Ertanul Haq
ID = 17-35338-3
SL = 02
Sec = O

Class	(f)	(x)	f(x)	flogx	f/x	$x-\bar{x}$ Here $\bar{x}=\frac{75}{20}=3.75$	$f_i\lvert x_i-\bar{x}\rvert$	$f_i(x_i-\bar{x})^2$
1-2	1	1.5	1.5	0.176	0.66	-2.25	2.25	5.06
2-3	3	2.5	7.5	1.194	1.2	-1.25	3.75	4.687
3-4	8	3.5	28	4.352	2.286	-0.25	2	0.5
4-5	6	4.5	27	3.919	1.33	0.75	4.5	3.375
5-6	2	5.5	11	1.48	0.384	1.75	3.5	6.125
total	20		75	11.12	5.87		16	19.75

a) $A.M = \frac{1}{n}\sum_{i=0}^{n} f_i x_i = \frac{75}{20} = 3.75$

b) $G.M = \text{Antilog}\left(\frac{1}{n}\sum_{i=1}^{n} f_i \log x_i\right)$

$= \text{Antilog}\left(\frac{11.12}{20}\right)$

$= 3.597$

c) $H.M = \frac{n}{\sum_{i=1}^{n} \frac{f_i}{x_i}} = \frac{20}{5.87} = 3.41$

d) Mean deviation, $MD = \frac{1}{n}\sum_{i-1}^{n} f_i\lvert x_i-\bar{x}\rvert = \frac{16}{20} = 0.8$

e) Varience, $\sigma^2 = \frac{1}{n}\sum_{i-1}^{n} f_i (x_i-\bar{x})^2 = \frac{19.75}{20} = 0.987$

Standard deviation, $\sigma = \sqrt{\sigma^2} = \sqrt{0.987} = 0.99$

f) Co efficient of varience, $CV = \frac{\sigma}{\bar{x}} = \frac{0.99}{20} \times 100\%$

$= 26.5\%$

3.1]

$A = \{3, 6, 9, 12, 15, 18\}$ [multiple of 3]

$B = \{5, 10, 15, 20\}$ [n n-5]

So that,

$$P(A) = \frac{6}{20} \quad \text{and} \quad P(B) = \frac{4}{20}$$

Now,

$$(A \cap B) = \{15\} \therefore P(A \cap B) = \frac{1}{20}$$

$$\therefore P(A \cup B) = \frac{6}{20} + \frac{4}{20} - \frac{1}{20} = \frac{2}{20}$$ (Ans)

3.2]

Total students = 15+10 = 25

Probability of selecting 1 girl and 2 boys $= \frac{{}^{10}C_1 \times {}^{10}C_2}{{}^{25}C_3}$

$= \frac{21}{46}$ (Ans)

3.3] Total balls = 4+5+6 = 15

Getting All red $= \frac{{}^{5}C_3}{{}^{15}C_3} = \frac{2}{91}$ (Ans)

3.4] Total engineers = 5+6 = 11

a] All E.E $= \frac{{}^{5}C_4}{{}^{11}C_4} = \frac{1}{16}$

b] 2 E.E and 2 C.E $= \frac{{}^{5}C_2 \, {}^{6}C_2}{{}^{11}C_4} = \frac{5}{11}$ (Ans)

Computational Statistics and Probability [0]

Khan, Mohiur Rahman
18-36303-1

Assignment 3

3.1

Tickets 1-20

let a = multiple of 3 = {3, 6, 9, 12, 15, 18}

$P(a) = \frac{6}{20}$

let b = multiple of 5 = {5, 10, 15, 20}

$P(b) = \frac{4}{20}$

$P(a \cap b) = \{15\} = \frac{1}{30}$

$P(a \cup b) = \frac{6}{20} + \frac{4}{20} - \frac{1}{20} = \frac{9}{20}$.

3.2

n = 25 (15 B, 10 G)

~~P(G, B, B,~~

~~P(GBB, BGB, BBG) =~~

let B = one girl, two boys = $10C_1 \times 15C_2$

$\therefore P(B) = \frac{10C_1 \times 15C_2}{25C_3} = 0.457$

3.3

4 w, 5 r, 6 b

Total = 15 balls

let C = r, r, r $= \frac{5C_3}{15C_3} = \frac{2}{91}$

3.4

5 EE, 6 CE

a) let E = All 4 Electronic $= \frac{5C_4}{11C_4} = \frac{1}{66}$

b) let G = 2 EE, 2 CE $= \frac{5C_2 \times 6C_2}{11C_4} = \frac{5}{11}$

Serial: 4

Moshiur Rahman Khan

Class	f	cf	x	f(x)	f Log(x)	f/x
1–2	1	1	1.5	1.5	0.17	0.667
2–3	3	4	2.5	7.5	1.19	1.20
3–4	8	12	3.5	28	4.38	2.28
4–5	6	18	4.5	27	3.91	1.33
5–6	2	20	5.5	11	1.48	0.36
Total	20			75	11.12	5.837

Arithmetic mean $= \frac{1}{n}\sum_{i=1}^{n} f_i x_i = \frac{75}{20} = 3.75$

Geometric mean $=$ Antilog$\left(\frac{11.12}{20}\right) = 3.60$

Harmonic mean $= \frac{20}{5.837} = 3.426$

Median $= \frac{n}{2} = 10$

Cf for class (3–4) is $4 > (3-4) \geq 12$

$\therefore$ median $= 3 + \frac{\frac{20}{2} - 4}{8} \times 1$

$= 3.75$

Mode = f for class (3–4) is 8 (highest frequency)

$\therefore f_m = 8$, $f_1 = 3$, $f_2 = 6$, $L = 3$, $n = 1$

mode $= 3 + \frac{8-3}{(2\times 8) - 3 - 6} \times 1$

$= 3.71$

Class	$\bar{x}$	$\lvert x - \bar{x}\rvert$	$f(x-\bar{x})$	$f(x-\bar{x})^2$
1–2	$75/20 = 3.75$	2.25	2.25	5.06
2–3		1.25	3.75	4.68
3–4		0.25	2	0.5
4–5		0.75	4.5	3.37
5–6		1.75	3.5	6.12
			16	19.75

MD $= \frac{16}{20} = 0.8$

$\sigma^2 = \frac{19.75}{20} = 0.98$

$\sigma_x = \sqrt{0.98} = 0.99$

CV $= \frac{\sigma}{\bar{x}} \times 100\% = \frac{0.99}{3.75} \times 100$

$= 26.4\%$

Name: Joy Matubber
ID : 20-41959-1

Section:- O
Serial: 07

Class	frequency (f)	cumulative frequency (cf)	Mid (x)	fx	f log x	f/x
1-2	1	1	1.5	1.5	0.17	0.667
2-3	3	4	2.5	7.5	1.19	1.20
3-4	8	12	3.5	28	4.35	2.28
4-5	6	18	4.5	27	3.91	1.33
5-6	2	20	5.5	11	1.48	0.36
Total:	n = 20			75	11.12	5.84

(a) Arithmetic Mean:-

$$AM = \frac{1}{n}\sum_{i=1}^{n} f_i x_i = \frac{75}{20} = 3.75$$

Geometric Mean:-

$$GM = \text{Antilog}\left(\frac{1}{n}\sum_{i=1}^{n} f_i \log x_i\right) = \text{Antilog}\left(\frac{11.12}{20}\right) = 3.60$$

Harmonic Mean:-

$$HM = \frac{n}{\sum_{i=1}^{n} \frac{f_i}{x_i}} = \frac{20}{5.84} = 3.42$$

(b) Median:- Here, $n/2 = 10$;

for class 3-4, $cf \geq 10$, so median class is (3-4)

We know that,

$$\text{Median} = L + \frac{\frac{n}{2} - c}{f} \times h$$

$$= 3 + \frac{\frac{20}{2} - 4}{8} \times 1$$

$$= 3.75$$

- lower limit of median class (L) = 3
- size of median class $h = 1$
- fre. of median class $f = 8$
- cf of previous class of median class (c) = 4

Name: Joy Matlebber

Serial: 07

Mode: The class 3-4 contains the highest frequency

So, the model class is (3-4)

We know that,

$$\text{Mode} = L + \frac{fm - f1}{2fm - f1 - f2} \times h$$

$$= 3 + \frac{8-3}{(2\times 8) - 3 - 6} \times 1$$

$$= 3.71$$

$fm = 8$
$f1 = 3$
$f2 = 6$
$L = 3$
$h = 1$

Class	f	x	fx	$\bar{x}$	$\lvert x-\bar{x}\rvert$	$f\lvert x-\bar{x}\rvert$	$f(x-\bar{x})^2$
1-2	1	1.5	1.5		2.25	2.25	5.06
2-3	3	2.5	7.5		1.25	3.75	4.68
3-4	8	3.5	28	75/20	0.25	2	0.5
4-5	6	4.5	27	= 3.75	0.75	4.5	3.37
5-6	2	5.5	11		1.75	3.5	6.12
Total:	n = 20		75			16	19.75

Mean deviation:

$$MD = \frac{1}{n}\sum_{i=1}^{n} f\lvert x-\bar{x}\rvert = \frac{16}{20} = 0.8$$

Variance: $\sigma^2 = \frac{1}{n}\sum_{i=1}^{n} f(x-\bar{x})^2 = \frac{19.75}{20}$

$= 0.98$

Name: Joy Matubber
Serial: 07

Standard deviation.

$$SD = \sigma = \sqrt{0.98} = 0.9899$$

Coefficient of Variation:

$$CV = \frac{\sigma}{\bar{x}} \times 100\% = \frac{0.989}{3.75} \times 100\%$$

$$= 26.39\%$$

Skewness = Mean - Median

$$= 3.75 - 3.75 = 0$$

So, the distribution is symmetrical.

probability

(3.1)

Tickets are numbered as 1 to 20.

A = Multiple of 3 = {3, 6, 9, 12, 15, 18}; So, $P(A) = \frac{6}{20}$

B = " " 5 = {5, 10, 15, 20}; So, $P(B) = \frac{4}{20}$

So, $A \cap B$ = {15}; So, $P(A \cap B) = \frac{1}{20}$

$$\therefore P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$= \frac{6}{20} + \frac{4}{20} - \frac{1}{20}$$

$$= 0.45$$

$$= 45\%$$

Name: Joy Matubber
Serial: 07
ID: 20-41959-1

(3.2)

There are 15 boys and 10 girls in a class

so, Total number of student = 30.25

Now,

1 girl and 2 boyes total three students seleect at randomly.

The probability will be $= \frac{^{15}C_2 \times {}^{10}C_1}{^{25}C_3}$

$= 0.456$

$= 45.6\%$ Ans:

(3.3) A bag contains 4 white, 5 red, and 6 blue balls

Total balls ~~are~~ is 15.

If 3 drawn three balls at randomly

The probability that all of them are red will be $= \frac{^5C_3}{^{15}C_3}$

$= \frac{2}{91}$ Ans:

(3.4)

The mobile operators office there are 5 electronic engineers and 6 computer engineers

∴ total = 6 + 5 = 11

A Commitee of 4 is to be formed randomly to perform a duty. Then the probility will consist.

(a) All electronic engineers, $= \frac{5c_4}{11c_4}$

$= \frac{1}{66}$

$= 1.51\%$

(b) 2 electronic engineers and 2 computer engineers, the probility will be.

$$P(B) = \frac{5c_2 \times 6c_2}{11c_4}$$

$$= \frac{5}{11}$$

$$= 45.54\%$$

Name: Jawad Mohmmad

ID: 20-42006-1

Serial no: 08

class interval	Frequency f	cf	Midpoint, x	fx	$\bar{x}$	f log x	f/x	$x_i - \bar{x}$	$\lvert x_i - \bar{x} \rvert$	$f\lvert x_i - \bar{x} \rvert$	$f(x_i - \bar{x})^2$
1-2	1	1	1.5	1.5	75/20 = 3.75	0.176	0.667	-2.25	2.25	2.25	5.062
2-3	3	4	2.5	7.5	3.75	1.94	1.2	-1.25	1.25	3.75	14.062
3-4	8	12	3.5	28	3.75	4.352	2.286	-0.25	0.25	2	1
4-5	6	18	4.5	27	3.75	3.919	1.333	0.75	0.75	4.5	20.25
5-6	2	20	5.5	11	3.75	1.481	0.364	1.75	1.75	3.5	12.25
Total	20			75		11.19	5.85			16	55.624

S=8

Arithmetic mean ;

$$Am = 75/20 = 3.75$$

Geometric mean ;

$$GM = Antilog\left(\frac{11.14}{20}\right) = 3.60$$

Harmonic mean .

$$Hm = \frac{20}{5.85} = 3.419$$

Mean Deviation ;

$$MD = \frac{16}{20} = 0.8$$

Variance :

$$\sigma^2 = \frac{55.629}{20} = 2.781$$

S = 8

Standard Deviation:

$$\sigma = \sqrt{2.781} = 1.668$$

Median

$$3 + \left(\frac{10-4}{8}\right) \times 1$$

$$= 3.75$$

Mode:

$$3 + \frac{8-3}{2\times8-3-6} \times 1$$

$$= 3.71$$

Co efficient variation.

$$CV = \frac{1.1668}{3.75} \times 100\%$$

$$= 44.48\%$$

S=8

Probability

3.1)

Let A = multiple of 3 = {3, 6, 9, 12, 15, 18} = $P(A) = \frac{6}{20}$

B = multiple of 5 = {5, 10, 15 20} = $P(B) = \frac{4}{20}$

$A \cap B = \{15\} = \frac{1}{20}$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{6}{20} + \frac{4}{20} - \frac{1}{20}$

$= \frac{9}{20}$

S = 8

3.2) There are total 15+20 students

= 25

~~Total~~

1 girl and 2 boys $P(A) = \frac{{}^{15}C_2 \times {}^{10}C_1}{{}^{25}C_3}$

$= \frac{21}{46}$

3.3) There are total 4+6+5 = 15 Balls

∴ All three are red. $P(B) = \frac{{}^{5}C_3}{{}^{15}C_3}$

$= \frac{2}{91}$

S = 8

3.q)

There are 5+6 = 11 engineers

a) all electronic engineers $P(A) = \frac{5_{eq}}{11_{eq}}$

$= \frac{1}{66}$

b) 2 electronic and 2 computer engineers

$P(B) = \frac{5_{eq} 6_{eq}}{11_{eq}}$

$= \frac{5}{11}$

[ABU TAHER MAHIM SARKAR, ID: 20-42042-1, SL-09]

Ans.No-15

Class Interval	Frequency, f	cf	Mid Point, x	fx	x´	flogx	f/x	|xi-x´|	f|xi-x´|	f(xi-x´)^2
1-2	1	1	1.5	1.5		0.18	0.67	2.25	2.25	5.06
2-3	3	4	2.5	7.5		1.19	1.20	1.25	3.75	4.69
3-4	8	12	3.5	28	3.75	4.35	2.29	0.25	2	0.50
4-5	6	18	4.5	27		3.92	1.33	0.75	4.5	3.38
5-6	2	20	5.5	11		1.48	0.36	1.75	3.5	6.13
Total	20			75		11.12	5.85		16	19.75

From the table,

(a) Arithmetic mean $= \frac{75}{20} = 3.75$

Geometric mean $= \text{antilog}\left(\frac{5.85}{20}\right)$

$= 3.597.$

Harmonic mean $= \frac{20}{5.85} = 3.419.$

(b) Total, $n = 20$; Hence, $n/2 = \frac{20}{2} = 10$

For the class (3-4), we get cf $= 12 > 10$

Hence, this is our median class.

Median, $Me = L + \frac{n_2 - c}{f} \times h$

$= 3 + \frac{10-4}{8} \times 1 = 3.75$

For the class (3-4), we have the highest frequency 8. Hence, this is our modal class.

Mode, $Mo = L + \frac{f_m - f_1}{2f_m - f_1 - f_2} \times h$

$= 3 + \frac{8-3}{2\times 8 - 3 - 6} \times 1 = 3.71$

(c) Here,
mean = 3.75

from b, median = 3.75

Sk = mean − median
= 3.75 − 3.75
= 0; that is symmetric.

So, the distribution is symmetric.

(d) Mean deviation = $\frac{16}{20}$ = 0.80.

(e) Variance, $\sigma^2 = \frac{19.75}{20}$ = 0.99.

Standard deviation, $\sigma = \sqrt{0.99}$ = 0.995

(f) Coefficient of variation = $\frac{0.995}{3.75} \times 100\%$
= 26.53%

[Ans].

"Exercise-3"

3.1. Tickets are numbered as 1 to 20.

Let, A = multiple of 3
= {3, 6, 9, 12, 15, 18}.

So, $P(A) = \frac{6}{20} = \frac{3}{10}$.

let, B = multiple of 5
= {5, 10, 15, 20}

So, $P(B) = \frac{4}{20} = \frac{1}{5}$.

$A \cap B = \{15\}$; $P(A \cap B) = \frac{1}{20}$.

We know:

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$
$= \frac{3}{10} + \frac{1}{5} - \frac{1}{20}$.
$= \frac{9}{20} = 0.45$

[Ans].

3.2. There are 15 boys and 10 girls in a class.

Total student $= (15+10) = 25$.

Hence, 1 girl and 2 boys are selected at random.

The probability will be, $= \frac{{}^{15}C_2 \times {}^{10}C_1}{{}^{25}C_3}$

$= \frac{21}{46} = 0.457$ [Ans].

3.3 A bag contain 4 white, 5 red and 6 blue balls.

Total ball $= (4+5+6) = 15$

The probability of red ball $= \frac{{}^{5}C_3}{{}^{15}C_3}$

$= \frac{2}{91} = 0.021$

[Ans].

3.4. There are 5 electronic engineers and 6 computers engineers in a mobile operator's office.

Total engineer $= (5+6) = 11$

(a) Let, A = all electric engineers.

$P(A) = \frac{{}^{5}C_4}{{}^{11}C_4} = \frac{1}{66} = 0.015$

(b) Let, B = 2 electronic engineers and 2 computer engineers.

$P(B) = \frac{{}^{5}C_2 \times {}^{6}C_2}{{}^{11}C_4}$

$= \frac{5}{11} = 0.45$

[Ans].

Rifath Bin Mashrur.
ID: 20-42079-1, Serial: 10

Ans to the Que No. 15

Cls Interval	freq(f)	cf	Mid point, x	fx	x'	flogx	f/x	|xi-x'|	f|xi-x'|	f(xi-x')^2
1-2	1	1	1.5	1.5		0.18	0.67	2.25	2.25	5.06
2-3	3	4	2.5	7.5		1.19	1.20	1.25	3.75	4.69
3-4	8	12	3.5	28	3.75	4.39	2.29	0.25	2	0.50
4-5	6	18	4.5	27		3.92	1.33	0.75	4.5	3.38
5-6	2	20	5.5	11		1.48	0.36	1.75	3.5	6.13
Total	20					11.12	5.85		16	19.75

From the table,

a) Arithmetic mean = $\frac{75}{20} = 3.75$

Geometric mean = antilog $\left(\frac{5.85}{20}\right) = 3.597$

Harmonic mean = $\frac{20}{5.85} = 3.419$

b) Total, $n = 20$, $\therefore \frac{n}{2} = \frac{20}{2} = 10$

class (3-4), we get of = 12 > 10

This is our median class.

Median, $M_e = L + \frac{\frac{n}{2} - c}{f} \times h$

$= 3 + \frac{10-4}{8} \times 1 = 3.75$

) serial-10

we have the highest frequency 8. Hence,

This is our modal class

$$\text{mode, } M_0 = L_t + \frac{f_m - f_1}{2f_m - f_1 - f_2} \times h = 3 + \frac{8-3}{2\times 8 - 3 - 6} \times 1$$

$$= 3.71$$

c) Mean = 3.75

from, b, mediah = 3.75

$$SK = \text{mean} - \text{median} = 3.75 - 3.75$$

$$= 0 \text{ [that is symmetric}$$

d) mean deviation $= \frac{16}{20} = 0.80$

e) variance $\sigma^2 = \frac{19.75}{20} = 0.99$

standard deviation $\sigma = \sqrt{0.99} = 0.995$

(f) coefficient of variation $= \frac{0.995}{3.75} \times 100\%$

$$= 26.53\%$$

(Ans)

Series-10

Ex-3

1) Tickets are numbered as 1 to 20

Let, A = multiple of 3 $\{3, 6, 9, 12, 15, 18\}$

So, $P(A) = \frac{6}{20} = \frac{3}{10}$

B = multiple of 5 $\{5, 10, 15, 20\}$

$\therefore P(B) = \frac{4}{20} = \frac{1}{5}$

$A \cap B = \{15\}$; $P(A \cap B) = \frac{1}{20}$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{3}{10} + \frac{1}{5} - \frac{1}{20}$

$= \frac{9}{20} = 0.45$ (Ans)

serial-10 :

2) There are 15 boys and 10 girls in a class

Total student = (10+15) = 25

∴ 1 girl and Two boys are selected at random

The probality = $\frac{15c_2 \times 10c_1}{25c_3}$

$= \frac{21}{46} = 0.457$ (Ans)

3) There are 5 electronic engineers and 6 computer engineers in a mobile operators office.

Total engineer = (5+6) = 11

a) Let, A = all electronic Engineers,

$P(A) = \frac{5c_4}{11c_4} = \frac{1}{66} = 0.015$

b)

Serial-10

b) B = 2 electronic engineers and 2 computer engineers.

$$P(B) = \frac{{}^5C_2 \times {}^6C_2}{{}^{11}C_4} = \frac{5}{11} = 0.45$$

Assignment - 03 (Sec: 0)

Seriall no - 12

Name: Md. Mamunur Rahman Moon ID: 20-42439-1

class interval of faded signals	No of stations (f_i)	c.f	Midpoint, x_i	$f_i x_i$	$f_i \log x_i$	$\frac{f_i}{x_i}$	$\bar{x}$
1-2	1	1	1.5	1.5	0.18	0.67	
2-3	3	4	2.5	7.5	1.19	1.2	
3-4	8	12	3.5	28	4.36	2.28	3.75
4-5	6	18	4.5	27	3.92	1.33	
5-6	2	20	5.5	11	1.49	0.36	
Total	20			75	11.14	5.84	

(a) Arithmetic mean:

$$AM = \frac{1}{n}\sum_{i=0}^{n} f_i x_i = \frac{75}{20} = 3.75$$

Geometric mean:

$$GM = \text{Antilog}\left(\frac{1}{n}\sum_{i=0}^{n} f_i \log x_i\right)$$

$$= \text{Antilog}\left(\frac{11.14}{20}\right) = 3.72$$

Harmonic mean:

$$HM = \frac{n}{\sum_{i=0}^{n} \frac{f_i}{x_i}} = \frac{20}{5.84} = 3.43$$

(b)

Class	f	cf	$\lvert x_i - \bar{x} \rvert$	$f_i \lvert x_i - \bar{x} \rvert$	$f_i (x_i - \bar{x})^2$
1-2	1	1	2.25	2.25	5.06
2-3	3	4	1.25	3.75	4.68
3-4	8	12	0.25	2	0.5
4-5	6	18	0.75	4.5	3.38
5-6	2	20	1.75	3.5	6.12
Total	20			16	19.74

Median: $M_e = L + \frac{\frac{n}{2} - c}{f} \times h$

$= 3 + \frac{\frac{20}{2} - 4}{8} \times 1$

$= 3.75$

Mode: $M_o = L + \frac{f_m - f_1}{2f_m - f_1 - f_2} \times h$

$= 3 + \frac{8 - 3}{2(8) - 3 - 6} \times 1$

$= 3.71$

L = Lower limit

n = total frequency

h = class size

c = cumulative frequency of previous class.

f_m = frequency of modal class

f_1 = frequency of previous cla

f_2 = frequency of next cla

(e) As, Mean > Median > Mode. So, the distribution is positively skewed.

(g) Mean deviation, $MD = \frac{1}{n}\sum_{i=1}^{n} f_i |x_i - \bar{x}| = \frac{16}{20} = 0.8$

(e) Variance, $\sigma^2 = \frac{1}{n}\sum_{i=1}^{n} f_i (x_i - \bar{x})^2 = \frac{19.74}{20} = 0.987$

Standard deviation, $\sigma = \sqrt{\text{Variance}} = \sqrt{0.987} = 0.99$

(f) Co-efficient of variable, $CV = \frac{\sigma}{\bar{x}} = \frac{0.99}{3.75} \times 100\%$

$= 26.4\%$

Probability

3.1/ Let, A = Multiple of 3 = {3, 6, 9, 12, 15, 18}
B = Multiple of 5 = {5, 10, 15, 20}

$P(A) = \frac{6}{20}$, $P(B) = \frac{4}{20}$

$\therefore (A \cap B) = \{15\}$

$P(A \cap B) = \frac{1}{20}$

We Know,

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$= \frac{6}{20} + \frac{4}{20} - \frac{1}{20}$$

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

3.2/ Given, 15 Boys, 10 girls in a class.

Probability to find 1 Girl and 2 Boys randomly,

$$= \frac{{}^{10}C_1 \times {}^{15}C_2}{{}^{25}C_3}$$

$$= \frac{21}{46} \quad \text{(Ans.)}$$

3.3/ Given, A bag contains, 4 white, 5 red and 6 blue balls.

Probability of three drawn ball of one red of all of them, $\frac{{}^{5}C_3}{{}^{15}C_3}$

Total ball = 4+5+6 = 15

$$= \frac{10}{455} = \frac{2}{91} \quad \text{(Ans.)}$$

3.4/ Given,

5 electronic engineers
6 computer engineers } Total = 11 engineers

Among the committee of 4, the propability of,

(a) all electronic engineers $= \frac{{}^5C_4}{{}^{11}C_4} = \frac{1}{16}$ (Ans)

(b) 2 electronic engineers and 2 computer engineers,

$$= \frac{{}^5C_2 \times {}^6C_2}{{}^{11}C_4}$$

$$= \frac{5}{11} \quad \text{(Ans.)}$$

Zaid Amin Rawfin
ID: 20-42459-1

Serial: 13

Class	f	x	fx	f log x	f/x	$x-\bar{x}$ $(\bar{x}=\frac{75}{20}=3.75)$	$f\lvert x-\bar{x}\rvert$	$f(x-\bar{x})^2$
1-2	1	1.5	1.5	0.176	0.66	-2.25	2.25	506
2-3	3	2.5	7.5	1.194	1.2	-1.25	3.75	4.687
3-4	8	3.5	2.8	4.352	2.286	-0.25	2	0.5
4-5	6	4.5	27	3.919	1.33	0.75	4.5	3.375
5-6	2	5.5	11	1.48	0.384	1.75	3.5	6.125
Total	20(N)		75	11.12	5.87		16	19.75

a) $AM = \frac{75}{20} = 3.75$

$GM = \text{Antilog}\left(\frac{11.12}{20}\right) = 3.597$

$HM = \frac{20}{5.87} = 3.41$

b)

Class	Frequency	Cumulative Frequency (c)
1-2	1	1
2-3	3	4
3-4	8	12
4-5	6	18
5-6	2	20

(1)

$$\text{median} = 3 + \frac{\frac{20}{2} - 4}{8} \times 1 = 3.75$$

$$\text{mode} = 3 + \frac{8-3}{8\times 2 - 3 - 6} \times 1 = 3.71$$

c) As, mean > median > mode, It is positively skewed.

d) $MD = \frac{16}{20} = 0.8$

e) variance, $\sigma^2 = \frac{19.75}{20} = 0.9875$

SD, $\sigma = 0.99$

f) $CV = \frac{0.99}{3.75} \times 100\% = 26.5\%$

3.1) Let, A = multiple of 3 = {3, 6, 9, 12, 15, 18}

B = " " 5 = {5, 10, 15, 20}

$\therefore P(A) = \frac{6}{20}$; $P(B) = \frac{4}{20}$

$\therefore A \cap B = \{15\}$ $\therefore P(A \cap B) = \frac{1}{20}$

$\therefore P(A \cup B) = \frac{6}{20} + \frac{4}{20} - \frac{1}{20} = \frac{9}{20}$

(Ans.)

3.2) Total Students = 15+0 = 25

Probality of selecting 1girl and 2 boys = $\frac{10_{C_1} \times 15_{C_2}}{25_{C_3}}$

$= \frac{21}{46}$ (Ans)

3.3) Total number of balls = 4+5+6 = 15

Probability of getting all reds

$= \frac{5_{C_3}}{15_{C_3}} = \frac{2}{91}$ (Ans.)

3.4) Total Engineers = 5.6 = 11

a) $\frac{5_{C_4}}{11_{C_4}} = \frac{1}{16}$

b) $\frac{5_{C_2} 6_{C_2}}{11_{C_4}} = \frac{5}{11}$ (Ans)

Name: Md. Tanvir Hossen. SL:- 14

ID:- 20-42488-1

Class	Frequency (f)	Mid value (x)	$f(x)$	$f \log x$	$\frac{f}{x}$	$x_i - \bar{x}$ ($\bar{x} = \frac{75}{20} = 3.75$)	$f_i\lvert x_i - \bar{x}\rvert$	$f_i(x-\bar{x})^2$
1-2	1	1.5	1.5	0.176	0.66	-2.25	2.25	5.06
2-3	3	2.5	7.5	1.194	1.2	-1.25	3.75	4.687
3-4	8	3.5	28	4.352	2.286	-0.75	2	0.5
4-5	6	4.5	27	3.919	1.33	0.75	4.5	3.375
5-6	2	5.5	11	1.48	0.384	1.75	3.5	6.125
Total	20(n)		75	11.12	5.87		16	19.75

a) Arithmetic mean, $AM = \frac{1}{n}\sum_{i=0}^{n} f_i x_i = \frac{75}{20} = 3.75$

b) Geometric mean, $GM = \text{Antilog}\left(\frac{1}{n}\sum_{i=1}^{n} f_i \log x_i\right)$

$= \text{Antilog}\left(\frac{11.12}{20}\right)$

$= 3.597$

Harmonic mean, $HM = \frac{n}{\sum_{i=1}^{n} \frac{f_i}{x_i}} = \frac{20}{5.87} = 3.41$

b)

Class	Frequency (f)	Cumulative frequency (c)
1-2	1	1
2-3	3	4
3-4	8	12
4-5	6	18
5-6	2	20

Median $= L + \frac{\frac{n}{2} - c}{f} \times h = 3 + \frac{\frac{20}{2} - 4}{8} \times 1 = 3.75$

Mode $= L + \frac{f_m - f_2}{2f_m - f_1 - f_2} \times h = 3 + \frac{8-3}{8\times 2 - 3 - 6} \times 1 = 3.71$

c) As Mean > Median > mode, it is positively skewed.

d) Mean deviation, $MD = \frac{1}{n} \sum_{i=1}^{n} f_i |x_i - \bar{x}| = \frac{16}{20} = 0.8$

e) Variance, $\sigma^2 = \frac{1}{n} \sum_{i=1}^{n} f_i (x_i - \bar{x})^2 = \frac{19.75}{20} = 0.9875$

Standard deviation, $\sigma = \sqrt{\sigma^2} = 0.99$

f) Coefficient of variation, $CV = \frac{\sigma}{\bar{x}} = \frac{0.99}{3.75} \times 100\%$

$= 26.5\%$

3.1/ Let, A = multiple of 3 = {3, 6, 9, 12, 15, 18}

B = " " 5 = {5, 10, 15, 20}

$\therefore P(A) = \frac{6}{20}$; $P(B) = \frac{4}{20}$

$\therefore A \cap B = \{15\}$ $\therefore P(A \cap B) = \frac{1}{20}$

$\therefore P(A \cup B) = \frac{6}{20} + \frac{4}{20} - \frac{1}{20} = \frac{9}{20}$ Ans

3.2/ Total students = 15 + 10 = 25

probability of selecting 1 girl and 2 boys = $\frac{{}^{10}C_1 \times {}^{15}C_2}{{}^{25}C_3}$

$= \frac{21}{46}$ Ans

3.3/ Total number of balls = 4 + 5 + 6 = 15

probability of getting all red = $\frac{{}^{5}C_3}{{}^{15}C_3} = \frac{2}{91}$ Ans

3.4/ Total engineers = 5 + 6 = 11

a) $\frac{{}^{5}C_4}{{}^{11}C_4} = \frac{1}{16}$

b) $\frac{{}^{5}C_2 \, {}^{6}C_2}{{}^{11}C_4} = \frac{5}{11}$ Ans

Assignment-3

Name: MD. Shanjidul Islam Sadkin

ID. 20-42621-1, Serial: 15

From the given dataset.

Interval	f_i	x_i	$f_i x_i$	$\bar{x}$	$f_i \log x_i$	f_i/x_i
1-2	1	1.5	1.5	$\frac{75}{20} = 3.75$	$1\log(1.5)$	$\frac{1}{1.5}$
2-3	3	2.5	7.5		$3\log(2.5)$	$\frac{3}{2.5}$
3-4	8	3.5	28		$8\log(3.5)$	$\frac{8}{3.5}$
4-5	6	4.5	27		$6\log(4.5)$	$\frac{6}{4.5}$
5-6	2	5.5	11		$2\log(5.5)$	$\frac{2}{5.5}$
Total	20		75		11.122	5.85

(a) Arithmetic mean $AM = \bar{x} = \frac{1}{n}\sum_{i=1}^{n} f_i x_i = \frac{75}{20} = 3.75$.

Geometric mean $GM = \bar{x}_G = \text{Anti}\log\left(\frac{1}{n}\sum_{i=1}^{n} f_i \log x_i\right)$

$= \text{Anti}\log\left(\frac{11.122}{20}\right) = 3.60$

Hermonic mean $HM = \bar{x}_H = \frac{n}{\sum_{i=1}^{n} \frac{f_i}{x_i}} = \frac{20}{5.85} = 3.42$

$AM > GM > HM$

6)

Interval	frequency (f)	Cumu. freq. cf
1-2	1	1
2-3	3	4
3-4	8	12
4-5	6	18
5-6	2	20

$n = 20$

Median $me = L + \frac{\frac{n}{2} - c}{f} \times h$

$= 3 + \frac{\frac{20}{2} - 4}{8} \times 1$

$= 3 + \frac{10-4}{8}$

$= 3.75$

L = lower limit
h = size of class
f = frequency of median class
c = cumulative sum of previous class

Mode $= L + \frac{f_m - f_1}{2f_m - f_1 - f_2} \times h$

$= 3 + \frac{8-3}{16-3-6} \times 1$

$= 3 + \frac{5}{7}$

$= 3.71$

f_m = modal class frequency
f_1 = modal class Previous frequency
f_2 = modal class next frequency.

c) Skewness = mean − median
= 3.75 − 3.75
= 0.00

Skewness = 0 the distribution would be ~~Positively~~ ~~skewed~~. Symmetrical.

d)

Interval	f_i	x_i	$f_i x_i$	$\bar{x}$	$x_i - \bar{x}$	$f_i\|x_i - \bar{x}\|$	$f_i(x_i - \bar{x})$
1-2	1	1.5	1.5		-2.25	2.25	5.06
2-3	3	2.5	7.5		-1.25	3.75	4.69
3-4	8	3.5	28	$\frac{75}{20}$	-0.25	2	0.5
4-5	6	4.5	27	$= 3.75$	0.75	4.5	3.375
5-6	2	5.5	11		1.75	3.5	6.125
Total	= 20		= 75			= 16	= 19.75

Mean deviation: $MD = \frac{1}{n}\sum_{i=1}^{n}(f_i|x_i - \bar{x}|) = \frac{16}{20} = 0.8$

→

e) Variance $\sigma^2 = \frac{1}{n}\sum_{i=1}^{n} f_i(x_i - \bar{x})^2$

$= \frac{19.75}{20} = 0.9875$

Standard deviation $\sigma = \sqrt{\text{variance}} = \sqrt{\sigma^2}$

$= \sqrt{0.9875} = 0.994$

f) Coefficient of variation $CV = \frac{\sigma}{\bar{x}} \times 100\%$

$= \frac{0.994}{3.75} \times 100\%$

$= 26.51\%$

3.1 Let, A is multiple of 3 = {3, 6, 9, 12, 15, 18} with the number 1 to 20, $P(A) = \frac{6}{20}$

B is multiple of 5 = {5, 10, 15, 20} = $\frac{4}{20}$

$A \cap B = \{15\} = \frac{1}{20}$

The Probability of the drawn ticket number is multiple of 3 or 5 would be

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$= \frac{6}{20} + \frac{4}{20} - \frac{1}{20}$$

$$= \frac{9}{20} = 0.45 \simeq 45\%$$

3.2 15 boys and 10 girls. Total 25 students.

Let, A = 1 girl and 2 boys $P(A) = \frac{{}^{15}C_2 \times {}^{10}C_1}{{}^{25}C_3}$

$$= \frac{21}{46} = 0.457$$

$$= 45.7\%$$

3.3 4 white, 5 red and 6 blue ball Total 15 balls in the beg.

Let A = all 3 ball is red $P(A) = \frac{{}^5C_3}{{}^{15}C_3}$

$= \frac{2}{91}$

3.4 5 electrical engineer and 6 computer engineers totall 11 engineers.

a) Let, A = all 4 are electrical engineers

$P(A) = \frac{{}^5C_4}{{}^{11}C_4} = \frac{1}{66}$

b) Let, B = 2 electric and 2 computer engineers

$P(B) = \frac{{}^5C_2 \times {}^6C_2}{{}^{11}C_4} = \frac{5}{11}$

Name: Sidul Islam Sohag Serial-16

Id: 20-42668-1 Section: 0

Class	Frequency (f)	Mid value (x_i)	$f(x)$	$f \log x$	$\frac{f}{x}$	$x_i - \bar{x}$ ($\bar{x} = \frac{75}{20} = 3.75$)	$f_i \lvert x_i - \bar{x} \rvert$	$f(x_i - \bar{x})^2$
1-2	1	1.5	1.5	0.176	0.66	-2.25	2.25	5.06
2-3	3	2.5	7.5	1.194	1.2	-1.25	3.75	4.87
3-4	8	3.5	28	4.352	2.286	-0.25	2	0.5
4-5	6	4.5	27	3.919	1.33	0.75	4.5	3.375
5-6	2	5.5	11	1.48	0.384	1.75	3.5	6.125
Total	20(x_i)		75	11.12	5.87		16	19.75

a) arithmetic mean, $AM = \frac{1}{n} \sum_{i=0}^{n} f_i x_i$

$= \frac{75}{20} = 3.75$

b) Geometric mean, $GM = \text{Antilog}\left(\frac{1}{n} \sum_{i=1}^{n} f_i \log x_i\right)$

$= \text{Antilog}\left(\frac{11.12}{20}\right)$

$= 3.597$

Harmonic mean, $HM = \frac{n}{\sum_{i=1}^{n} \frac{f_i}{x_i}} = \frac{20}{5.87} = 3.41$

b)

Class	Frequency (f)	Comulative frequency (cf)
1-2	1	1
2-3	3	4
3-4	8	12
4-5	6	18
5-6	2	20

$$\text{Median} = L + \frac{\frac{n}{2} - c}{f} \times h$$

$$= 3 + \frac{20/2 - 4}{8} \times 1 = 3.75$$

$$\text{Mode} = L + \frac{f_m - f_{m-1}}{2f_m - f_1 - f_2} \times h$$

$$= 3 + \frac{8 - 3}{16 - 3 - 6} \times 1$$

$$= 3.71$$

c) As Mean > Median > Mode,

If is Positivly skewed.

d) Mean deviation, $MD = \frac{1}{n} \sum_{i=1}^{n} f_i |x_i - \bar{x}|$

$= \frac{16}{20} = 0.8$

e) Vanience, $\sigma^2 = \frac{1}{n} \sum_{i=1}^{n} f_i (x_i - \bar{x})^2 = \frac{55.62}{20}$

$= 2.781$

standard deviation, $\sigma = \sqrt{\text{Variance}}$

$= \sqrt{2.781} = 1.66$ (Ans)

f) coefficent of variation, $CV = \frac{\sigma}{\bar{x}} \times 100$

$= \frac{1.66}{3.75} \times 100$

$= 44.27$

3.1] Let, A = multiple of 3 = {3, 6, 9, 12, 15, 18}

B = multiple of 5 = {5, 10, 15, 20}

$\therefore P(A) = \frac{6}{20}$; $P(B) = \frac{4}{20}$

$\therefore A \cap B = \{15\}$ $\therefore P(A \cap B) = \frac{1}{20}$

$\therefore P(A \cup B) = \frac{6}{20} + \frac{4}{20} - \frac{1}{20} = \frac{9}{20}$ Ans.

3.2] Total students = 15 + 10 = 25

Probability of selecting 1 girl and 2 boys $= \frac{{}^{10}C_1 \times {}^{15}C_2}{{}^{25}C_3}$

$= \frac{27}{46}$ Ans.

3.3] Total number of balls = 4 + 5 + 6 = 15

Probability of getting all red $= \frac{{}^{5}C_3}{{}^{15}C_3}$

Ans

3.4| Total engineers = 5+6 = 11

a) $\frac{^5C_4}{^{11}C_4} = \frac{1}{16}$

b) $\frac{^5C_2 \ ^6C_2}{^{11}C_4} = \frac{5}{11}$ Ans,

End