X})^2}{n-1}}$

$S = \sqrt{\frac{213.61}{10}}$

$= \sqrt{21,361}$

$= 4,62$

Q3 A mean: $\bar{x} = \frac{\Sigma x}{n}$

$= \frac{101}{49}$

$= 2.06$

mode: = 20

median: = 20

B) range = largest − smallest

$= 38 - 4$

$= 34$

C) $IQR = Q_3 - Q_1$

$= 28 - 9.5$

$= 18.5$

D) ~~28~~ 80^{th} = 28, 29, 29, 30, 30, 31, 31, 32, 34, 35, 36, 38.

Q4: 53, 68, 69, ~~70, 70, 70~~, 75, 76, 77, 80, 82, 82, 85, 85, 85, 88, 92, 93, 96, 100

A) 80 is the $\frac{10}{20}$ = 50%
~~58~~ percentile

Q5:

A) $X_{min} = -5$

$Q_1 = -2,5$

$Q_2 = 0$

$Q_3 = 3,5$

$X_{max} = 5$

B) rang = 5 - -5 = 10

IQR = 3,5 - -2,5 = 6

C) Z-score = $\frac{x - \bar{x}}{5}$

c) $2\text{-score} = \frac{x - \bar{x}}{s}$

x	f	x^2	x·f	$x^2 \cdot f$
-5	2	25	-10	50
-3	1	9	-3	9
-2	3	4	-6	12
-1	2	1	-2	2
0	4	0	0	0
1	1	1	1	2
3	1	9	3	9
4	2	16	8	32
5	1	25	5	25
total	17		-4	140

$\bar{x} = \frac{\sum x \cdot f}{n}$

$= \frac{-4}{17}$

$\bar{x} = -0.23$

$s = \sqrt{\frac{SXX}{n-1}}$

$SXX = \sum x^2 \cdot f - \frac{(\sum x \cdot f)^2}{n}$

$= 140 - \frac{16}{9}$

$= 140 - 67$

$= 138.3$

$s = \sqrt{\frac{138.3}{8}}$

$s = 17.28$

$Z = \frac{3 + 0.23}{17.28}$

$= \frac{3.23}{17.28}$

$Z = 0.18$

Q6:

class	f	x	x^2	x·f	$x^2 \cdot f$
12-20	6	16	256	96	1536
21-29	3	25	625	75	1875
30-38	4	34	1156	136	4624
39-47	4	43	1849	172	688
total				479	8723

variance: $s^2 = \frac{SXX}{n-1}$

$SXX = \sum x^2 \cdot f - \frac{(\sum x \cdot f)^2}{n}$

$= 8723 - \frac{(479)^2}{4}$

$= 8723 - 57360.25$

$= \frac{-48637.25}{3}$

$s^2 = 16212,41$

mode 4

mediane 29.5

Q7 A) $\bar{x} = \frac{\Sigma x}{n} = \frac{20}{5} = 4$

$$S = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}}$$

$$= \sqrt{\frac{6}{4}}$$

$$= \sqrt{1,5}$$

$$= 1,22$$

B) $y = 1 - 2x$

~~$2x + y = 1$~~

$1 - y = 2x$

$x = \frac{1-y}{2}$

$\bar{x} = \frac{\sum \frac{1-y}{2}}{5}$

$4 = \frac{1-\Sigma y}{10}$

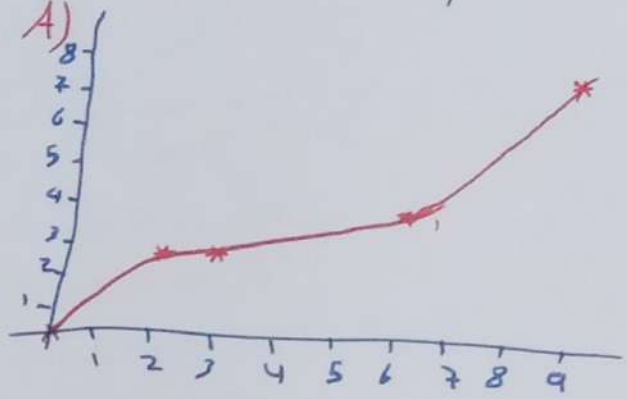
$40 = 1 - \Sigma y$

$\boxed{\Sigma y = 39}$

Q8:

x	y	$x-\bar{x}$	$y-\bar{y}$	$(x-\bar{x})(y-\bar{y})$	$(x-\bar{x})^2$	xy
0	0	-4	-3.6	14.4	16	0
2	3	-2	-0.6	1.2	4	6
3	3	-1	-0.6	0.6	1	9
6	4	2	0.4	0.8	4	24
9	8	5	4.4	22	25	72
total	20	18		39	50	111

A)



B) $cov(x,y) > 0$ Positive.

C) $cov(x,y) = \dfrac{\Sigma xy - \frac{\Sigma x \Sigma y}{n}}{n-1}$

$= \dfrac{111 - \frac{(20)(18)}{5}}{4}$

$= \dfrac{111-72}{4}$

$= 9.75$

D) $y = ax + b$

$a = \dfrac{\Sigma (x-\bar{x})(y-\bar{y})}{\Sigma (x-\bar{x})^2}$

$a = \dfrac{39}{50}$

$= 0.78$

$\bar{y} = \dfrac{\Sigma y}{n}$

$= \dfrac{18}{5}$

$= 3.6$

$\bar{x} = \dfrac{\Sigma x}{n}$

$= \dfrac{20}{5}$

$= 4$

$b = \bar{y} - a\bar{x}$

$b = 3.6 - (0.78)(4)$

$= 0.48$

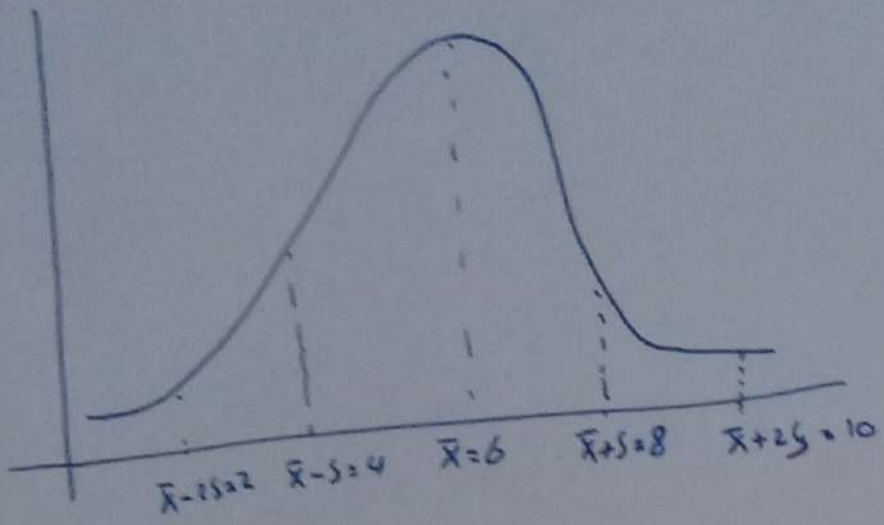
$y = (0.78)(x) + 0.48$

E) $x = 5 \quad y = ??$

$y = (0.78)(5) + 0.48$

$y = 4.38$

Q.9:



A) 4 and 8 $\approx$ 68%.

B) 2 and 10 $\approx$ 95%.

C) Below 10 $\approx$ ~~2.5%~~ 97.5%.

D) Above 4 $\approx$ 97.5%.

Q10:

$(\bar{x}+25, \bar{x}-25)$

$(139+(2)(13), (39+(2)(13))$

~~(165, 113)~~ (113, 165)

A) is based on the Empirical Rule and therefore it might not be correct.

B) is direct application of part (1) of chebyshev's Theorem because $(\bar{x}-25, \bar{x}+25) = (113, 165)$. It must be correct.

C) It cannot be 10%. because according to the law it is approximately 67%.

D) It can be said that the ratio between the highest and lowest ratio is approximately 97%.

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