Higher Institute of Engineering &technology

Name : Section : Code:

Course Title: statistics | Date: 2017(2nd term) Allowed time: 1hrs

$$\rho = 1 - \frac{6\sum d^2}{n(n^2-1)}$$

Q (1) From the following distribution of data find

Age	0 -10	10-20	20-30	30-40	40-50	50-60	60-70
frequency	6	10	14	22	13	11	7

2

(a) Mean by short cut method 2 (b) Standard deviation by shortest method

(c) Median for grouped data 2 2 (d) Mode for grouped data

Q (2) Let a coin be tossed three times , A event that heads and tail appears in three tossed , B event that at most one head appears in three tossed , and C event that at least one tails appears in three tossed: 3 (i)Show that A and B are independent.

3 (ii) Find probability of A if C occurs.

Q(3) Calculate rank correlation coefficient for 8 students in two examinations which

6

1st examination	pass 7	pass 7	Very good 2.5	Good 4.5	excellent 1	pass 7	Very good 2.5	good 4.5
2st examination	pass 6	good 3	Very good 1	pass 6	good 3	good 3	pass 6	weak 8

With my best wishes Dr. M.Shokry

M.P	f_i	$d_i = x_i - a$	$f_i d_i$	c.f	$f_i d_i^2$
5	6	-30		6	
15	10	-20		16	
25	14	-10		30	
35	22	0		52	
45	13	10		65	
55	11	20		76	
65	7	30		83	
	83		40		22800

$\boxed{a = 35}$

$$\mu = a + \frac{\sum fd}{\sum f} = 35 + \frac{40}{83} = 35.48$$

$$\sigma = \sqrt{\frac{\sum f_i d_i^2}{\sum f_i} - \left(\frac{\sum f_i d_i}{\sum f_i}\right)^2}$$

$$= \sqrt{\frac{22800}{83} - \left(\frac{40}{83}\right)^2} = 16.567$$

$$\text{Median} = \ell + \frac{\frac{N}{2} - C}{f} * i$$

$\ell = 20$, $\frac{N}{2} = 41.5$; $C = 16$

$f = 14$; $i = 10$

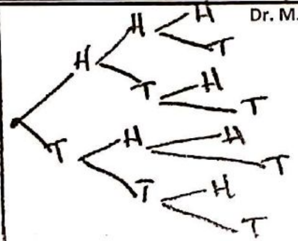
$$\text{Med} = 20 + \frac{41.5 - 16}{14} * 10$$

Median = 38.214

$$\text{Mode} = \ell + \frac{f - f_{-1}}{2f - f_{-1} - f_1} * i$$

$$= 30 + \frac{22 - 14}{2(22) - 14 - 13} * 10$$

$= 34.705$



$A = \{HHT, HTH, HTT, THH, THT, TTH\}$

$B = \{HTT, THT, TTH, TTT\}$

$C = \{HHT, HTH, HTT, THH, THT, TTH, TTT\}$

$P(A) = \frac{6}{8}$; $P(B) = \frac{4}{8}$

$P(A \cap B) = 3/8$

$P(A \cap B) = P(A)\, P(B)$

$$P(A|C) = \frac{P(A \cap C)}{P(C)} = \frac{6/8}{7/8} = \frac{6}{7}$$

1st Rank	2nd Rank	d^2
7	6	
7	3	
2.5	1	
4.5	6	
1	3	
7	3	
2.5	6	
4.5	8	
		66

$\rho = 0.21428$

$$\rho = 1 - \frac{3\sum d^2}{n(n^2-1)}$$

Higher Institute of Engineering &technology

Name :

Section :

Code:

Course Title: Numerical analysis	Date: 2017(2nd term)	Allowed time: 1hrs

(a) Fitting the curve $y = ab^{5x}$ to the following data and find RMSE

x	1	2	3	4	5
y	2	6	8	9	12

(b) From the following table find f(0.11), f(.75) and f(0.35)

(use Gauss and Newton)

x	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
f(x)	5	3	4	7	5	6	4	10

(c) show that $\sqrt{1+\delta^2\mu^2} = 1 + \frac{\delta^2}{2}$

With my best wishes

Dr. M.Shokry

$\ln y = \ln a + 5x \ln b$, $Y = \ln y$, $A = \ln a$, $B = 5\ln b$

$Y = A + Bx$

x	Y	xY	x^2	y_{app}	D^2
1	ln2			2.86	
2	ln6			4.261	
3	ln8	31.728	55	6.348	9.066
4	ln9			9.458	
5	ln12			14.091	
15	9.246				

$\sum Y = nA + B\sum x$ | $9.246 = 5A + 15B$

$\sum xY = A\sum x + B\sum x^2$ | $31.728 = 15A + 55B$

$A = 0.6522$, $B = 0.399$

$a = e^{0.6522} = 1.9197$

$b = e^{\frac{B}{5}} = 1.0830$

$y_{app} = (1.9197)(1.083)^{5x}$

$RMSE = \sqrt{\frac{\sum D^2}{5}} = 1.35$

x	Y							
0.1	5	-2	3	-1	-6	21	-50	110
0.2	3	1	2	-7	15	-29	60	
$\boxed{0.3}$	4	3	-5	8	-14	31		
0.4	7	-2	3	-6	17			
0.5	5	1	-3	11				
0.6	6	-2	8					
0.7	4	6						
0.8	10							

$P_n(x) = y_0 + p\Delta y_0 + \frac{p(p-1)}{2!}\Delta^2 y_0 + \dots$ $p = 0.1$

$P_n(x) \simeq y_n + p\nabla y_n + \frac{p(p+1)}{2!}\nabla^2 y_n + \dots$ $p = 0.5$

G-F

$P_n(x) \simeq y_0 + p\Delta y_0 + \frac{p(p-1)}{2!}\Delta^2 y_{-1} + \frac{(p+1)p(p-1)}{3!}\Delta^3 y_{-1} + \dots$

G-B

$P_n(x) = y_0 + p\Delta y_{-1} + \frac{(p+1)p}{2!}\Delta^2 y_{-1} + \frac{(p+1)p(p-1)}{3!}\Delta^3 y_{-2} + \dots$

$p = 0.5$

$1+\delta^2\mu^2 = 1 + \frac{1}{4}(E^{1/2} - E^{-1/2})^2(E^{1/2} + E^{-1/2})^2$

$= 1 + \frac{1}{4}(E - E^{-1})^2$

$= \frac{1}{4}[4 + E^2 - 2 + E^{-2}]$

$= \frac{1}{4}[E^2 + 2 + E^{-2}] = \frac{1}{4}(E + E^{-1})^2$

$L.H.S = \sqrt{1+\delta^2\mu^2} = \frac{1}{2}(E + E^{-1})$

$R.H.S = 1 + \frac{1}{2}\delta^2$

$= 1 + \frac{1}{2}(E^{1/2} - E^{-1/2})^2$

$= \frac{1}{2}[2 + E - 2 + E^{-1}] =$

$= \frac{1}{2}(E + E^{-1})$