Aim :- To calculate the Mean height of the students of class.

Introduction :-

The tendency of the distribution is known as its Central tendency and the measures devised to consider this tendency are known as measures of Central tendency.

The most familiar and widely used measure of Central tendency is the arithmetic mean. It represents the entire data by one value which is obtained by adding together all the values and dividing this by the number of observations.

Procedure :-

Step 1 - Gather all the height measurements for all the students in the class.

Step-2 - Sum all the height measurements. (Variates -X)

Sum = (X1 + X2 + X3 +.....+ Xn)

Step-3 - Divide the sum by the total number of observations.

 $Mean(\overline{X}) = \frac{\chi_1 + \chi_2 + \chi_3 + \dots + \chi_n}{n}$ 

5.	Name of	Height (in cm)	S.	Name of the students.	Height (incm
-1	Aadua	165	29	Nikesh	175
2	Aakash	170	30	Nilesh	170
3	Abbau	165	31	Onkar .	171
4	Abbichek	168	32	Pallavi	168
-	Akansha	165	33	Prashant	177
6	Alka	165	34	Purbasha	168
7	Anuradha	164	35	Purvi	166
8	Arcen	178	36	Rahul	168
9	Argan	162	37	Rajesh	170
10	Deepshikha	169	38	Rectika	164
	Farhat	162	39	Rhitu	172
12	aciendra	170	40	Ritika	168
13	Garima	168	41	Rohit	185
14	Giracy	156	42	Roshani	165
15	Giunia	156	43	shalini	160
K	Harshdev	165	44	Shubham	174
17	Heena	168	45	Shubhangi	162
18	Humange	165	46	Siddhant	171
19	Himanshi	166	47	Srishti	158
20	Himshikha	164	48	Suman	158
21	Indra Kumar	182	49	Swastik	171
23	Kajal	168	50	Taanya	168
23	Kanha	165	52	Tarun	175
24	Khushboo	168	59	Tikesh	174
25	Manjeet	182	543	Vasundhara	172
56	Mansi	162	54 55	Vikash	175
27	Michael	176	55	Vinay	178
99	hibir	165	56	Yash.	176.

Calculation :-	tide A ID	L_GIGKING
$\leq X = X_i + X_{ii} +$	X + X + X S.no.	Sum of data
= 1671 + 16	$40 + 1731 + 1692$ i) $1 \rightarrow 10$	1671
+1672 +1	050 ii) 11-720	1640
= 9438	iii) 21→30	1731
1.00	iv) 31->40	1692
the	v) 41→50	,1672
	vi) 51 → 56	1050
	100 P	John Hall
$\bar{X} = \xi X$	9438 = 168.53 cm.	sdas i
n	56	Codtuit .

So the calculated mean height of the students of the class is 168.53 cm.

Aim :- To calculate the Mean weight of the students of class.

Introduction :-

The tendency of the distribution is known as its Central tendency and the measures devised to consider this tendency are known as measures of Central tendency.

The most familiar and widely used measure of Central tendency is the arithmetic mean. It represents the entire data by one value which is obtained by adding together all the values and dividing this by the number of observations.

Procedure :-

Step 1 - Gather all the weight measurements for all the students in the class.

Step-2 - Sum all the height measurements. (Variates -X)

Sum = (X1 + X2 + X3 +.....+ Xn)

Step-3 - Divide the sum by the total number of observations.

 $Mean(\overline{X}) = \frac{\chi_1 + \chi_2 + \chi_3 + \dots + \chi_n}{n}$ 

Name of Students	Weight (in kg)	Name of students	Weight (inkg)
1. Aadya i	10 45:0000	Nikesh i non on	Stobie51 of the
2. Aakash	93	30 Nilesh	68
a Abhay	72	31. Onkar	.64
4. Abhöshek	56	32. Pallavi,	53
5. Akansha	50	83. Prashant	81
G. Alka	. 45	34. Purbasha	64
7. Anuradha	46	35. Purvi	. 48
8. Arun	7.6	36. Rahul	75
9. Aryan	50,000	37. Ravesh	52
o. Deepshikha	60	38. Reetika	54
1. Farnat	47	39 Rhitce	0.031/64
12. Glassendra i	55	40. Ritika	65
3. Garcima	49	41. Rohit	0085 0000
4. Gracy	45	42. Roshani + +	×+:52 %
s. Gulia	319-1- (1	43. Shalinis + and	1 64
6. Harshdev	343 1 01	44. Shubham	65
7. Heena	60	45. Shubhangi	50
18. Himange	46	46. Siddhant	59
a. Himanshi	56	47. Srishti	56
ro. Himshikha	47-1	48. Suman	49
RI. Indrakumar	62 -0 (	49. Swartik	94
2. Kajal	58	50. Taanya	52
23. Kanha	5410 60	51. Tarun SPA	85 ×
24. Khushboo	52	52. Tikesh	54
25. Manjeet	83	53. Varundhara	68
R6. Mansi	55	54. Vîkash	60 Juzoz
27. Michael,	87	55. Vinay	plusto77 ant
28. Mihir	53	SG. Yash.	100 59 62 61
	a strain the second	the second se	

Calculation :-	here the second	
$\xi x = x_1 + x_{ii} + x_{ii}$	S.NO.	sum of data
= 1080 + 1257 + 1029	(i) 1→20	1080
- 3366	$(ii)$ 21 $\rightarrow$ 40	1257
	(111) \$41→56	1029
x = x = 3366 - 60.10 Kg		
n 56 0		and the second

<u>Result</u> :-So the calculated mean weight of the students of the class is 60.10 kg .

<u>Aim</u> :-To calculate the Mean height of the students of class by using class intervals . (continuous series method)

#### Introduction :-

In a continuous series, the arithmetic mean may be calculated after taking into consideration the midpoint of various classes. However, the method will be the same for both inclusive class intervals and exclusive class intervals.

#### Procedure :-

There are two methods, i.e. direct method and shortcut method

#### DIRECT METHOD

Step-1: Make class intervals from raw data and write their (f) frequencies also.

Step2 : Find the mid value of each class (m).

Step3: Individually multiple the Frequency with the respective mid value (f.m)

Step4: Find the product of the Frequency (sum of f).

Step-5: Find the product of the (f.m) [sum of f.m]

Step-6: By using formula, calculate the Mean



### Shortcut Method

Step-1: Make class intervals from raw data and write their (f) frequencies.

Step-2: Find the mid value of each class (m).

Step-3: Calculate the deviation for each class .

[deviation (d) = Mid Value (m) - Assumed mean (A)]

(Assumed mean should be taken from mid value)

Step-4: Multiply the deviation with respective frequency (f.d)

Step-5: By using formula, calculate the Mean



Observation :-

* Observation Table :- (Direct Method).						
s.no.	Class Int	erval (C1)	Frequence	y(f)	(m) Midvalue	f.m.
1.	155-160	cm.	4		157.5	630
2.	160 - 165	Cminon	16	hoards	162.5	. 2600
3.	165 - 170	cm.	19	Y	167.5	3182.5
4.0x	170-175	Cm	10 10	Sisut	172.5	1725
5.	175 - 180	cm.	mul 4 hours	it int	177.5	710
6.	180-185	cm.	3	Reserve	182.5	547.5
C. C. D. C.		<u>er-X</u>	₹f = 56	+ ::*-	EAR	≤f.m = 9395
* Observ	ation Tabl	e - (short	cut Meth	(boi	e the hier	une lo coloular
class In	terval (CI)	frequency	(m) midvalue	d=	(m-A)	f.d.
155 -	160 cm.	4	157.5	157.5	-167.5 = (-10)	$-10 \times 4 = (-40)$
160-	165 cm	16	162.5	162.5	-167.5 = (-5)	-5×16 = (-80)
165-	170 cm.	119101	167.5	167.5	-167.5 = 0	0 × 19 = 0
170-	175 cm.	10	172.5	172.5	-167.5= 5	5×10 = 50
175-	180 cm.	4	177.5	177.5	-167.5 =10	: 4×10=40
180 -	185 cm.	0130 410	182.5	182-1	5-16-7-5=15	15×3 = 45
and the second		₹.f = 5.6	ot each	50 ·	quancies gu	<f.d 15<="" =="" td=""></f.d>

### Calculation :-

Direct method calculation

on  $\xi f = 56$ 9395 m -9395 -m 167.76 cm. = 56

Shortcut method calculation

Calculation -	the second s
Let the (A) Assumed mean be 167.5.	
$d_1 = m_1 - A_1 = 157.5 - 167.5 = (-10)$	$f_1 d_1 = -10 \times 4 = (-40)$
$d_2 = m_2 - A_2 = 16a \cdot 5 - 167 \cdot 5 = (-5)$	$f_2d_2 = -5 \times 16 = (-80)$
$d_3 = m_3 - A_3 = 167.5 - 167.5 = 0$	$f_{3}d_{3} = 0 \times 19 = 0$
$d_4 = m_4 - A = 172.5 - 167.5 = (5)$	$f_4 d_4 = 5 \times 10 = 50$
$q_5 = m_5 - A = 177.5 - 167.5 = (10)$	$f_{5}d_{5} = 10 \times 4 = 40$
$d_{G} = m_{G} - A = 182.5 - 167.5 = (15).$	$f_{6}d_{6} = 15 \times 3 = 45$
	$\xi f = 15$
$\xi f = 4 + 16 + 19 + 10 + 4 + 3 = 56$	
X = A + 2tq = 167.5 + 15 =	167.5 + 0.26 = 167.76 cm
2+ 56	

So the calculated mean height of the students of the class is 167.76 cm.

<u>Aim</u> :-To calculate the Mean weight of the students of class by using class intervals . (continuous series method)

#### Introduction :-

In a continuous series, the arithmetic mean may be calculated after taking into consideration the midpoint of various classes. However, the method will be the same for both inclusive class intervals and exclusive class intervals.

#### Procedure :-

There are two methods, i.e. direct method and shortcut method

#### DIRECT METHOD

Step-1: Make class intervals from raw data and write their (f) frequencies also.

Step2 : Find the mid value of each class (m).

Step3: Individually multiple the Frequency with the respective mid value (f.m)

Step4: Find the product of the Frequency (sum of f).

Step-5: Find the product of the (f.m) [sum of f.m]

Step-6: By using formula, calculate the Mean



### Shortcut Method

Step-1: Make class intervals from raw data and write their (f) frequencies.

Step-2: Find the mid value of each class (m).

Step-3: Calculate the deviation for each class .

[deviation (d) = Mid Value (m) - Assumed mean (A)]

(Assumed mean should be taken from mid value)

Step-4: Multiply the deviation with respective frequency (f.d)

Step-5: By using formula, calculate the Mean



class Interval (G	1)   Frequency (f)	Midvalue	form
35-40	1	37.5	. 37.5
40-45	. 5 adas R	0442-5	212.5
45- 50	and a ground and	47.5	427.5
50-55	11	52.5	577.5
55-60	9	57.5	517.5
60-65	. 8	62.5	500
65-70	2 10 10	67.5	135
70-75	2 10 2	72.5	145
75 -80	2 .	·77.5	155
80-85	4	82.5	330
85-90	1	87.5	87.5
90-95	2	92.5	185

observation Table :- (Shortcut Method)					
(C1) Class Interval	(f) frequency	(m) Mid-point	(d = m-A) deviation(d)	f.d	
35-40	1	037.51	37.5-72-5=(35)	(-35)	
40-45	5	42.5	42.5-72.5=(-30)	(-150)	
45 - 50	9	47.5	47.5-72.5=(-25)	(-225)	
50-55	11	52.5	57.5-72.5= (-20)	(-220)	
55-60	a li	57.5	57-5-7.2.5= (-15)	(-135)	
60 - 65	8	62.5	62.5 - 72.5 = (-10)	(-80)	
65-70	2	67.5	67.5-72.5= (-5)	(+10)	
70-75	2	72.5	72.5-72.5=0	0	
75-80	2	77.5	77.5-72.5=5	(10)	
80-85	4	82.5	82.5-72.5=10	(40)	
85-90	1	87.5	87.5-72.5 = 15	(15)	
90-95	2 3	92.5	92.5-72.5 = 20	(40)	
$\xi f = 56$ $\xi f \cdot d = (-750)$					

Direct method calculation

	<u>Calculation</u> :- <u>Ef.m = 3495</u>	ξf = 56	
	$\overline{X} = \xi f.m = 33$	3310 -	59.10 Kg
-	٤f	56	g , so ng .

Shortcut method calculation

Calculation :-Let, Assumed Mean (A) be 72.5.  $\xi f.d = (-750), \xi f = 56$  $\bar{X} = A + \frac{\xi f d}{\xi f}$ 72.5 + (-750) 56 72.5-13.39 kg = 59.1 -=

So the calculated mean weight of the students of the class is 59.10 kg .

Aim :- To calculate the Median height of the students of class from raw data .

Introduction :-

The median is another important and widely used measure of central tendency. The median is usually defined as that value which divides the distribution so that an equal number of items occur on either side of it. In other words 50% of the observation will be smaller than the median. The data are arranged in ascending order of magnitude to find out the value of the median. If the data set contains an odd number of values, the middle one of the array is the median and if there is an even number of items, the median is the average of the middle two items.

Procedure :-

Step-1: Arrange the data in Ascending / Descending order of magnitude. Step-2: Find the value of (n+1)/2 th item or (n/2) th Step-3 : If the number of items is even, the mean of two middle terms is taken as Median.

N. Starter	Height (incm.)	Name - Application	Height
Name	reight (mont)	29. Nikesh	175
2. Ackesh	170	30 Nilesh	170
2 Abbau	1170	21. Opkor	171
4 Abbishek	165	32 Pallavii - 1011310	168
5. Akapsha	165	33. Prosbant	177
C AIKO	165	34. Purpasha	168
. Anwadha	100	25. Purvi	166
8. Arun	178	36. Rapul	168
g. Aryan	162	37. Rayert	170
10. Deepshikha	169	38. Rectika	164
17. Farbat	162 16311 103010	39. Rhitu	172
19. Gialendra	170 1 the to m	40. Ritika	168
13. Garima	168	GI- Rohit	185
14. GIRACY	156	42. Roshani	165
15. Giunia	156	43. Shabind	-160
16. Harshdev	165 marshall	49. Shubham	1.774
17. Heena	168	45. Shubhangi	-162
18. Hilmangi	PEIEL -165: (08)	48.Siddhant 17	171
19. Himanshi	. 166	47. Srishti	16858
20. Himshikha	164	48. Suman	158
21. Indrakumar	182	49. Swastik	171
2. Kajalos	the dia 168/2 and 10 to	50-Tanya	168
3. Kanha	165	51. Tarup	175
24. Khushboo	168	52. Tiketh	174
5- Manjeet	182	52 1110040	172
26. Marsi	16.2	Ss. Varuncinara	135
R7. Michael	176	Er Vina	170
8. Mibir	165	ss. vinay	126

Calculation :-104.4 There are total 56 students in the class. First the collected data should be arranged in Ascending order 156, 156, 158, 158, 162, 162, 162, 162, 164, 164, 164, 165, 165 168, 168, 168, 168, 168, 168, 168, 169, 170, 170, 170, 170, 170, 170 171, 171, 171, 172, 172, 174, 174, 175, 175, 175, 176, 177, 178, 178, 182, 182, 185 -Total number (n) = 56 (56 is even) 28th item + 29th item 168 + 168 \_ 56 WV-168 2. 10 : M = 168 cm.

So the calculated median height of the students of the class is 168 cm.

Aim :- To calculate the Median weight of the students of class from raw data .

Introduction :-

The median is another important and widely used measure of central tendency. The median is usually defined as that value which divides the distribution so that an equal number of items occur on either side of it. In other words 50% of the observation will be smaller than the median. The data are arranged in ascending order of magnitude to find out the value of the median. If the data set contains an odd number of values, the middle one of the array is the median and if there is an even number of items, the median is the average of the middle two items.

Procedure :-

Step-1: Arrange the data in Ascending / Descending order of magnitude. Step-2: Find the value of (n+1)/2 th item or (n/2) th Step-3 : If the number of items is even, the mean of two middle terms is taken as Median.

	(in Ka)	Name	Weight link
Name	Weight (in Kg)	Last durabalit out atolus	65
1. Haaya	11045 20 10	29. Niketh	00
2. Aakain	43	20. Nilesh	681
3. Abhay	72	31. On Kar	64
4. Abrisher	56	32. Vallavi	0 23 1
5. Akanshan it	conduin of eree	33. Prochantant and and	; 0,1, 10 Ch
6. Alka	45	34. Purbasha shulippin	69
7. Anuradha	- H (46 moti	35 purvis salt boil	48
8. Arun Ibburg no	1 to 76 and anise	36-Rapul 1. 10-1011 11	75
7. Aryan	50	37. Rajeth on no not	52
10. Deepshikha	60	35 Reetika	34
1. Farhat	47	39. Rhitu	64
12. Gavendra	55	210, Ritika, at 10101	65
13. Glarima	49	Ali Robit into hatalla	85
14. Gracy	45	42, Roshani	52
15. Gunia	39	43. Shalini	64
16-Harshder	43	49. Shubham	65
17. Heena	60	45 Shubhangi	-, 50
18. Himangi	46	46. Siddhant	59
19. Flimanshi	56	47. Srishti	56
20. Himshikhar	47	48. Suman	49
21. Indrokumar	62	49. Sweetik	94
22. Kasidel	58	50. Tabua	52
23. Kanhalu	54	51 Tarren	85
24. Khushboo	52	52. Tiketh	54
25 Manjeet	83	53. Varundhara (11) 60	68
R6. imansili	55	54. Vikach	60
R7. Michael	87	55 Vincure	10.77.
na Mihin	53	Carringeron hoteling	50

Calculation :-	The second
Arrange the data in ascending order for	or median calculation.
<b>.</b>	Albert Contractor Contractor
39, 43, 45, 45, 45, 46, 46, 47, 47, 48	,49,49,50,50,50,52,
52, 52, 52, 53, 53, 54, 54, 54, 55, 55,	56, 56, 56, 58, 59, 59,
60,60, 60,62,64, 64, 64, 64, 64, 65, 65	65, 68, 68, 72, 75, 76,
77,81,83,85,85,87,93,94	and the second second second
A CARLER AND A CARLEND AND A CARLEND	and the second second
Median(M) = 50 + 56 = 112 = 56  kg	
<u>a</u> 0	
	Figure 1 and 1

So the calculated median weight of the students of the class is 56kg.

<u>Aim</u> :-To calculate the Median height of the students of class by using class interval (continuous series) method .

Introduction :-

The median is another important and widely used measure of central tendency. The median is usually defined as that value which divides the distribution so that an equal number of items occur on either side of it. In other words 50% of the observation will be smaller than the median. The data are arranged in ascending order of magnitude to find out the value of the median. If the data set contains an odd number of values, the middle one of the array is the median and if there is an even number of items, the median is the average of the middle two items.

Procedure :-

Step-1: Make class intervals from raw data and write their (F) frequencies also.

Step-2: Find out the cumulative frequency (CF)

Step-3: Find the Median number (n/2) or (n+1)/2

Step-4: Locate the median number in the CF, the respective class will be the median class. Step-5: Calculate the median with the help of formula.

$M = l + m - c \chi \tilde{c}$	l=lower limit of Median Class.
f	m=median number.
	c = cf of the class just preceeding.
m = n  or  m+1	Median class.
2 2	f = frequency of median class
$m_{i} n \mu_{i} m = N$	z = class interval size.
2	

* observation Table :-	naght of the s	nni - 10 calculate the Median is rouidata.
	1	1 (CF) mutanell
class Interval (CI)	frequency.	Cumulative frequency.
155-160	4	slot4inporr
160-165 Choo and	11) (1116: d'((t)	Tassalov29: but spor
165-170 out lon	even 19: news	i medianclas
170 - 175	10 . ()	Dinaison 49 10 405
175-180	4	53 14 9312
180 - 185	3	56 - miteluate?
median coloniation	to island prait	Anonge the data in ascert

Median numbe	$r(M) = \frac{N}{2} = \frac{56}{8} = \frac{28}{8}$
l = 165	$M = l + \frac{m-c}{f} \times \dot{c}$
C = 20	- 105 + 28-20 VE
f = 19	- 165 1 5 19
6-5	= 165 + 8 × 5 = 165 + 2.1 cm. = 167.100

### Result :-

So the calculated median height of the students of the class is 167.10 cm

<u>Aim</u> :-To calculate the Median weight of the students of class by using class interval (continuous series) method .

### Introduction :-

The median is another important and widely used measure of central tendency. The median is usually defined as that value which divides the distribution so that an equal number of items occur on either side of it. In other words 50% of the observation will be smaller than the median. The data are arranged in ascending order of magnitude to find out the value of the median. If the data set contains an odd number of values, the middle one of the array is the median and if there is an even number of items, the median is the average of the middle two items.

### Procedure :-

Step-1: Make class intervals from raw data and write their (F) frequencies also.

Step-2: Find out the cumulative frequency (CF)

Step-3: Find the Median number (n/2) or (n+1)/2

Step-4: Locate the median number in the CF, the respective class will be the median class. Step-5: Calculate the median with the help of formula.

$M = l + m - c \times \hat{z}$	l=lower limit of Median Class.
f	m=median number.
	c = cf of the class just preceeding.
m = n or $m+1$	Median class.
2 2	f = frequency of median class
mainly m = N	z = claus interval size.
8 2	

Class Interval (CI)	Frequency (f),	cumulative frequency (CF)
35-45	6	. Can Gonaupair
45-55	1. 20 m 20	turnes orther and a control
55-65	is (\$17 some	no was 93 Jo median clays
65-75	o any management	1 00 the ngt supplier to gets
75-85	G C	100000 53 SA VIG
85-95	3	100 m Stomaton : 01913

Calculation :-	
Calculation -	$1 = (m_1) - 5c/9 = 98$
Median num	ber(m) = 307a - x0
L= 55	
c = a6	$M = l + \frac{m^2}{2} \times t$
f = 17	+
i = 10	$= 55 + \frac{28 - 26}{10} \times 10$
	17
	$= 55 + \frac{2}{17} \times 10 = 55 + 1.17 = 56.17 \text{ kg}.$
Court 1	

So the calculated median weight of the students of the class is 56.17kg

Aim :- To calculate standard deviation of height of the class .

#### Introduction :-

Standard deviation is a statistical measure that reflects the amount of variability or dispersion in a set of data points. Higher standard deviation indicates greater variability while lower standard deviation suggest that the data points tend to be close to the mean .

#### Procedure :-

Step-1: Collect the data (height measurements) From all the students in a class as class intervals. (continuous series).

Step-2: Calculate the Mean height.

Step-3: Calculate the mid values (m) for each class.

Step-4: Calculate deviation (d) by subtracting the mean from each midpoint for all classes.

Step-5 : Square each of the deviations.

Step-6 : Multiply the squared deviation with respective Frequency for each class.

Step-7: Calculate standard deviation by using the formula:-

f = frequency (d)<sup>2</sup> = Squared deviation N = Total number.  $\leq f(d)^2$ Standard

* Observation	Table :	talo a	oral Som	++ zin++z	es Mate class of	ubazarq 1 Lean
(C1) Class Interval	(f) frequency	(X) Mean	(m) Midvalue	(d) deviation	deviation(d <sup>2</sup> ),	fd <sup>2</sup>
155-160	ry w	(n)	157.5	(-10:5)	110.25	:441
160-165	12670	the	162.51	(4515)	130:25 10001	484 3
165-170	19	168	167.5 1	(-0.51)	1.0.125 start	4.75
170-175	0100	plant	1421.5 W	405bom	20.25/00/00	202-5
175-180	4		177.5	9:05	90.25	361
180-185	300	1 231	182.5	14.5× -	210.25	630.75
oer ayoncy, of the	iaum d Asviti	olutio	mi=n cf=Cu		•	${fd^2 = 2124}$
seding maria	st prece	11 22.			Ith is bly	1 : 00
$d_1 = 157.5$ $d_2 = 162.5$	- 168 = - 168 =	(-10	;5) ;5)			
$d_3 = 167.5$	- 168 =	(-0	• 5)		: (10)	Calculat
dy = 172.5	- 168 =	4.5	- 38 -	= 56/2	(mr) reduced	PROJECTION
$d_5 = 177.5$	- 168 =	9.5				1= 55
de = 182.5	- 168 =	14.	5 VX	- +1.	= M	6 = 6 6
						- 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10

Calculation :-		2124				
$\xi f d^2 = 2124$ , N = 56	Q =/	56	= \	37.92	= 6.1579	om

### Result :-

So the calculated standard deviation of height is 6.1579 cm

Aim :- To calculate standard deviation of weight of the class .

#### Introduction :-

Standard deviation is a statistical measure that reflects the amount of variability or dispersion in a set of data points. Higher standard deviation indicates greater variability while lower standard deviation suggests that the data points tend to be close to the mean .

#### Procedure :-

Step-1: Collect the data (height measurements) From all the students in a class as class intervals. (continuous series).

Step-2: Calculate the Mean height.

Step-3: Calculate the mid values (m) for each class.

Step-4: Calculate deviation (d) by subtracting the mean from each midpoint for all classes.

Step-5 : Square each of the deviations.

Step-6 : Multiply the squared deviation with respective Frequency for each class.

Step-7: Calculate standard deviation by using the formula:-

f = frequency (d)<sup>2</sup> = Squared deviation N = Total number.  $\leq f(d)^2$ Standard

* observation	Table :-				-t apit-	athen stark
(c1) Class Interval	(f) frequency	Mean (文)	mid value	Deviation (d)	squared $deviation (d^2)$	fd <sup>2</sup>
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<u>Result</u> :-So the calculated standard deviation of weight is 12.8 kg

<u>Aim</u> :-To study the ideas and concepts of probability theory through chi-Square .

### Introduction :-

The theory of probability has its own origin in the games of chance related to gambling. It measures the relative frequency of a particular event happening by chance.

Probability is the likelihood of occurrence of an event. The simplest example of a classical probability experiment is a coin toss, when we toss a coin there is a 50% chance of getting a head and 50% chance of getting a tail.

No. of favourable Events. Total. no. of events. Probability

#### Procedure :-

- 1. Toss the coin, write all the outcomes that came during tossing the coins.
- 2. Write the observed and expected frequency in the separate columns
- 3. Minus the observed frequency from expected frequency and then square the value.
- 4. Divide the squared value by expected frequency or by putting in the chi-square formula, calculate the value.
- 5. After matching the calculated value from the chi-square tabulated value, provide the hypothesis .

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### Result :-

So, before the experiment we make two assumptions.

First, Ho= There is no significant difference.

HA= There is a significant difference.

 $\rightarrow$  On the basis of our calculated chi-square value and tabulated value, we do the calculation

and provide our assumption.

 $\rightarrow$  If the tabulated value is greater than the calculated value, then there are no significant differences (Ho= accept , HA= reject).

 $\rightarrow$  If the calculated value is greater than the tabulated value then there are significant differences (Ho = Reject , HA= accept) .

Aim :- To study the basic concept of T-test and method of computation.

#### Introduction :-

Sir William Gosset, gave a test popularly known as T-test. The test is based on Tdistribution. Gosset was employed by Guinness Brewery (Dubling, Ireland), which does not permit employees to publish research findings under their own name, hence Gosset adopted the pen name "student" and published his discoveries in 1905, under his name, thereafter, the t-test is commonly Known as student t-test. This test helps us in determining Whether observed differences between 2 samples are actually due to chance, or whether they are really significant or not.

Procedure :-

- 1. Separately, calculate the mean of both the samples (S1,S2). (Mean = Sum of all observations/Total no. of observation)
- 2. Now, we have to calculate standard deviation for calculating this, first of all we have to calculate the deviation of each value in the sample from mean. (X-meanX)
- 3. Then square the value (X-meanX)2 and sum up all the values.
- 4. Now, put in the formula of standard deviation and calculate the value (S1 and S2) of both samples.
- 5. Now, we have to put all the values in the formula of T-test for a difference between two independent means.

X1=Mean of Sample-1  $\frac{1}{n_2} = \frac{1}{n_2} = \frac{1}$ n,=total no. of individuals in group 1 nz=total no. of individuals in group 2

- 6. Now, the value obtained is called the calculated T-test value.
- 7. Compare the calculated value from the tabulated Value and give a hypothesis

• Given Table :-

Subject	Baseline	6-week after		
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• Obser	vation	Table :	-				
subject	Baseline	$ \chi - \overline{\chi} $	$\left \left(\pi-\overline{\chi}\right)^2\right $	s.m	6 weeks after	2-2	$(\chi-\overline{\chi})^2$
1.	8.3	1.45	2.10	1.	19:3	3.85	14.82
<b>a</b> .	5.7	-1.15	1.32	2.	10.7	-4.75	22.56
3.	3.3	-3.55	12.60	3,	8.3	- 7.15	51.12
4.	4.6	-2.25	5.06	Ч,	9 2 10 2	-6.45	41.60
5.	5.6	-1.25	1.56	5.	13.6	-1.85	3.42
6.	2.3	-4.55	20.70	6.	9.3	-6.15	37.82
7.	11.7	4.85	23.52	7.	16.6	1.15	1.32
8,	33.7	26.85	720.92	8.	47.3	31.85	1014-42
9.	3.3	-3.55	12.60	9.	9	-6.45	41.60
10.	1.3	-5.55	30.80	100	18 20.081	2.55	5.50
11.	5.3	-1.55	2.40	η.	12	-3.45	11:90
12.	32.3	25.45	647.70	12,	43	27-55	759
13.	2	-4.85	23.52	13.	10.3	-5.15	26.52
14.	0.8	-6.05	36.60	14.	7	-8.45	71.40
15.	2.7	-4.15	17.22	15	9	-6.45	41.60
16.	2.7	-4.15	17.22	16.	10	-5.45	29,70
17.	3	-3.85	14.82	17	7.70.5.00	-7.75	60.06
18.	0	-6.85	46 92	18.	23.7	8.25	68.06
19.	3.7	-3.15	9.92	19,	10.3	-5.15	25.52
20.	4.7	-2.15	4.62	20,	15.	-0.45	0.20
Total.	Mean X =6.85	05	1652.12		Mean (末) = 15.45	31	2330.14.

Calculation :-• standard deviation of first group,  $s_{j} = \sqrt{\frac{\xi(\chi - \bar{\chi})^2}{n-1}}$  $S_1 = \sqrt{1652.12} = \sqrt{86.95} = 9.32$ • Mean of first group -  $\overline{X} = \frac{x_1 + x_2 + x_3 + \dots + x_{20}}{n}$  $\overline{X} = \frac{8 \cdot 3 + 5 \cdot 7 + 3 \cdot 3 + 4 \cdot 6 + \dots + 4 \cdot 7}{20} = \frac{137}{20} = \frac{6.85}{20}$ • standard deviation of second group.  $s = \sqrt{\frac{\xi(x-\bar{x})^2}{2}}$  $S_2 = \sqrt{\frac{2330.14}{19}} = \sqrt{\frac{122.63}{12.63}} = 11.07$ • Mean of second group -  $X = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$  $\overline{X}_2 = \frac{19.3 + 10.7 + 8.3 + 9 + \dots + 15}{20} = \frac{309.1}{20} = \frac{15.45}{20}$ T-Test Formula : $t = \frac{\overline{X_{j}} - \overline{X_{2}}}{\sqrt{\frac{S_{j}^{2}}{\eta_{1}} + \frac{S_{2}^{2}}{\eta_{2}}}}$ 



calculated value = 2.68 (one-Tailed) Tabulated value = 2.09 (At t=19, d=0.05) (calculated value > Tabulated value.) There is a significant difference. HA = Accept Ho = Reject .