Chapter - 11

STATISTICS

Solutions

1. **(d):** Objectives of Constructing table for presenting data:
   1. To bring out the essential features of the data
   2. To facilitate statistical analysis
   3. Saving of Space
2. **(c):** Tabular presentation of data saves space without compromising "Quality of data" & "Quantity of data".
3. **(a):** When the quantitative and qualitative data are arranged according to a single feature, the tabulation is known as "One-way tabulation".
4. **(d):** The table where the variables are subdivided with interrelated features is known as two-way table.
5. **(c):** General tables of data used to show data in an orderly manner are called as repository tables.
6. **(a):** Required percentage = $\frac{152.2}{86.4} \times 100 \approx 176\%$ approx.
7. **(b):** Clearly shown by table, oilseeds is the answer.
8. **(c):** Average production of pulses
   $= \frac{20.5+22.4+24.6+23.5+27.8+28.2}{6}$
   $\Rightarrow \frac{147}{6} = 24.5$ million tonnes.
9. **(a):** Required percentage = $\frac{32.4}{450} \times 100 = 7.2\%$
10. **(b):** Total production of oilseeds in the given years
    = 42.4 + 46.8 + 52.4 = 141.6
    Which is equal to the production of wheat in 1994-95

Mean

11. **(c):** $\overline{x} = \frac{\sum x_i}{n}, \sum x_i = n\overline{x}$
    New mean $= \frac{\sum \lambda x_i}{n} = \lambda \frac{\sum x_i}{n} = \lambda\overline{x}$.
12. **(a):** It is obvious.
13. **(b):** $M_g = a + \frac{1}{\sum f_i}(\sum f_i d_i)$;
    $x = a$ i.e., $x =$ assumed mean.
14. **(c):** Let $x_1, x_2 \dots, x_n$ be n obervations.
    Then, $\overline{x} = \frac{1}{n}\sum x_i$. Let $y_i = \frac{x_i}{\alpha} + 10$
    Then, $\frac{1}{n}\sum_{i=1}^{n} y_i = \frac{1}{\alpha}\left(\frac{1}{n}\sum x_i\right) + \frac{1}{n}(10n)$

$\Rightarrow \bar{y} = \frac{1}{\alpha}\bar{x} + 10 = \frac{\bar{x}+10\alpha}{\alpha}$

15. (d): Since, root mean square $\geq$ arithmetic mean

$\therefore \sqrt{\frac{\sum_{i=1}^{n} x_i^2}{n}} \geq \frac{\sum_{i=1}^{n} x_i}{n} \Rightarrow \sqrt{\frac{400}{n}} \geq \frac{80}{n} \Rightarrow n \geq 16$

Hence, possible value of $n = 18$.

16. (d): Required mean

$= \frac{(ax_1+b)+(ax_2+b)+\cdots+(ax_n+b)}{n}$

$= \frac{a(x_n+x_2+\cdots+x_n)+nb}{n} = a\bar{x} + b.$

$\left[\because \frac{x_1+x_2+\cdots+x_n}{n} = \bar{x}\right]$

17. (a): It is obvious.

18. (c): It is a fundamental property.

19. (c): Total weight of 7 students is $= 55 \times 7 = 385$ kg

Sum of weight of 6 students

$= 52 + 58 + 55 + 53 + 56 + 54 = 328$ kg

$\therefore$ Weight of seventh student $= 385 - 328$

$= 57$kg.

20. (b): Weighted mean $= \frac{1.1^2+2.2^2+\cdots+n.n^2}{1^2+2^2+\cdots+n^2}$

$= \frac{\sum n^3}{\sum n^2} = \frac{\frac{n(n+1)}{2}\frac{n(n+1)}{2}}{\frac{n(n+1)(2n+1)}{6}} = \frac{3n(n+1)}{2(2n+1)}.$

21. (d): Mean $= \frac{1.1+\frac{1}{2}.2+\frac{1}{3}.3+\frac{1}{4}.4+\frac{1}{5}.5+\cdots+\frac{1}{n}.n}{1+2+3+\cdots+n}$

$= \frac{1+1+1+1+\cdots+1}{\frac{n(n+1)}{2}} = \frac{n}{\frac{n(n+1)}{2}} = \frac{2}{n+1}.$

22. (b): $\frac{x_1+x_2+\cdots+x_{10}}{10} = 4.5$

$\Rightarrow x_1 + x_2 + \cdots + x_{10} = 45$

And $\frac{x_{11}+x_{12}+\cdots+x_{40}}{30} = 3.5$

$\Rightarrow x_{11} + x_{12} + \cdots + x_{40} = 105$

$\therefore x_1 + x_2 + \cdots + x_{40} = 150$

$\therefore \frac{x_1+x_2+\cdots+x_{40}}{40} = \frac{150}{40} = \frac{15}{4}.$

23. (a): Marks obtained form 3 subjects out of 300 $= 75 + 80 + 85 = 240$

It the marks of another subjected is added, then the marks will be ≤ 240 out of 400

$\therefore$ Minimum average marks$= \frac{240}{4} = 60\%.$

[When marks in the fourth subject $= 0$]

24. (b): A. M. = Sum of n terms.

Here the given sequence is in G. P.

$\therefore a = 1, r = 3 > 1$

A. M. $= \frac{a(r^n-1)}{r-1} = \frac{1(3^n-1)}{3-1} = \frac{3^n-1}{2}$

25. (c): Old avg. is x

Then new avg. is $(x + 2)$

According to question

$15x + 70 = 16(x + 2)$

$15x + 70 = 16x + 32$

$x = 38$

New avg. $= 40$.

26. (d): $\frac{x_1+x_2 \ldots x_6}{16} = 16$

If $x_1 = 16$

$\frac{x_1+x_2\ldots x_6-16+3+4+5}{18}$

$= \frac{16\times16-16+12}{18} = \frac{240+12}{18} = \frac{252}{18} = 14.$

Median and Mode

27. (d): It is obvious.

28. (b): It is obvious.

29. (c): It is a formula.

30. (d): It is a fundamental property.

31. (a): It is obvious.

32. (c): As the distribution is symmetrical, therefore,

$Q_2(\text{Median}) = \frac{Q_1+Q_3}{2} = \frac{25+45}{2} = 35.$

33. (d): Since, $n = 6$, then median term

$= \left(\frac{9+1}{2}\right)^{th} = 5^{th}$ term.

Now, last four observations are increased by 2.

$\because$ The median is 5^{th} observation, which is remaining unchanged.

$\therefore$ There will be no change in median.

34. (c): It is obvious.

35. (d): It is obvious.

36. (a): Since $x > 0$,

$\frac{x}{5}, \frac{x}{4}, \frac{x}{3}, \frac{x}{2}$, x is in ascending order.

$\therefore$ Median $= \frac{x}{3}$

Also, median $= 8$. So, $x = 24$

Relation between mean, median and mode, Pie diagram

37. (c): By the given condition,

Mean $= (2 \text{ mean})k \Rightarrow k = \frac{1}{2}.$

[$\therefore$ Mode $= 3$median $- 2$ mean]

38. (b): We know that,

Mode $= 3$ Median -2 Mean $= 3(22) - 2(21)$

$= 66 - 42 = 24.$

39. (d): It is a fundamental property.

40. (a): It is obvious.

41. (c): It is a fundamental property.

Measures of dispersion

42. (d): It is obvious.

43. (b): It is a fundamental property.

44. (c): Median $= 25.5a$

Mean deviation about median $= 50$

$\Rightarrow \frac{\sum|x_i=25.5a|}{50} = 50$

$\Rightarrow 24.5a + 23.5a + \cdots + 0.5a + 0.5a + \cdots + 24.5a = 2500$

$\Rightarrow a + 3a + 5a + \cdots + 49a = 2500$

$\Rightarrow \frac{25}{2}(50a) = 2500 \Rightarrow a = 4.$

45. (c): Here, $\bar{x} = \frac{2+4+6+8+10}{5} = 6$

Hence, variance $= \frac{1}{n}\sum(x_i - \bar{x})^2$

$= \frac{1}{5}\{(2-6)^2 + (4-6)^2 + (6-6)^2 + (8-6)^2 + (10-6)^2\}$

$= \frac{1}{5}\{(16+4+0+4+16)\} = \frac{1}{5}\{40\} = 8.$

46. (c): It is obvious.
47. (a): It is obvious.
48. (d): It is obvious
49. (c): It is obvious.
50. (b): It is obvious.

51. (a): Variance $= (S.D.)^2 = \frac{1}{n}\sum x^2 - \left(\frac{\sum x}{n}\right)^2 \left[\because \bar{x} = \frac{\sum x}{n}\right]$

$= \frac{n(n+1)(2n+1)}{6n} - \left(\frac{n(n+1)}{2n}\right)^2 = \frac{n^2-1}{12}.$

52. (b): It is obvious.
53. (d): It is obvious.
54. (c): It is obvious.

55. (a): We know that, S.D. $= \frac{3}{2}$ Q.D.

$\therefore$ S.D. $= \frac{3}{2} \times 16 = 24.$

56. (a): We know that, Q.D. $= \frac{5}{6} \times$ M.D. $= \frac{5}{6} \times 12 = 10$

$\therefore$ S.D. $= \frac{3}{2} \times$ Q.D. $= \frac{3}{2} \times 10 \Rightarrow$ S.D. $= 15.$

Aliter : M.D. $= \frac{4}{5}$S.D. $\Rightarrow 12 = \frac{4}{5}$S.D.

$\therefore$ S.D. $= \frac{12\times5}{4} = 15.$

57. (a): Data : 3, 4, 5, 7, 10, 10, 10

Median is 7 : Mean is also 7 $\left[\text{check} : \frac{49}{7} = 7\right]$ but mode is 10.

M.D. (from mode)

$= \frac{1}{7}(7+6+8+3+0+0+0) = \frac{1}{7}(21) = 3.$

58. (c):

59. (a, d): $CV_1 = 60, CV_2 = 70, \sigma_1 = 21, \sigma_2 = 16$

Let $\overline{x_1}, \overline{x_2}$ be the means of 1st and 2nd distribution respectively.

$\Rightarrow CV_1 = \frac{\sigma_1}{x_1} \times 100$

$\Rightarrow \overline{x_1}, = \frac{\sigma_1}{CV_1} \times 100 = \frac{21}{60} \times 100 = 35$

Similarly, $\overline{x_2} = \frac{\sigma_1}{CV_2} \times 100 = \frac{16}{70} \times 100 = 22.85.$

60. (a): Standard deviation of numbers 2, 3, a and 11 is 3.5

$\therefore (3.5)^2 = \frac{\sum x_i^2}{4} - (\bar{x})^2$

$\Rightarrow (3.5)^2 = \frac{4+9+a^2+121}{4} - \left(\frac{2+3+a+11}{4}\right)^2$

On solving, we get

$3a^2 - 32a + 84 = 0.$

61. (b): Given, observations are 3, 10, 10, 4, 7, 10 and 5.

$\therefore \bar{x} = \frac{3+10+10+4+7+10+5}{7} = \frac{49}{7} = 7$

x_i	$d_i = \lvert x_i - \bar{x}\rvert$
3	4
10	3
10	3
4	3
7	0
10	3
5	2
Total	$\sum d_i = 18$

Now, M.D. $= \frac{\sum d_i}{N} = \frac{18}{7} = 2.57$

62. (b): M.D. $= \frac{1}{n}\sum_{i=1}^{n}\lvert x_i - \bar{x}\rvert$

63. (a): Since, the lives of 5 bulbs are 1357, 1090, 1666, 1494 and 1623.

$\therefore$ Mean $= \frac{1357+1090+1666+1494+1623}{5}$

$\Rightarrow \frac{7230}{5} = 1446$

x_i	$d_i = \lvert x_i - \bar{x}\rvert$
1357	89
1090	356
1666	220
1494	48
1623	177
Total	$\sum d_i = 890$

M.D. $= \frac{\sum d_i}{N} = \frac{890}{5} = 178.$

64. (c): Since, marks obtained by 9 students in Mathematics are 50, 69, 20, 33, 53, 39, 40, 65, 59

Rewrite the given data in ascending order

20, 33, 39, 40, 50, 53, 59, 65, 69

Here, n = 9[odd]

$\therefore$ Median $= \left(\frac{9+1}{2}\right)$ term $= 5^{th}$ term

Mean = 50

x_i	$d_i = \lvert x_i - Me\rvert$
20	30
33	17
39	11
40	10
50	0
53	3
59	9
65	15
69	19
N = 2	$\sum d_i = 114$

$\therefore$ M.D. $= \frac{114}{9} = 12.67.$

65. (a): Given, data are 6, 5, 9, 13, 12, 8, and 10.

x_i	x_i^2
6	36
5	25
9	81
13	169
12	144
8	64
10	100
$\sum x_i = 63$	$\sum x_i^2 = 619$

$\therefore$ S.D. $= \sigma = \sqrt{\frac{\sum x_i^2}{N} - \left(\frac{\sum x_i}{N}\right)^2} = \sqrt{\frac{619}{7} - \left(\frac{63}{7}\right)^2}$

$\Rightarrow \sqrt{\frac{7\times619-3969}{49}}$

$\Rightarrow \sqrt{\frac{4333-3969}{49}}$

$\Rightarrow \sqrt{\frac{364}{49}} = \sqrt{\frac{52}{7}}$.

66. (c): S.D. is given by

$\sigma = \sqrt{\frac{\Sigma(x_i-\bar{x})^2}{n}}$.

67. (c): $\bar{x} = 50, n = 100$ and $\sigma = 5$

$\sum x_i^2 = ?$

$\because \bar{x} = \frac{\sum x_i}{n}$

$\Rightarrow 50 = \frac{\sum x_i}{100}$

$\therefore \sum x_i = 50 \times 100 = 5000$

Now, $\sigma = \sqrt{\frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2} \Rightarrow \sigma^2 = \frac{\sum x_i^2}{n} - (\bar{x})^2$

$\Rightarrow 25 = \frac{\sum x_i^2}{100} - (50)^2 \Rightarrow 25 = \frac{\sum x_i^2}{100} - 2500$

$\Rightarrow 2525 = \frac{\sum x_i^2}{100}$

$\therefore \sum x_i^2 = 252500.$

68. (a): Given observations are a, b, c, d and e.

Mean $= m = \frac{a+b+c+d+e}{5}$

$\sum x_i = a + b + c + d + e = 5m$

Now, mean $= \frac{a+k+b+k+c+k+d+k+e+k}{5}$

$\Rightarrow \frac{(a+b+c+d+e)+5k}{5} = m + k$

$\therefore$ S.D. $= \sqrt{\frac{\Sigma(x_i+k)^2}{n} - (m+k)^2}$

$\Rightarrow \sqrt{\frac{\Sigma(x_i^2+k^2+2k\,x_i)}{n} - (m^2 + k^2 + 2mk)}$

$\Rightarrow \sqrt{\frac{\sum x_i^2}{n} - m^2 + \frac{2k\sum x_i}{n} - 2mk}$

$\Rightarrow \sqrt{\frac{\sum x_i^2}{n} - m^2 + 2mk - 2mk}$ $\left[\because \frac{\sum x_i}{n} = m\right]$

$\Rightarrow \sqrt{\frac{\sum x_i^2}{n} - m^2} \Rightarrow$ s.

69. (c): Here, $= \frac{\sum x_i}{5}, s = \sqrt{\frac{\sum x_i^2}{5} - \left(\frac{\sum x_i}{5}\right)^2}$

$\therefore$ S.D. $= \sqrt{\frac{k^2\sum x_i^2}{5} - \left(\frac{k\sum x_i}{5}\right)^2}$

$\Rightarrow \sqrt{\frac{k^2\sum x_i^2}{5} - k^2\left(\frac{\sum x_i}{5}\right)^2} = \sqrt{\left(\frac{\sum x_i^2}{5}\right) - \left(\frac{\sum x_i}{5}\right)^2} = ks$

70. (a): $w_i = x_i + k, \overline{x_i} = 48, sx_i = 12, w_i = 55$ and $sw_i = 15$

Then , $\overline{w_i} = \overline{x_i} + k$

[where , $\overline{w_i}$ is mean w_i's and $\overline{x_i}$ is mean of x_i's]

$\Rightarrow 55 = 48 + k$ .....(i)

Now, S. D. of w_i = S. D. of x_i

$\Rightarrow 15 = 12$

$\Rightarrow l = \frac{15}{12}$

$= 1.25$ ...... (ii)

From Eqs. (i) and (ii),

$\Rightarrow k = 55 - 1.25 \times 48$

$= -5.$

71. (d): We know that, S.D. of first n natural number

$= \sqrt{\frac{n^2-1}{12}}$

$\therefore$ S. D. of first 10 natural numbers $= \sqrt{\frac{(10)^2-1}{12}}$

$= \sqrt{\frac{100-1}{12}} = \sqrt{\frac{99}{12}} = \sqrt{8.25} = 2.87.$

72. (d): Given numbers are 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10. If 1 is added to each number, then observations will be 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11

$\therefore \sum x_i = 2 + 3 + 4 + \cdots + 11$

$= \frac{10}{2}[2 \times 2 + 9 \times 1] = 5[4 + 9] = 65$

And $\sum x_i^2 = 2^2 + 3^2 + 4^2 + 5^2 + \cdots + 11^2$

$= (1^2 + 2^2 + 3^3 + \cdots + 11^2) - (1^2)$

$= \frac{11\times12\times23-6}{6} = 505$

$\therefore s^2 = \frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2 = \frac{505}{10} - \left(\frac{65}{10}\right)^2$

$\Rightarrow 50.5 - (6.5)^2$

$= 50.5 - 42.25$

$= 8.25.$

73. (a): Since, the first 10 positive integers are 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10.

On multiplying each number by –1 we get

–1, –2, –3, –4, –5, –6, –7, –8, –9, –10.

On adding 1 in each number, we get

0, –1, –2, –3, –4, –5, –6, –7, –8, –9

$\therefore \sum x_i = 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9$

$= -\frac{9\times10}{2}$

$= -45$

And $\sum x_i^2 = 0^2 + (-1)^2 + (-2)^2 + \cdots + (-9)^2$

$= \frac{9\times10\times19}{6}$

$= 285$

$\text{S. D.} = \sqrt{\frac{285}{10} - \left(\frac{-45}{10}\right)^2} = \sqrt{\frac{285}{10} - \frac{2025}{100}}$

Now, variance $= (\text{S. D.})^2 = \left(\sqrt{8.25}\right)^2 = 8.25.$

74. (d): Variance $= \frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2$

$= \frac{18000}{60} - \left(\frac{960}{60}\right)^2 = 300 - 256 = 44.$

75. (a): Here, $CV_1 50, CV_2 = 60, \overline{x_1} = 30$ and $\overline{x_2} = 25$

$\therefore CV_1 = \frac{\sigma_1}{\overline{x_1}} \times 100 \Rightarrow 50 = \frac{\sigma_1}{30} \times 100$

$\therefore \sigma_1 = \frac{30 \times 50}{100} = 15$ and $CV_2 = \frac{\sigma_1}{\overline{x_1}} \times 100$

$\Rightarrow 60 = \frac{\sigma_2}{25} \times 100$

$\therefore \sigma_2 = \frac{60 \times 25}{100} = 15$

Now, $\sigma_1 - \sigma_2 = 15 - 15 = 0.$

76. (a): $\sigma_c = 5 \Rightarrow \frac{5}{9}(F - 32) = C$

$F = \frac{9C}{5} + 32$

$\sigma_F = \frac{9}{5}\sigma_C = \frac{9}{5} \times 5 = 9$

Here,

$\sigma_F^2 = (9)^2 = 81.$

77. (d): Average production of sugar in years 1998, 1999, 2000 and 2001 $= \frac{15+50+30+35}{4}$

= 32.5 thousand metric tonnes

And average production of sugar in years 2001, 2002, 2003, and 2004 $= \frac{35+65+75+70}{4}$

= 61.25 thousand metric tonnes

∴ Required difference = 61.25 – 32.5 = 28.75 thousand metric tonnes

78. (a): In 1999, % increase in production from the previous year $= \frac{50-15}{15} \times 100\% = 233.33\%$

In 2001, % increase in production from the previous year $= \frac{35-30}{30} \times 100\% = 16.66\%$

In 2003, % increase in production from the previous year $\frac{75-65}{65} \times 100\% = 15.38\%$

∴ In the remaining three was decrease.

79. (d): In 1998 the value of sugar per thousand Metric tonne $= \frac{27.5}{15} = Rs. 1.833$ lakh

In 1999 the value of sugar per thousand Metric tonne $= \frac{80}{50} = Rs. 1.600$ lakh

In 2000 the value of sugar per thousand Metric tonne $= \frac{50}{30} = Rs. 1.666$ lakh

In 2001 the value of sugar per thousand Metric tonne $= \frac{57.5}{35} = Rs. 1.642$ lakh

In 2002 the value of sugar per thousand Metric tonne $= \frac{102.5}{65} = Rs. 1.575$ lakh

In 2003 the value of sugar per thousand Metric tonne $= \frac{117.5}{75} = Rs. 1.571$ lakh

∴ It is the highest in the year = 1998.

80. (d): In 1998 the value of sugar per thousand Metric tonne $= \frac{27.5}{15} = Rs. 1.833$ lakh

In 1999 the value of sugar per thousand Metric tonne $= \frac{80}{50} = Rs. 1.600$ lakh

In 2000 the value of sugar per thousand Metric tonne $= \frac{50}{30} = Rs. 1.666$ lakh

In 2001 the value of sugar per thousand Metric tonne $= \frac{57.5}{35} = Rs. 1.642$ lakh

In 2002 the value of sugar per thousand Metric tonne $= \frac{102.5}{65} = Rs. 1.575$ lakh

In 2003 the value of sugar per thousand Metric tonne $= \frac{117.5}{75} = Rs. 1.571$ lakh

It is the lowest in the year 2003.

81. (a): Total production $= (15 + 50 + 30 + 35 + 65 + 75 + 70)$ thousand metric tonnes

25% of the total production $= \frac{25}{100} \times 340 = 85$ thousand metric tonnes

And the production of the year 1998 and 2004 = (15 + 70) = 85 thousand metric tonnes

82. (a): The frequency 25 corresponds to the class mark 800.

The common width of class intervals= 400 – 200 = 200

Therefore, Class interval$= \left\{\left(800 - \frac{200}{2}\right) - \left(800 + \frac{200}{2}\right)\right\} = (700 - 900)$

83. (b): The number of labourers has to fall in the class interval 500 – 700 whose class mark is 600. The frequency corresponding to the class mark 600 is 20.

Hence, the required number of labourers is 20.

84. (c): The largest number of labourers belong to the class interval whose class mark is 400.

The corresponding class interval is $\left(400 - \frac{200}{2}\right) - \left(400 + \frac{200}{2}\right)$, i.e. (300 – 500).

So, the largest numbers of labourers have a weekly income of at least \$ 300 but less than \$ 500.

85. (a): Frequency of the class interval whose class mark is 15 is 18.

86. (b): A frequency polygon is obtained by connecting the mid-points of the tops of the rectangles in a histogram. Therefore, Statement b is correct.

87. (b): Frequency of the class interval 15 – 20 is 25.

88. (b): Class interval having the greatest frequency (30) is 20 – 25.

89. (b):

Class Interval	Frequency	Cumulative Frequency
10 - 15	20	20
15 - 20	25	45
20 - 25	30	75
25 - 30	15	90
30 - 35	10	100
35 - 40	5	105

Cumulative frequency of the class interval 20 – 25 is 75.

90. (c):

Class Interval	Frequency	Cumulative Frequency
10 - 15	20	20
15 - 20	25	45
20 - 25	30	75
25 - 30	15	90
30 - 35	10	100
35 - 40	5	105

Cumulative frequency of the class interval 25 – 30 is 90.

91. (d):

Class Interval	Frequency	Cumulative Frequency
10 - 15	20	20
15 - 20	25	45
20 - 25	30	75
25 - 30	15	90
30 - 35	10	100
35 - 40	5	105

Cumulative frequency of the class interval 30 – 35 is 100.

92. (a): The class interval 10 – 20 has the greatest frequency as the rectangle corresponding to the interval has the greatest area, the height being the greatest.

93. (c): The class interval 30 – 40 has the least frequency as the rectangle corresponding to the interval has the least area, the height being the least.

94. (d): The class intervals $(20 - 30)$ and $(40 - 50)$ has the frequency of 40.

95. (b): The class intervals $(30 - 40)$ has the frequency of 30.

96. (c): $50 + 40 + 30 = 120$