Weighted Mean $\bar{X}_W$

$\bar{X}_W = \frac{\Sigma W.x}{\Sigma W}$, ΣW = Sum of weights
$\Sigma W.x$ = Product of weights and observations

(15.)

Commodity	(x) Price (₹ per Kg) (observations)	(W) Quantity Purchased (in Kg)	W.x
Flour	25	10	250
Oil	100	2	200
Sugar	40	3	120
Potato	20	5	100
		20	$\Sigma W.x = 670$

$\Sigma W = 20$
$\Sigma W.x = 670$

$\bar{X}_W = \frac{\Sigma Wx}{\Sigma W} = \frac{670}{20}$ ₹33.5 Ans.

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17.

C.I	Cf	f	m	f·m
0-10	15	15	5	75
10-20	35	20	15	300
20-30	60	25	25	625
30-40	85	25	35	875
40-50	90	5	45	225
		90		2100

$$\bar{x} = \frac{\Sigma fm}{N} = \frac{2100}{90} = 23.33 \text{ Ans}$$

(18.)

C.I	cf	f	m	$d = \frac{m-c}{A}$	fd'
~~0-10~~					
5-10	25	5	7.5	$\frac{-10}{5} = -2$	-10
10-15	20	8	12.5	-1	-8
15-20	12	3	(17.5)	0	0
20-25	9	4	22.5	1	4
25-30	5	5	27.5	2	10
		25			-4

$$\bar{X} = A + \frac{\Sigma fd'}{N} \times C$$

$$= 17.5 - \frac{4}{25} \times 5$$

$$= 17.5 - 0.8$$

$$= 16.7 \text{ marks}$$

(21.) Average = 40

No. of players = 11

Total runs = Let's assume x

$$\therefore \frac{x}{11} = 40$$

$$x = 40 \times 11 = 440$$

$440 - 11 = 429 \rightarrow$ correct total runs

$$\therefore \text{Average} = \frac{429}{11} = 39 \text{ runs}$$

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(23.)

Age(x)	No. of persons (f)	f·x
20	1	20
21	2	42
22	4	88
x	5	5x
24	15	360
25	23	575
	50	1085 + 5x

$\bar{x} = 24$

$\bar{x} = \frac{\Sigma f \cdot m}{N}$

$\therefore 24 = \frac{1085 + 5x}{50}$

$24 \times 50 = 1085 + 5x$

$1085 + 5x = 1200$

$5x = 1200 - 1085$

$5x = 115$

$x = \frac{115}{5}$

$x = 23$ years.

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(26.) Mean weight = 70 Kg
Total boys = 50

Mean weight = 55 Kg
Total girls = 100

For boys x = Total weight of boys

$\therefore 70 = \frac{x}{50}$

$x = 3500$

y = Total weight of girls

$\therefore 55 = \frac{y}{100}$

$y = 5500$

Total weight of boys + girls = 3500 + 5500
= 9000

Total no. of boys + girls = 50 + 100 = 150

$\therefore$ Mean weight of boys + girls together = $\frac{\text{Total weight}}{\text{Total boys + girls}}$

$= \frac{9000}{150}$

$= 60$ Kg

Weighted Mean

15. The following table gives the quantity of different commodities purchased at various prices:

Commodity	Price (₹ per kg)	Quantity Purchased (in kg)
Flour	25	10
Oil	100	2
Sugar	40	3
Potato	20	5

Taking quantity purchased as weights, find weighted Arithmetic average of the prices.

[Ans: ₹ 33.50]

16. A student obtained 82 marks in commerce, 86 marks in accountancy, 90 marks in mathematics and 70 marks in English. Calculate Weighted Mean of the marks if weights given to these subjects are 3, 5, 3 and 1 respectively.

[Ans: 84.67 marks]

Typical Problems

17. Find the Arithmetic Mean of the data given below:

Daily pocket money (in ₹):	Below	10	20	30	40	50
Frequency:		15	35	60	85	90

[Ans: ₹37 App.]

18. Determine the Arithmetic Mean of the following data:

Marks:	More than	5	10	15	20	25
No. of students:		25	20	12	9	5

[Ans: 16.7 marks]

19. Calculate the Arithmetic Mean of the following frequency distribution:

Marks	No. of students
Less than 10	4
10–20	6
20–30	20
30–40	10
40–50	7
More than 50	3

[Ans: 28.8 marks]

20. Calculate the Mean of the following data by converting them into grouped data:

Mid-value:	22	24	26	28	30	32
Frequency:	15	17	22	23	13	10

[Ans: 26.64]

21. In a cricket match the average runs made by 11 players were calculated as 40. Later on it was discovered that the score of a player who had actually made 11 runs was read as 22. Find the correct average.

[Ans: 39 runs]

22. Mean marks obtained by a student in his five subjects are 78. He has secured 80 marks in economics, 85 in mathematics, 70 in commerce, and 75 in accountancy. Find the marks he has secured in English.

[Ans: 80 marks]

23. Arithmetic Mean of the following series is 24.

Age in years:	20	21	22	X	24	25
Number of persons:	1	2	4	5	15	23

Find the missing item X. [Ans: Missing item X = 23 years]

24. The average daily wage of the following series is ₹41.

Daily wages (₹)	20	30	40	50	60	70
No. of workers:	8	12	X	10	6	4

Find the missing frequency X. [Ans: 20 workers]

25. Arithmetic Mean of the following data is 25.4.

X:	10–20	20–30	30–40	40–50	50–60
Frequency:	20	15	Y	3	2

Find the missing frequency Y. [Ans: 10]

26. The Mean weight of 50 boys in a class is 70 kg, and the Mean weight of 100 girls in that class is 55 kg. Find the combined Mean weight of boys and girls taken together. [Ans: 60 kg]