Bhiwandi Weavers' Education Society's

SAMADIYA COLLEGE OF ARTS AND COMMERCE

(A Minority Institution Affiliated to the University of Mumbai)

INTERNAL MARK SHEET

Class: FYBA

Semester: I **Month:** 8th Oct **20**18-19

Subject: Foundation Course

Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks
1	16	23	16	45	17	67	Ab	89	16	111	
2	18	24	20	46	17	68	16	90	19	112	
3	20	25	21	47	20	69	20	91	20	113	
4	12	26	Ab	48	20	70	22	92	21	114	
5	13	27	22	49	19	71	24	93	Ab	115	
6	16	28	23	50	18	72	16	94	22	116	
7	20	29	20	51	20	73	16	95	23	117	
8	13	30	20	52	21	74	16	96	24	118	
9	15	31	24	53	16	75	16	97	20	119	
10	16	32	20	54	19	76	19	98	20	120	
11	20	33	19	55	19	77	16	99	20	121	
12	20	34	16	56	20	78	20	100	19	122	
13	21	35	12	57	18	79	19	101	19	123	
14	22	36	13	58	18	80	14	102	~~20~~	124	
15	19	37	13	59	16	81	15	103		125	
16	20	38	15	60	15	82	19	104		126	
17	16	39	20	61	14	83	20	105		127	
18	19	40	20	62	15	84	21	106		128	
19	20	41	16	63	15	85	20	107		129	
20	22	42	19	64	20	86	19	108		130	
21	24	43	20	65	22	87	19	109		131	
22	Ab	44	19	66	20	88	20			132	

SAMADIYA COLLEGE OF ARTS & COM. BHIWANDI

Bhiwandi Weavers' Education Society's

SAMADIYA COLLEGE OF ARTS AND COMMERCE

(A Minority Institution Affiliated to the University of Mumbai)

INTERNAL MARK SHEET

Class: FYB.A

Semester: II **Month:** feb **20** 18-19

Subject: Foundation Course

Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks
1	20	23	19	45	Ab	67	19	89	13	111	
2	15	24	22	46	15	68	20	90	23	112	
3	18	25	23	47	22	69	22	91	22	113	
4	Ab	26	19	48	17	70	Ab	92	14	114	
5	23	27	20	49	14	71	21	93	19	115	
6	23	28	20	50	Ab	72	19	94	21	116	
7	15	29	23	51	18	73	Ab	95	20	117	
8	14	30	18	52	14	74	20	96	23	118	
9	22	31	22	53	Ab	75	19	97	22	119	
10	23	32	14	54	Ab	76	23	98	19	120	
11	22	33	21	55	23	77	21	99	20	121	
12	14	34	23	56	22	78	22	100	20	122	
13	23	35	19	57	23	79	20	101	15	123	
14	20	36	13	58	12	80	19	102		124	
15	20	37	16	59	13	81	Ab	103		125	
16	21	38	16	60	Ab	82	22	104		126	
17	18	39	Ab	61	23	83	21	105		127	
18	21	40	18	62	18	84	23	106		128	
19	18	41	17	63	21	85	20	107		129	
20	21	42	14	64	23	86	21	108		130	
21	22	43	14	65	21	87	22	109		131	
22	19	44	14	66	Ab	88		110		132	

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Bhiwandi Weavers' Education Society's

SAMADIYA COLLEGE OF ARTS AND COMMERCE

(A Minority Institution Affiliated to the University of Mumbai)

INTERNAL MARK SHEET

Class: FYB.A

Semester: I **Month:** Oct **20** 19-20

Subject: Foundation Course

Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks
1	24	23	16	45	21	67	20	89		111	
2	20	24	16	46	20	68	22	90		112	
3	20	25	18	47	20	69	20	91		113	
4	16	26	20	48	Ab	70	13	92		114	
5	18	27	20	49	21	71	14	93		115	
6	16	28	21	50	12	72		94		116	
7	16	29	18	51	13	73		95		117	
8	16	30	19	52	19	74		96		118	
9	20	31	22	53	19	75		97		119	
10	20	32	19	54	20	76		98		120	
11	21	33	Ab	55	23	77		99		121	
12	14	34	13	56	23	78		100		122	
13	16	35	14	57	20	79		101		123	
14	Ab	36	20	58	Ab	80		102		124	
15	20	37	16	59	18	81		103		125	
16	20	38	19	60	19	82		104		126	
17	18	39	19	61	20	83		105		127	
18	19	40	20	62	21	84		106		128	
19	20	41	22	63	20	85		107		129	
20	20	42	20	64	20	86		108		130	
21	18	43	23	65	19	87		109		131	
22	16	44	23	66	20	88		110		132	

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SAMADIYA COLLEGE OF ARTS AND COMMERCE

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INTERNAL MARK SHEET

Class: F.Y.B.A

Semester: II **Month:** **20** 19-20

Subject: Foundation Course

Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks
1	16	23	19	45	19	67	18	89		111	
2	16	24	17	46	20	68	20	90		112	
3	13	25	17	47	14	69	16	91		113	
4	19	26	16	48	13	70	20	92		114	
5	17	27	16	49	16	71	16	93		115	
6	20	28	17	50	16	72		94		116	
7	20	29	17	51	20	73		95		117	
8	19	30	20	52	Ab	74		96		118	
9	19	31	20	53	15	75		97		119	
10	17	32	17	54	17	76		98		120	
11	Ab	33	17	55	17	77		99		121	
12	17	34	16	56	20	78		100		122	
13	20	35	16	57	17	79		101		123	
14	19	36	20	58	20	80		102		124	
15	17	37	16	59	22	81		103		125	
16	16	38	Ab	60	Ab	82		104		126	
17	17	39	20	61	24	83		105		127	
18	Ab	40	18	62	20	84		106		128	
19	17	41	18	63	20	85		107		129	
20	20	42	20	64	19	86		108		130	
21	17	43	21	65	18	87		109		131	
22	19	44	20	66	20	88		110		132	

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SAMADIYA COLLEGE OF ARTS AND COMMERCE

(A Minority Institution Affiliated to the University of Mumbai)

INTERNAL MARK SHEET

Class: FYB.A

Semester: I **Month:** Sep **20** 21-22

Subject: Foundation Course

Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks
1	19	23	22	45	16	67		89		111	
2	20	24	20	46	16	68		90		112	
3	19	25	21	47	18	69		91		113	
4	17	26	Ab	48	20	70		92		114	
5	20	27	20	49	18	71		93		115	
6	16	28	21	50	Ab	72		94		116	
7	19	29	22	51	20	73		95		117	
8	20	30	23	52	16	74		96		118	
9	19	31	20	53	19	75		97		119	
10	20	32	Ab	54	19	76		98		120	
11	16	33	20	55	19	77		99		121	
12	19	34	16	56	20	78		100		122	
13	Ab	35	16	57		79		101		123	
14	17	36	17	58		80		102		124	
15	17	37	17	59		81		103		125	
16	13	38	18	60		82		104		126	
17	16	39	18	61		83		105		127	
18	15	40	20	62		84		106		128	
19	16	41	21	63		85		107		129	
20	Ab	42	20	64		86		108		130	
21	15	43	22	65		87		109		131	
22	20	44	20	66		88		110		132	

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SAMADIYA COLLEGE OF ARTS AND COMMERCE

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INTERNAL MARK SHEET

Class: F.Y.B.A

Semester: II **Month:** Jan **20** 21-22

Subject: Foundation Course

Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks
1	15	23	16	45	19	67		89		111	
2	16	24	17	46	19	68		90		112	
3	20	25	17	47	20	69		91		113	
4	20	26	Ab	48	21	70		92		114	
5	15	27	19	49	Ab	71		93		115	
6	17	28	19	50	16	72		94		116	
7	20	29	16	51	13	73		95		117	
8	20	30	19	52	16	74		96		118	
9	15	31	16	53	19	75		97		119	
10	17	32	20	54	16	76		98		120	
11	Ab	33	21	55	17	77		99		121	
12	20	34	22	56	20	78		100		122	
13	20	35	19	57		79		101		123	
14	15	36	20	58		80		102		124	
15	15	37	20	59		81		103		125	
16	16	38	19	60		82		104		126	
17	16	39	19	61		83		105		127	
18	15	40	17	62		84		106		128	
19	16	41	17	63		85		107		129	
20	20	42	20	64		86		108		130	
21	20	43	20	65		87		109		131	
22	20	44	17	66		88		110		132	

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SAMADIYA COLLEGE OF ARTS AND COMMERCE

(A Minority Institution Affiliated to the University of Mumbai)

INTERNAL MARK SHEET

Class: FYB.A

Semester: I **Month:** Sep **20** 22-23

Subject: Foundation Course

Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks
1	20	23	16	45	Ab	67	20	89	Ab	111	
2	Ab	24	20	46	20	68	20	90	Ab	112	
3	20	25	20	47	20	69	20	91	Ab	113	
4	20	26	20	48	20	70	18	92	20	114	
5	20	27	18	49	20	71	18	93	Ab	115	
6	18	28	18	50	18	72	20	94	Ab	116	
7	20	29	16	51	18	73	18	95	16	117	
8	20	30	20	52	Ab	74	20	96		118	
9	20	31	16	53	20	75	Ab	97		119	
10	20	32	20	54	20	76	20	98		120	
11	20	33	18	55	Ab	77	20	99		121	
12	20	34	Ab	56	20	78	16	100		122	
13	20	35	16	57	20	79	Ab	101		123	
14	18	36	Ab	58	20	80	20	102		124	
15	20	37	20	59	20	81	20	103		125	
16	16	38	20	60	20	82	20	104		126	
17	20	39	20	61	20	83	20	105		127	
18	20	40	18	62	20	84	16	106		128	
19	20	41	20	63	20	85	20	107		129	
20	16	42	18	64	18	86	20	108		130	
21	18	43	Ab	65	Ab	87	20	109		131	
22	20	44	20	66	20	88	20	110		132	

Bhiwandi Weavers' Education Society's

SAMADIYA COLLEGE OF ARTS AND COMMERCE

(A Minority Institution Affiliated to the University of Mumbai)

INTERNAL MARK SHEET

SAMADIYA COLLEGE OF ARTS & COM. BHIWANDI

Class: F.Y.B.A

Semester: II **Month:** Jan **20** 22-23

Subject: Foundation Course

Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks	Roll No.	Marks
1	18	23	14	45	Ab	67	Ab	89	Ab	111	
2	Ab	24	12	46	Ab	68	15	90	Ab	112	
3	20	25	18	47	16	69	17	91	Ab	113	
4	12	26	Ab	48	22	70	18	92	12	114	
5	Ab	27	17	49	17	71	14	93	Ab	115	
6	15	28	14	50	15	72	14	94	Ab	116	
7	14	29	Ab	51	Ab	73	18	95	14	117	
8	16	30	17	52	Ab	74	15	96		118	
9	Ab	31	Ab	53	Ab	75	Ab	97		119	
10	12	32	Ab	54	Ab	76	17	98		120	
11	15	33	Ab	55	Ab	77	Ab	99		121	
12	13	34	Ab	56	Ab	78	18	100		122	
13	17	35	15	57	12	79	Ab	101		123	
14	15	36	Ab	58	18	80	Ab	102		124	
15	17	37	Ab	59	15	81	15	103		125	
16	Ab	38	17	60	17	82	16	104		126	
17	14	39	Ab	61	18	83	16	105		127	
18	17	40	18	62	14	84	Ab	106		128	
19	20	41	15	63	16	85	Ab	107		129	
20	15	42	Ab	64	16	86	Ab	108		130	
21	15	43	Ab	65	Ab	87	12	109		131	
22	14	44	15	66	15	88	Ab	110		132	

Name : ANSARI MOAZZAM MOHD AMEEN. 85

Std. : F.Y B.Com Div. : _____ Roll No. : 30

Sub. : MATHS & STAT. TECH.

School / College : Sammadiya College.

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Unit :3

Q Find the Arithmatic mean and mode for the following data.

x	5	8	10	12	14
f	2	7	13	18	10

Soln

x	f	fx
5	2	10
8	7	56
10	13	130
12	18	216
14	10	140
	$\Sigma N = 50$	$\Sigma fx = 552$

$$\text{Mean} = \bar{x} = \frac{\Sigma fx}{N}$$

$$= \frac{552}{50}$$

$$\bar{x} = 11.04$$

Mode, maximum frequency = 18

$$x = 12$$

Q. For the following data find the combined mean. Also find which group has more variation.

	Grp 1	Grp 2
Number	70	90
Mean weight	75	82
S.D	4	7

Soln.

$$\bar{x} = \frac{n_1 \bar{x}_1 + n_2 \bar{x}_2}{n_1 + n_2}$$

$$\bar{x} = \frac{70 \times 75 + 90 \times 82}{70 + 90}$$

$$= \frac{5250 + 7380}{160}$$

$$= \frac{12630}{160}$$

$$= 78.9375$$

$$CV_{G\text{-}I} = \frac{\sigma_1}{\bar{x}_1} \times 100$$

$$= \frac{4}{75} \times 100$$

$$= 5.33$$

$$CV_{G\text{-}II} = \frac{\sigma_2}{\bar{x}_2} \times 100$$

$$= \frac{7}{82} \times 100$$

$$= 8.54$$

∴ Group II is more variation.

Unit 4. probability

Q. Two fair dice are thrown simultaneously find the probability that. (i) sum of numbers is 7 (ii) same number occures twice (iii) second number is greater than the first

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U

Soln

$$S = \begin{Bmatrix} (1,1)(1,2)(1,3)(1,4)(1,5)(1,6) \\ (2,1)(2,2)(2,3)(2,4)(2,5)(2,6) \\ (3,1)(3,2)(3,3)(3,4)(3,5)(3,6) \\ (4,1)(4,2)(4,3)(4,4)(4,5)(4,6) \\ (5,1)(5,2)(5,3)(5,4)(5,5)(5,6) \\ (6,1)(6,2)(6,3)(6,4)(6,5)(6,6) \end{Bmatrix}$$

$n(S) = 36$

(i) Sum of number is 7

Let A be the event that the sum of number is 7

$A = \{(1,6)(6,1)(2,5)(5,2)(3,4)(4,3)\}$.

$n(A) = 6$

$p(A) = \frac{n(A)}{n(S)} = \frac{6}{36} = \frac{1}{6}$

(ii) Same numbers occurs twice

Let B be the event that same number occurs twice

$B = \{(1,1)(2,2)(3,3)(4,4)(5,5)(6,6)\}$.

$n(B) = 6$

$p(B) = \frac{6}{36} = \frac{1}{6}$

(iii) second number is greater that the first

Let C be the event the second number is greater than the first.

$C = \{(1,2)(1,3)(1,4)(1,5)(1,6)(2,3)(2,4)(2,5)(2,6)(3,4)(3,5)(3,6)(4,5)(4,6)(5,6)\}$.

$n(C) = 15$

$p(C) = \frac{n(C)}{n(S)} = \frac{15}{36}$

$p(C) = \frac{5}{12}$

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Q. The following table shows a probability distribution of a random variable X

x	1	2	3	4	5
p(x)	k	0.3	0.15	0.15	0.1	2k

find (i) k (ii) E(x) (iii) V(x)

Sol^n $k + 0.3 + 0.15 + 0.15 + 0.1 + 2k = 1$

$3k + 0.7 = 1$

$3k = 1 - 0.7$

$3k = 0.3$

$k = 0.3/3$

$k = 0.1$

x	p(x)	xp(x)	x^2	$x^2p(x)$
0	0.1	0	0	0
1	0.3	0.3	1	0.3
2	0.15	0.3	4	0.6
3	0.15	0.45	9	1.35
4	0.1	0.4	16	1.6
5	0.2	1	25	5
		$\Sigma xp(x) = 2.45$		$\Sigma x^2p(x) = 8.85$

$E(x) = \Sigma xp(x) = 2.45$

$V(x) = E(x^2) - [E(x)]^2$

$= 8.85 - (2.45)^2$

$= 8.85 - 6.0025$

$= 2.8475$

Unit 5: Decision theory

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Q. For the following payoff table suggest the best decision by using (i) Maximax criterian (ii) Maximin criterian (iii) Laplace criterian.

Course of Action	States of Nature.		
	S_1	S_2	S_3
A_1	25	85	95
A_2	40	0	60
A_3	65	30	55

Solu (i) Maximax

Course of Action	Maximum payoff.
A_1	$\max(25, 85, 95) = 95$
A_2	$\max(40, 0, 60) = 60$
A_3	$\max(65, 30, 55) = 65$

$\max(95, 60, 65) = 95$ which corresponds to the Act A_1 Hence A_1 is the best Act.

(ii) Maximin

Course of Nature.	Maximum payoff.
A_1	$\min(25, 85, 95) = 25$
A_2	$\min(40, 0, 60) = 0$
A_3	$\min(65, 30, 55) = 30$

Maximum = $\max(25, 0, 30) = 30$

which corresponds to the Act A_3 Hence A_3 is the best Act.

(ii) Laplace.

Courses of Action	Average payoff.
A_1	$25+85+95/3 = 205/3 = 68.33$
A_2	$40+0+60/3 = 100/3 = 33.33$
A_3	$65+30+55/3 = 150/3 = 50$

max (68.33, 33.33, 50) = 68.33

which corresponds to the Act A_1 Hence A_1 is the best Act.

Q given the payoff matrix choose the decision problem using EMV criterian.

Criterion: Action	States of Nature		
	S_1	S_2	S_3
A_1	40	50	20
A_2	30	60	40
A_3	10	40	80
probability	0.4	0.2	0.4

soln. EMV = $\sum$ Payoff × probability

$EMV(A_1) = 40 \times 0.4 + 50 \times 0.2 + 20 \times 0.4$

$= 16 + 10 + 8$

$= 34$

$EMV(A_2) = 30 \times 0.4 + 60 \times 0.2 + 40 \times 0.4$

$= 12 + 12 + 16 = 40$

$EMV(A_3) = 10 \times 0.4 + 40 \times 0.2 + 60 \times 0.4$

$= 4 + 8 + 24 = 36$

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Max (34, 40, 76) = 40 which is corresponds to the Act A_2 Hence A_2 is the best Act.

Unit 1st Shares & Mutual fund.

Q. If the market price of a shares with face value ₹ 100 is ₹ 130 how many shares of the company can be bought for ₹ 3263 brokerage being 0.4% ?

Soln. MV = 130 FV = 100 Investment = 3263
brokerage. = 0.4%
CP per share = MV + brokerage
= 130 + 0.52
= 130.52

brokerage = 0.4% × MV per share..
$= \frac{0.4}{100} \times 130$
= 0.52

No of shares purchased = $\frac{\text{Investment}}{\text{CP per share}}$
$= \frac{3263}{130.52}$
= 25

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Q. If a m.f. had NAV of ₹ 36 at the beginning & ₹ 44 at the end of the year find the absolute changes & the % change during the year.

Soln. Absolute change in NAV = NAV at the end of year
— NAV at the begining of the year

$= 44 - 36 = 8$

% change in NAV = $\frac{\text{Absolute change in NAV}}{\text{NAV at the begining}} \times 100$

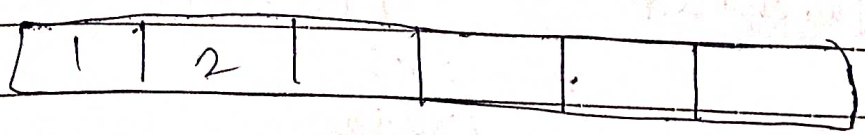
$= \frac{8}{36} \times 100$

$= 22.22\%$

Unit 2: permutation & combination

Q. In how many ways can the letters of the word 'AGENCY' be arranged so that vowels are in first two places?

Soln. The word AGENCY has 6 letters. of which 2 are vowels & 4 are consonents.



The first & 2nd place has to be filled with two vowels

This can be done in ${}^2P_2$ ways.
The remaining 4 places with 4 consonants is filled in ${}^4P_4$ ways.

$\therefore$ The total no of ways $= {}^2P_2 \times {}^4P_4$

$$= \frac{2!}{(2-2)!} \times \frac{4!}{(4-4)!} = 2! \times 4!$$

$$= 2 \times 1 \times 4 \times 3 \times 2 \times 1$$

$$= 48$$

Q. An organisation consists of a members of which 4 are doctors A selection of 4 persons is to done among & these members find how many selection will have.

(i) No doctors (ii) Exactly 2 doctors.

Soln No doctors.

$a - 4 = 5$

No of ways $= {}^4C_0 \; {}^5C_4 = 1 \times \frac{5!}{4!(5-4)!}$

$= 5$

(2) Exactly 2 doctors.

No of ways $= {}^4C_2 \; {}^5C_2 = \frac{4!}{2!(4-2)!} \times \frac{5!}{2!(5-2)!}$

$= \frac{4 \times 3 \times 2!}{2! \; 2!} \times \frac{5 \times 4 \times 3!}{2! \; 3!}$

$= \frac{4 \times 3}{2 \times 1} \times \frac{5 \times 4}{2 \times 1} = 6 \times 10$

$= 60$

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6. A toy manufacturer has to manufacture scooter & bicycles. Each toy has undergo ~~test to~~ manufacture scooters processing through the machines, Machine A & Machines B. A Bicycle requires 6 hours in machines A & 3 hours of in machine B. A scooter requires 4 hours in machine A & 10 hour in machine B machine A & B are available for at most 120 hours & 180 hours respectively. The profit of bicycle is ₹ 108 & that per scooter is ₹ 800 formulate the L.P.P.

Soln

Let x = scooters.

Let y = bicycles.

objective function coeff	variable	items	Constraints. machine A	B
~~800~~	x	scooters	4	10
100	y	bicycles.	6	3
		Availability	≤ 120	≤ 180

maximize

$Z = 800x + 100y$

Subject to.

$4x + 6y \leq 120$

$10x + 3y \leq 180.$

$x, y \geq 0$

Sem II[nd].

Unit 3.

Bivariate linear Correlation & Regression.

Q.1) If for a bivariate data.

$\Sigma(x_i - \bar{x})^2 = 10 \quad \Sigma(y_i - \bar{y})^2 = 8$

$\Sigma(x_i - \bar{x})(y_i - \bar{y}) = 7.8$

find the Karl Pearson's coefficient of Corr.

Sol:- $$r = \frac{\Sigma(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\Sigma(x_i - \bar{x})^2}\sqrt{\Sigma(y_i - \bar{y})^2}}$$

$$= \frac{7.8}{\sqrt{10}\sqrt{8}} = \frac{7.8}{3.1622 \times 2.8284}$$

$$= \frac{7.8}{8.9439}$$

$$= 0.8721$$

Q.2) Find the mean values of x & y also the coefficient of correlation if the regression equation of y on x is $x + 3y - 88 = 0$ & that of x on y is $2x + y - 71 = 0$

Sol:- $x + 3y - 88 = 0$ & $2x + y - 71 = 0$

$x + 3y = 88$ — (1)

$2x + y = 71$ — (2)

Eq = 2 × 3

$6x + 3y = 213$ — (3)

eq(1) − eqn (3)

$x + 3y = 88$

$6x + 3y = 213$

$+5x = +125$

$x = \frac{+25}{5}$ 25

$x = 25$

put $x = 25$ in eqn (1)

$25 + 3y = 88$

$3y = 88 - 25$

$3y = 63$

$y = \frac{63}{3}$ 21

$y = 21$

$\bar{x} = 25, \bar{y} = 21$

$m_1 = -\frac{\text{coeff of } x}{\text{coeff. of } y}$

$m_1 = -\frac{1}{3}$

$m_2 = \frac{-2}{1} = -2$

$|m_1| = 1/3 = 0.33$

$|m_2| = 2.$

$|m_1| < |m_2|$

$b_{yx} = m_1 = \frac{-1}{3}$

$b_{xy} = 1/m_2 = \frac{1}{2}$

$r = \pm \sqrt{b_{yx} \times b_{xy}}$

$r = -\sqrt{-1/3 \times -1/2}$

$= -\sqrt{1/6}$

$= -\sqrt{0.166}$

$r = -0.4$

Unit 4 Time series.

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Q. Find three yearly moving Average for the following data.

year.	2011	2012	2013	2014	2015	2016	2017
Sales (Lakh)	15	17	22	30	25	27	35

year	Sales (Lakh).	three yearly total	Three years moving Av.
2011	15	—	
2012	17	15+17+22 = 54	54/3 = 18
2013	22	17+22+30 = 69	69/3 = 23
2014	30	22+30+25 = 77	77/3 = 25
2015	25	30+25+27 = 82	82/3 = 27.3
2016	27	25+27+35 = 87	87/3 = 29
2017	35	—	

Index Number.

Q. Find the Laspeyer's Paasche's, Dorbish bowl Fishers & Marshall-Edgeworth weighted index number. for the following data

Commodity ~~Base year current year~~

Commodity	Base year		current year	
	price	qty	price	qty.
A	40	4	80	4
B	50	3	70	3
C	60	2	90	2
D	80	4	100	1

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Sol:-

Commodity	p_0	p_1	q_0	q_1	p_0q_0	p_1q_0	p_0q_1	p_1q_1
A	40	50	4	9	160	200	360	450
B	50	70	3	3	150	210	150	210
C	60	110	2	2	120	180	120	180
D	80	100	4	1	320	400	80	
			$\Sigma =$		750	990	710	940

ΣC

i) laspeyer's price index number

$$P_{01(L)} = \frac{\Sigma p_1 q_0}{\Sigma p_0 q_0} \times 100$$

$$= \frac{990}{750} \times 100$$

$$= 132$$

(ii) paasche's Index number

$$P_{01(P)} = \frac{\Sigma p_1 q_1}{\Sigma p_0 q_1} \times 100$$

$$= \frac{940}{710} \times 100$$

$$= 132.39$$

(iii) Dorbish - Bowley Index no.

$$P_{01}(D-B) = \frac{P_{01}(L) + P_{01}(P)}{2}$$

$$= \frac{132 + 132.39}{2}$$

$$= \frac{264.39}{2}$$

$$= 132.195$$

(iv) Fisher's Index number

$$P_{01}(F) = \sqrt{P_{01}(L) \cdot (P_{01}(P))}$$

$$= \sqrt{132 \times 132.39}$$

$$= \sqrt{17475.48}$$

$$= 132.19$$

(v) Marshall - Edgeworth's Index number.

$$P_{01}(M-E) = \frac{\Sigma P_1 q_0 + \Sigma P_1 q_1}{\Sigma p_0 q_0 + \Sigma p_0 q_1} \times 100$$

$$= \frac{990 + 940}{750 + 710} \times 100$$

$$= \frac{1930}{1460} \times 100$$

$$= 132.19$$

Unit 5: Binomial distribution.

Q. An unbiased coin is tossed 5 times Find the probabilities of getting (i) 3 heads (ii) at least 3 heads. (iii) atmost 3 heads (iv) no heads.

Soln: $p = P(H) = \frac{1}{2}$ $q = P(T) = \frac{1}{2}$

(A) $P(x) = {}^nC_x\, p^x q^{n-x}$

$n = 5$

$P(x) = {}^5C_x \left(\frac{1}{2}\right)^x \left(\frac{1}{2}\right)^{5-x}$

$= {}^5C_x \left(\frac{1}{2}\right)^{x+5-x}$

$P(x) = {}^5C_x \left(\frac{1}{2}\right)^5$

(i) 3 heads.

$P(3) = {}^5C_3 \left(\frac{1}{2}\right)^5$

$= \frac{5!}{3!(5-3)!} \times \frac{1}{32}$

$= \frac{5 \times 4 \times 3!}{3! \times 2!} \times \frac{1}{32}$

$= \frac{5}{16}$

(ii) At least 3 heads.

$P(x \geq 3) = P(3) + P(4) + P(5)$

$= {}^5C_3 \left(\frac{1}{2}\right)^5 + {}^5C_4 \left(\frac{1}{2}\right)^5 + {}^5C_5 \left(\frac{1}{2}\right)^5$

$= \left(\frac{1}{2}\right)^5 \left[{}^5C_3 + {}^5C_4 + {}^5C_5\right]$

$$= \frac{1}{32}\left[\frac{5!}{3!(5-3)!} + \frac{5!}{4!\,1!} + \frac{5!}{5!\,0!}\right]$$

$$= \frac{1}{32}\left[\frac{5\times4\times3!}{3!\times2\times1} + \frac{5\times4!}{4!\times1} + \frac{5!}{5!\,0!}\right]$$

$$= \frac{1}{32}\left[10 + 5 + 1\right]$$

$$= \frac{16}{32} = \frac{1}{2}$$

(iii) atmost 3 heads.

$$P(X \le 3) = P(0) + P(1) + P(2) + P(3)$$

$$= {}^5C_0\left(\tfrac{1}{2}\right)^5 + {}^5C_1\left(\tfrac{1}{2}\right)^5 + {}^5C_2\left(\tfrac{1}{2}\right)^5 + {}^5C_3\left(\tfrac{1}{2}\right)^5$$

$$= \left(\tfrac{1}{2}\right)^5\left[{}^5C_0 + {}^5C_1 + {}^5C_2 + {}^5C_3\right)$$

$$= \frac{1}{32}\left[\frac{5!}{0!(5-0)!} + \frac{5!}{1!(5-1)!} + \frac{5!}{2!(5-2)!} + \frac{5!}{2!(5-2)!\,3!(5-3)!}\right]$$

$$= \frac{1}{32}\left[\frac{5!}{1\times5!} + \frac{5!}{1\times4!} + \frac{5!}{3\times1\times3!} + \frac{5!}{3!\times2!}\right]$$

$$= \frac{1}{32}\left[1 + \frac{5\times4!}{4!} + \frac{5\times4\times3!}{2\times3!} + \frac{5\times4\times3!}{3!\times2\times1}\right]$$

$$= \frac{1}{32}\left[1 + 5 + 10 + 10\right]$$

$$= \frac{1}{32} = \frac{1}{32}\times26$$

$$= \frac{13}{16}$$

$$= \frac{26}{32} = 13/16$$

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(iv) No Head.

$$P(0) = {}^5C_0 \left(\frac{1}{2}\right)^5$$

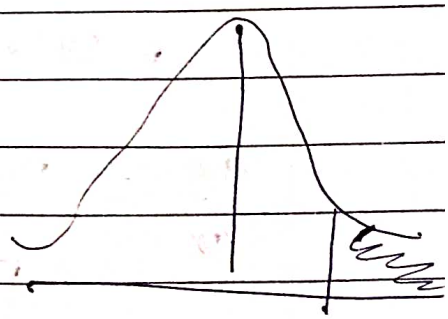
$$= \frac{5!}{0!(5-0)!} \times \frac{1}{32}$$

$$= \frac{5!}{1 \times 5!} \times \frac{1}{32}$$

$$= \frac{1}{32}$$

Normal Distribution.

(2) The weekly wages of 1000 workers are normally distributed with mean = 900 & standard deviation = 50 find the no of workers getting wages above ₹ 1050 [Area between $z=0$ & $z=3$ is 0.4987]



Sol^n $z = \frac{x - 900}{50}$

when $x = 900$ $z = 0$

when $x = 1050$

$$z = \frac{1050 - 900}{50} \quad z = \frac{150}{50} = 3$$

Area to the right of $z=3$ = (Area to the right of $z=0$) − Area between $z=0$ & $z=3$

$= 0.5 - 0.4987$

$= 0.0013$

$P(x > 1050) = P(z > 3) = 0.0013$

The no of workers earning above 1050 =

$= np$

$= 1000 \times 0.0013$

$= 1.3$

≈ 1 Approximately.

Unit 1. Derivative

Q Find the derivative of y with respect to x

(i) $y = x^3 - \log x + e^x + 4^x - 25$

(ii) $y = e^x (x^3 + 5x + 1)$

soln (i) diff w.r.t.

$$\frac{dy}{dx} = \frac{d}{dx}(x^3 - \log x + e^x + 4^x + 25)$$

$$= \frac{dx^3}{dx} - \frac{d}{dx}\log x + \frac{de^x}{dx} + \frac{d}{dx}4^x + \frac{d}{dx}(25)$$

$$= 3x^2 - \frac{1}{x} + e^x + 4^x \log 4 + 0$$

$$\frac{dy}{dx} = 3x^2 - \frac{1}{x} + e^x + 4^x \log 4.$$

function

Q The total cost function is given by. $C = x^2 + x + 20$ find the average cost. marginal cost and marginal average cost when $x = 10$

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Soln $AC = \frac{C}{x} = \frac{x^2 + x + 20}{x}$

$AC = x + 1 + \frac{20}{x}$

AC at $x = 10 = 10 + 1 + \frac{20}{10}$

$= 13$

$MC = \frac{d}{dx}(x^2 + x + 20)$

$\frac{d(x^2}{dx} + \frac{dx}{dx} + \frac{d}{dx}(20)$

$= 2x + 1 + 0$

$MC = 2x + 1$

MC at $x = 10 = 2(10) + 1 = 20 + 1$

$= 21$

$MAC = \frac{d}{dx}(AC)$

$= \frac{d}{dx}(x + 1 + 20x^{-1})$

$\frac{d}{dx}x + \frac{d}{dx}(1) + 20\frac{d}{dx}x^{-1}$

$\Rightarrow 1 + 0 + (-1)\,20x^{-2}$

$MAC = 1 - 20x^{-2} = 1 - \frac{20}{x^2}$

MAC at $x = 10 = 1 - \frac{20}{(10)^2}$

$= 1 - \frac{20}{100}$

$= 1 - 0.2$

$= 0.8$

Unit 2 · Simple & Compound Interest

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Q. A principal amounts to ₹ 11,880 after 4 years and to ₹ 14040 after 7 years. Find the principal & the rate of simple interest

Sol:-

$$P + (P \times 4 \times R)/100 = 11,880 \quad -(1)$$

$$P + (P \times 7 \times R)/100 = 14040 \quad -(2)$$

(2) − (1)

$$P + \frac{(P \times 7 \times R) - P - (P \times 4 \times R)}{100} = 14040 - 11880$$

$$\frac{3PR}{100} = 2160$$

$$\frac{PR}{100} = \frac{2160}{3} \quad -(3)$$

$$\frac{PR}{100} = 720 \quad -(3)$$

$$= 720$$

$$R = \frac{720}{99}$$

$$R = 8\%$$

Q. What is the present worth of Annuity of £25000 per year for 3 years with 9% rate of interest compound annually.

Soln.

$c = 25000 \qquad n = 3$

$i = \frac{9}{100} = 0.09 \qquad v = \frac{1}{(1+i)} = \frac{1}{1+0.09}$

$= \frac{1}{1.09} = 0.9174$

$v = 0.9174$

$PV = \frac{c \times (1 - v^n)}{i}$

$= \frac{25000\,[1-(0.9174)^3]}{0.09}$

$= \frac{25000\,(1-0.7721)}{0.09}$

$= \frac{25000 \times 0.2279}{0.09}$

$= \frac{5697.5}{0.09}$

$PV = 63305.5$

Ans

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Ansari Mohammad Bilal Riyaz Ahmad.

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		checked Stat		
		2021-22		

* Unit -> *

(8) Find A.M, median and mode for the following data.

Marks - 0-10, 10-20, 20-30, 30-40, 40-50

No. of Student: 7, 11, 15, 10, 7

Marks	No. of Student	mid point (x_i)	$f_i x_i$
0-10	7	05	35
10-20	11	15	165
20-30	15	25	375
30-40	10	35	350
40-50	07	45	315
	N=50		$\Sigma f_i x_i = 1240$

$$\bar{x} = \frac{\Sigma f_i x_i}{N} = \frac{1240}{50} = 24.8$$

Median.

Marks	No. of Student (f)	Less than C.f.
0-10	07	7
10-20	11	7+11=18
20-30	15	18+15=33 → Median class
30-40	10	33+10=43
40-50	07	43+7=50

Position of Median = $\frac{N}{2} = \frac{50}{2} = 25^{th}$ observation

So, Median lie in the C.I 20-30

∴ Median lies in the C.I. 20-30

$$\text{Median} = l_1 + \left[\frac{(n/2 - c - b)}{b}\right](l_2 - l_1)$$

$$= 20 + \left[\frac{50 - 14}{14}\right](30 - 20)$$

$$= 20 + \frac{22}{15} \times 10 = 20 + \frac{320}{15}$$

$$= 20 + 21.33$$

$$= 41.33$$

Mode 20-30 is the modal class

$f_1 = 15, f_0 = 11, f_2 = 10$

$$= l_1 + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right](l_2 - l_1)$$

$$= 20 + \left[\frac{15-11}{2\times15-11-10}\right](30-20)$$

$$= 20 + \left[\frac{4}{30-21}\right] \times 10$$

$$= 20 + \frac{4}{9} \times 10$$

$$= 20 + \frac{40}{9}$$

$$= 20 + 4.44$$

$$= 24.44$$

(Q) For the following data, find the combined mean. Also find which group has more variation.

	Group I	Group II
Number	70	90
Mean weight	75	82
S.D	04	07

Solution: $\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$

$\bar{x} = \frac{70 \times 75 + 90 \times 82}{70 + 90}$

$= \frac{5250 + 7380}{160}$

$= \frac{12630}{160}$

$= 78.9375$

$CV_{I} = \frac{\sigma_1}{\bar{x}_1} \times 100$

$= \frac{4}{75} \times 100$

$= 5.33$

$CV_{II} = \frac{\sigma_2}{\bar{x}_2} \times 100$

$= \frac{7}{82} \times 100$

$= 8.54$

∴ Group II is more variable.

Solution: $\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$

$\bar{x} = \frac{70 \times 75 + 90 \times 82}{70 + 90}$

$= \frac{5250 + 7380}{160}$

$= \frac{12630}{160}$

$= 78.9375$

$CV_{Gp-I} = \frac{\sigma_1}{\bar{x}_1} \times 100$

$= \frac{4}{75} \times 100$

$= 5.33$

$CV_{Gp-II} = \frac{\sigma_2}{\bar{x}_2} \times 100$

$= \frac{7}{82} \times 100$

$= 8.54$

∴ Group II is more variable.

* unit 4 *

(Q) Two fair dice are thrown simultaneously. Find the probability that

(i) Sum of number is 7
(ii) Same number occurs twice.
(iii) Second number is greater that the first

Solution:

$$S = \begin{Bmatrix} (1,1)(1,2)(1,3)(1,4)(1,5)(1,6) \\ (2,1)(2,2)(2,3)(2,4)(2,5)(2,6) \\ (3,1)(3,2)(3,3)(3,4)(3,5)(3,6) \\ (4,1)(4,2)(4,3)(4,4)(4,5)(4,6) \\ (5,1)(5,2)(5,3)(5,4)(5,5)(5,6) \\ (6,1)(6,2)(6,3)(6,4)(6,5)(6,6) \end{Bmatrix}$$

$n(S) = 36$

(i) Sum of number is 07 let A be the event that the sum of number is 07

$A = \{(1,6), (6,1), (2,5), (5,2), (3,4), (4,3)\}$

$n(A) = 6$

$$P(A) = \frac{n(A)}{n(S)} = \frac{6}{36} = \frac{1}{6}$$

(ii) Same number occurs twice let D be the event that same numbers occurs both.

$D = \{(1,1)(2,2)(3,3)(4,4)(5,5)(6,6)\}$

$n(D) = 6$

$P(D) = \frac{6}{36} = \frac{1}{6}$

(iii) Second no is greater that the first.

Let C be the event that second no is greater than the first number.

$C = \{(1,2)(1,3)(1,4)(1,5)(1,6)$
$(2,3)(2,4)(2,5)(2,6)(3,4)(3,5)$
$(3,6)(4,5)(4,6)(5,6)\}$

$n(C) = 15$

$P(C) = \frac{n(C)}{n(S)} = \frac{15}{36}$

$P(C) = \frac{5}{12}$

(ii) Same number occurs twice let D be the event that same numbers occurs twice

$D = \{(1,1)(2,2)(3,3)(4,4)(5,5)(6,6)\}$

$n(D) = 6$

$P(D) = \frac{6}{36} = \frac{1}{6}$

(iii) Second no is greater than the first.

Let C be the event that second no is greater than the first number.

$C = \{(1,2)(1,3)(1,4)(1,5)(1,6)$
$(2,3)(2,4)(2,5)(2,6)(3,4)(3,5)$
$(3,6)(4,5)(4,6)(5,6)\}$

$n(C) = 15$

$P(C) = \frac{n(C)}{n(S)} = \frac{15}{36}$

$P(C) = \frac{5}{12}$

(c) The following table shows a probability Distribution of a random variable x

x	0	1	2	3	4	5
$P(x)$	k	0.3	0.15	0.15	0.1	$2k$

Find (i) k (ii) $E(x)$ (iii) $V(x)$

Solution: $k + 0.3 + 0.15 + 0.15 + 0.1 + 2k = 1$

$3k + 0.7 = 1$

$3k = 1 - 0.7$

$3k = 0.3$

$k = \frac{0.3}{3}$

$k = 0.1$

x	$P(x)$	$xP(x)$	x^2	$x^2P(x)$
0	0.1	0	0	0
1	0.3	0.3	1	0.3
2	0.15	0.3	4	0.6
3	0.15	0.45	9	1.35
4	0.1	0.4	16	1.6
5	0.2	1	25	5
		$\Sigma xP(x)$		$\Sigma x^2P(x)$
		$= 2.45$		$= 8.85$

$E(x) = \Sigma xP(x) = 2.45$

$$\mu(x) = E(x^2) - [E(x)]^2$$

$$= 8.85 - (2.45)^2$$

$$= 8.85 - 6.0025$$

$$= 2.8475.$$

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Unit 05

(C) For the following pay off table, Suggest to the best decision by using

(i) Maximax Criteion
(ii) Maximum Criterion
(iii) Laplace Criteion

Course of Action	Sales of Nature		
	S_1	S_2	S_3
A_1	25	85	95
A_2	40	0	60
A_3	65	20	55

Solution

(i) Maximum

Course of Action	Maximum payoff
A_1	Max (25, 85, 95) = 95
A_2	Max (40, 0, 60) = 60
A_3	Max (65, 20, 55) = 65

∴ Max (95, 60, 65) = 95 which corresponding to the act A_1

Hence A_1 is the best Act

(ii) Maximum

Course of Action	minimum payoff
A_1	min (25, 85, 95) = 25
A_2	min (40, 0, 60) = 0

A_3 : min (65, 20, 55) = 20

Maximum = max (25, 0, 20) = 20

Which corresponds to the acb A_3. Hence A_3 is the best Act

(iii) Laplace.

Course of Action	Average payoff
A_1	25 + 85 + 95 / 3 = 205/3 =
A_2	40 + 0 + 60 / 3 = 100/3 = 33
A_3	65 + 20 + 55 / 3 = 140/3 = 20

Max (68, 33, 33.33, 56) = 68.33

Which corresponds to the act A_1. Hence A_1 is the best Act

(iv) Given the payoff matrix, choose the decision problem using criterion

Action	state of nature		
A_1	80, 40	52	20
A_2	48 30	60	401
A_3	10	40	60
Probability	0.4	0.2	0.4

Solution :- EMV = Σ Payoff × Probability

EMV(A1) 40 × 0.4 + 50 × 0.2 + 20 × 0.4

= 16 + 10 + 8

= 34

EMV(A2) = 10 × 0.4 + 40 × 0.2 + 60 × 0.4

= 4 + 8 + 24 = 36

Max (34, 40, 36) = 40 which correspond to the act A2

Hence A2 is the best act

Unit 5

(Q) If the market price of share with face ₹ 100 is ₹ 130. How many shares of the company can be bought for ₹ 3400

Solution: MV = 130
FV = 100
Investment = ₹ 3263
Brokerage = 0.4 %

Price per share = MV + Brokerage
= 130 + 0.52
= 130.52

No. of shares purchased = $\frac{\text{Investment}}{\text{Price per share}}$

$= \frac{3263}{130.52}$

$= 25$

Brokerage = 0.4 % on market price per share.

$= \frac{0.4}{100} \times 130$

$= 0.52$

(Q) If a m.f had NAV of ₹ 26 at the beginning of ₹ 44 at the end of the years, find the absolute change and the % change during the years.

Solution:

Absolute change in NAV = NAV at the end of the years − NAV at the beginning of the year

= 44 − 26 = 08

% age change in NAV = ~~Absolute change in NAV~~

$$\frac{\text{Absolute change in NAV}}{\text{NAV at the beginning}} \times 100$$

$$= \frac{8}{26} \times 100$$

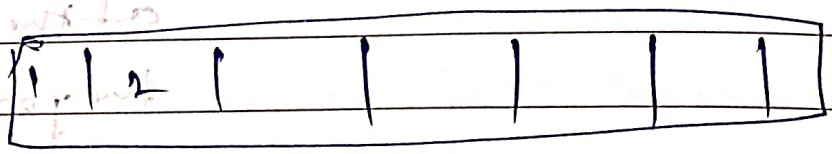
$$= 22.22\ \%$$

Unit 2

(Q1) In how many ways can the letters of the word 'AGENCY' be arranged so that vowels are in first two places.

Solution :-

The word AGENCY has 6 letters which 2 are vowels, and 4 are consonants.



The first and 2nd place has to be filled with two vowels.

∴ This can be done in $^2P_2$ ways.

The remaning 4 places within 4 consonants is filled in $^4P_4$ ways

∴ The total no of ways = $^2P_2 \times {}^4P_4$

$$= \frac{2!}{(2-2)!} \times \frac{4!}{(4-4)!} = 2! \times 4!$$

$$= 2 \times 1 \times 4 \times 3 \times 2 \times 1$$

$$= 48$$

(c) An organization consists of 9 members, of which 4 are doctors. A selection of 4 person is to done amongst to these members. Find how many selection will have.

(1) No of doctors

(2) Exactly 2 doctors

Solution:

No of doctor:

$9-4=5$

No of way $= {}^4C_4 \times {}^5C_4 = 1 \times \frac{5!}{4!(5-4)!}$

$= 5$

(2) Exactly 2 doctors

No of way $= {}^4C_2 \times {}^5C_2 = \frac{4!}{2!(4-2)!} \times \frac{5!}{2!(5-2)!}$

$= \frac{4 \times 3 \times 2!}{2! \times 2!} \times \frac{5 \times 4 \times 3!}{2! \times 3!}$

$= \frac{24 \times 3}{4} \times \frac{5 \times 4}{2}$

$= 6 \times 10$

$= 60$

(c) A toy Manufacturer has to Manufacture scooters and bicycles. Each toy has to undergo processing through two machines, Machine A and machine B. A bicycle requires 6 hours in machine A and 3 hours in machine B. A scooter requires 4 hours in machine A and 10 hours in machine B. Machine A and B are available for at most 120 hours and 180 hours respectively. The profit for bicycle is ₹ 100 and that per scooter is ₹ 800. Formulate the L.P.P:

Solution: Let x = scooters

y = bicycle

Objective function coefficient	Variable Items	Constraints Machine A	Machine B
800	x scooter	4	10
100	y bicycles	6	03
	availability	≤ 120	≤ 180

Maximize

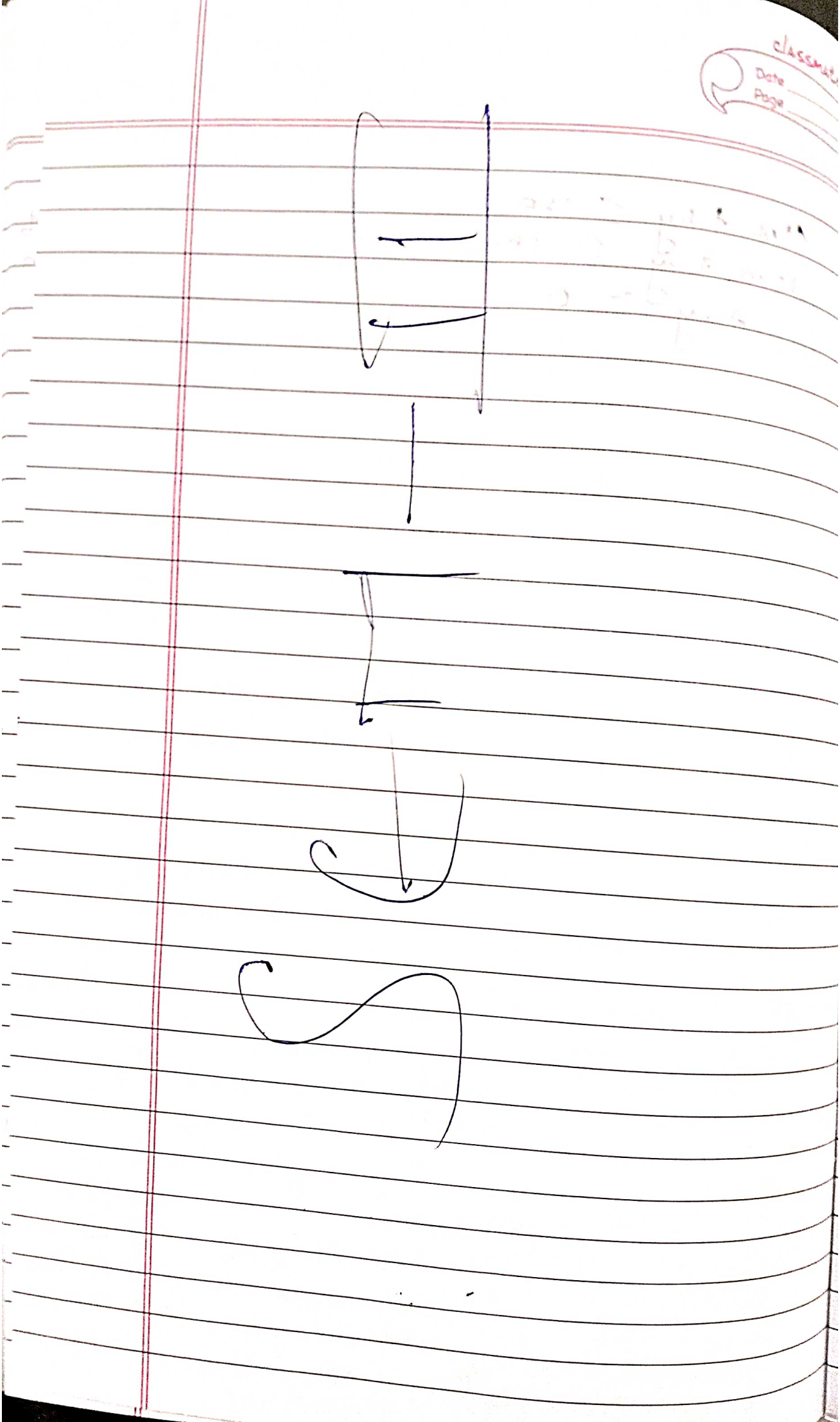
$Z = 800x + 100y$

Subject to

$4x + 6y \leq 120$

$10x + 20y \leq 1000$

$x, y \geq 0.$



Bivariate linear correlation & Regression

unit - 2

(Q1) If for a bivariate data

$\Sigma(x_i - \bar{x})^2 = 10$, $\Sigma(y_i - \bar{y})^2 = 6$

$\Sigma(x_i - \bar{x})(y_i - \bar{y}) = 7.8$

Find the karl pearson's coefficient of correlation.

Solution:

$$r = \frac{\Sigma(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\Sigma(x_i - \bar{x})^2}\sqrt{\Sigma(y_i - \bar{y})^2}}$$

$$= \frac{7.8}{\sqrt{10}\ \sqrt{6}} = \frac{7.8}{3.1622 \times 2.4542}$$

$$= \frac{7.8}{8.9459}$$

$$= 0.8724$$

(Q2) Find the mean values of x and y and also the coefficient of correlation & the regression equation of y on x is $x + 3y - 10 = 0$ and that of x on y is $2x + y - 7 = 0$.

Unit 4

Time Series an Index No.

Q.1 Find three yearly moving Average for the following data

Solution

	Sales [In lakh]	3 yearly Moving total	3 yearly moving average
2011	15	15+17+22 = 54	—
2012	17	17+20+25 = 77	54/3 = 18
2013	22	20+25+27 = 77	69/3 = 23
2014	20	25+27+30 = 82	77/3 = 25.6
2015	25	27+30+25 = 82	82/3 = 27.3
2016	27		84/3 = 28
2017	30		

Q.2 Find the Laspayable, Porche, Drobish, Fisher and marksheet & Edgeworth, weighted Index numbers for the following data

Solution

Commodity	p_0	p_1	q_0	q_1	p_0q_0	p_0q_1	p_1q_1
A	40	50	4	9	160	200	450
B	50	70	3	7	150	210	490
C	60	90	2	2	120	180	180
D	80	100	4	1	320	400	100
					750	990	940

$P_1 q_0$

200

210

100

400

990

(i) Laspayre Index no:

$$P_0[L] = \frac{\Sigma P_1 q_0}{\Sigma P_0 q_0} \times 100$$

$$= \frac{990}{750} \times 100$$

$$= 132$$

(ii) Paache Index no

$$P_0'[P] = \frac{\Sigma P_1 q_1}{\Sigma P_1 q_1} \times 100$$

$$= \frac{940}{710} \times 100$$

$$= 132.39$$

(iii) Drobisch + Bowley's Index no:

$$P_{01}[D-D] = \frac{P_{01}[L] + P_{01}[P]}{2}$$

$$= \frac{132 + 132.09}{2} \qquad = \frac{264.09}{2}$$

$$= 132.195$$

(iv) Fisher's Index no:

$$P_{01}[F] = \sqrt{P_{01}[L]\, P_{01}[P]}$$

$$= \sqrt{132 \times 132.09}$$

$$= \sqrt{17475.48}$$

$$= 132.19$$

(v) Marshall Index no:

$$= \frac{\Sigma P_1 q_0 + \Sigma P_1 q_1}{\Sigma P_1 q_0 + \Sigma P_0 q_1} \times 100$$

$$= \frac{400 + 940}{300 + 710} \times 100$$

Unit 5 Probability and Normal Distribution.

Q1) An unbaised coin is tossed 5 times find the probability of getting

(i) 2 Head,
(ii) At least 2 head,
(iii) At least 2 head,
(iv) No Head

Solution :

$p = P[H] = 1/2 \quad q = P[T] = 1/2$

$\therefore P(x) = {}^nC_x p^x q^{n-x}$

$n = 5$

$= P(x) : x = {}^5C_x p^x q^{5-x}$

$= {}^5C_x (1/2)^x (1/2)^{5-x}$

$= {}^5C_x (1/2)^5$

(i) 2 Head

$P(2) = {}^5C_2 [2 = 1/2]^5$

$= \frac{5!}{2!(5-2)!} \times \frac{1}{32}$

$= \frac{5 \times 4 \times 3!}{2! \; 3!} \times \frac{1}{32}$

$= \frac{10}{16} \times \frac{1}{32}$

$= \frac{5}{16}$

(iii) At least 2 head,

$P(x \geq 2) = P(2) + P(4) + P(5)$

$= {}^5C_2 \left[\frac{1}{2}\right]^5 + {}^5C_4 \left[\frac{1}{2}\right]^5 + {}^5C_5$

$= \left[\frac{1}{2}\right]^5 \left[{}^5C_2 + {}^5C_4 + {}^5C_5\right]$

$= \frac{1}{32} \left[\frac{5!}{3!\,2!} + \frac{5!}{4!\,1!} + \frac{5!}{5!\,0!}\right]$

$= \frac{1}{32} \left[\frac{5 \times 4 \times 3!}{3! \times 2 \times 1} + \frac{5 \times 4!}{4!} + 1\right]$

$= \frac{1}{32} \left[10 + 5 + 1\right]$

$= \frac{16}{32}$

$= \frac{1}{2}$

(iii) [At most 2 head]

$P\{X \leq 2\} = P(0) + P(1) + P(2)$

$= {}^5C_0 \left(\frac{1}{2}\right)^5 + {}^5C_1 \left(\frac{1}{2}\right)^5 + {}^5C_2 \left(\frac{1}{2}\right)^5$

$= \left[\frac{1}{2}\right]^5 \left[{}^5C_0 + {}^5C_1 + {}^5C_2 \right]$

$= \frac{1}{32} \left[\frac{5!}{0!5!} + \frac{5!}{1!4!} + \frac{5!}{2!3!} \right]$

$= \frac{1}{32} \left[\frac{5!}{1 \times 5!} + \frac{5!}{1 \times 4!} + \frac{5 \times 4 \times 3!}{2 \times 1 \times 3!} \right]$

$= \frac{1}{32} \left[1 + 5 + \frac{5 \times 4}{2 \times 1} + \frac{5 \times 4 \times 3}{3 \times 2 \times 1} \right]$

$= \frac{1}{32} \left[1 + 5 + 10 + 10 \right]$

$= \frac{1}{32} \times 26 = \frac{26}{32} = \frac{13}{16}$

(Q1) The weekly wages of 1000 workers are normally distributed with mean ₹ 900 and S.D ₹ 50. Find the No. of workers getting wage above ₹ 1050

Solution:-

$$z = \frac{x - 900}{50}$$

When $x = 900$

$z = 0$

When $x = 105$

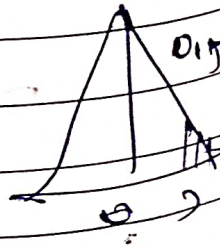
$$z = \frac{1050 - 900}{50} = \frac{150}{50} = 3$$

$\therefore P[z > 3]$

$= P[0 > z > \infty] - P[0 > z > 3]$

$= 0.5 - 0.49865$

$= 0.00135$



Total no. of workers $= 0.00135 \times 1000$

$= 1.35$

$= 1$ [Approximately]

classmate
Date
Page

unit-I * Function and derivating of

Q.1. Find derivatives of y with respect to x

(i) $y = x^3 - \log x + e^x - 4^x + 5$

(ii) $y = C^x [A^3 + 5x + 1]$

(i) Difference w.r.t x

$$\frac{dy}{dx}\left[x^3 - \log x + e^x + 4x + 5\right]$$

$$\frac{dy}{dx} = \frac{d}{dx}\left(\frac{x}{1}\right) - \frac{d}{dx}\log x + \frac{d}{dx}e^x - \frac{d}{dx}4^x - \frac{d}{dx}(5)$$

$$= 3x^2 - \frac{1}{x} + e^x + 4^x \log_e 4$$

(ii) difference w.r.t x

$$\frac{dy}{dx} = \left[e^x \frac{d}{dx}\left(x^3 + 5x + 1\right)\right] + \left[x^3 + 5x + 1\right]\frac{de^x}{dx}$$

$$= e^x\left[\frac{dx^3}{dx} + 5\frac{dx}{dx} + \frac{d(1)}{dx}\right] + \left(x^3 + \right.$$

$= e^x [3x^2 + 5x + 1 + 6] + [x^3 + 5x + 1] e^x$

$= e^x [3x^2 + 5] + [x^3 + 5x + 1] e^x$

$= e^x \{3x^2 + 5\} + [x^3 + 5x + 1] e^x$

$= e^x [3x^2 + 5 + x^3 + 5x + 1]$

$= e^x [x^3 + 3x^2 + 5x + 6]$

(Q.) The total cost function is given by $C = x^2 + x + 20$ find the average cost, marginal cost and marginal average cost

Solution:

(i) $AC = \frac{C}{x} = \frac{x^2 + x + 20}{x}$ AC = ATC

AC at $x = 10$

$= 10 + 1 + \frac{20}{10} = 13$

(iii) $MC = \frac{d}{dx} [x^2 + x + 20]$

$$= \frac{d}{dx} x^2 + \frac{d}{dx}(10)$$

$$= 2x + 0$$

$$MC = 2x + 1$$

$$MC = \text{at } x = 10$$

$$= 2 \times 10 + 1$$

$$= 21.$$

$$TR = \frac{d}{dx}[AR] \times \frac{dx}{dx}(x + 10x)$$

$$= \frac{d}{dx} x + \frac{d}{dx} 10 \cdot \frac{d}{dx} x^{-1}$$

$$= 1 + 0 + [-1] 20 x^{-2}$$

$$TMC = 1 - 20 x^{-2}$$

$$= \frac{1 - 20}{x^2}$$

$$MAC \text{ at } x = 10 = 1 - \frac{20}{(10)^2}$$

$$= 1 - \frac{20}{100} = 1 - 0.2$$

$$= 0.8$$

(b) What is the present worth of annuity of ₹ 25000 per year for 2 years, with 9% rate of interest, compound annually

Solution:

$C = 25000 \quad n = 2$

$i = 9/100 = 0.09$

$v = \frac{1}{(1+i)} = \frac{1}{1+0.09} = \frac{1}{1.09} = 0.9174$

$P_4 = \frac{C_m (1-v^n)}{i}$

$= 25000 \frac{[1-(0.9174)^2]}{0.09}$

$= \frac{25000 \times 0.2279}{0.09}$

$= \frac{5697.5}{0.09}$

$P_4 = 63305$ ₹

Business Communication and CSE Tutorial Activities: Group Discussion, Book Review, Mock Interview etc. in BC and CSE tutorial lecture.