

2. Measures of central tendency

$$1. \quad 4 + 6 + 10 + 14 + x + 24 + 14 + 6 = 100$$

$$78 + x = 100$$

(i) $x = 22$

(ii) Modal class = 55 - 59

Marks	x	f	fx	$c.f$
30-34	32	4	128	4
35-39	37	6	222	10
40-44	42	10	420	20
45-49	47	14	659	34
50-54	52	22	1144	56
55-59	57	24	1368	80
60-64	62	14	868	94
65-69	67	6	462	100
B_1		$\Sigma f = 100$ B_1	$\Sigma fx = 5210$	B_1

$$\Sigma fx = 5210$$

(i) Mean = $\frac{5210}{100}$
= 52.10

(ii) Median = $49.5 + \left(\frac{50-34}{22}\right) \times 5$
= 53.14

2. $\log_{10} 5^2 - \log_{10} 2^3 + \log 2^5$

$$\log_{10} \left(\frac{4}{25 \times 32} \right)$$

$$1 \left(\frac{2}{8} \right)$$

$$\log_{10} 100 = \log_{10} 10^2$$

$$= 2 \log_{10} 10$$

$$\text{But } \log_{10} 10 = 1$$

$$\therefore = 2$$

✓ Application of logarithmic laws.

✓ Application

C.A.O

3. Modal class 150-154

Height	Frequency	$c.f$
140- 144	3	3
145 - 149	15	18
150 - 154	19	37
155 - 159	11	48
160 -164	2	50

$$\text{Height } \text{Frequency } c.f$$

$$= 149.5 + \frac{(25-18) \times 5}{19}$$

$$= 149.5 + \frac{7 \times 5}{19}$$

$$= 149.5 + 1.842$$

$$= 15.34$$

4.

<i>H</i>	20-24	25-29	30-34	35-39	40-44	45-49
<i>F</i>	3	19	25	20	18	15
<i>CF</i>	3	22	47	67	85	100

$$Md = 34.5 + \frac{(50 - 47) \times 4}{20}$$

$$= 34.5 + \frac{12}{20} = 35.1$$

5. a) $2x^2 + 6x - 2x = 0$
 $32 - 24 - 2x = 0$
 $-2x = -8$
 $x = 4$

b) $2x^2 + 6x - 8 = 0$
 $x^2 + 3x - 4 = 0$
 $x^2 + 4x - x - 4 = 0$
 $x(x + 4) - (x - 4) = 0$
 $(x - 1)(x + 4) = 0$
 \therefore the other root is 1

6. $\Sigma xf = 61 \times 10 + 65.5 \times 20 + 71 \times 40 + 77 \times 15$
 $= 610 + 1310 + 2840 + 1155$
 $= 5915$

$$\frac{\Sigma xf}{\Sigma f} = \frac{5915}{85}$$

$$\Sigma f = 85$$

$$X \text{ Mean} = 69.59$$

7.

<i>Marks</i>	30-39	40-49	50-59	60-69	70-79	80-89	90-99
<i>No. of candidates</i>	2	3	10	12	8	3	2
<i>C.F</i>	2	5	15	27	35	38	40

a) Number who sat = 40

b) The modal class = 60 - 69

c)

<i>Marks</i>	<i>x</i>	<i>f</i>	$X - 64.5 = d$	<i>fd</i>
30-39	34.5	2	-30	-60
40-49	44.5	3	-20	-60
50-59	54.5	10	-10	-100
60-69	64.5	12	0	0
70-79	74.5	8	10	80
80-89	84.5	3	20	60
90-99	94.5	2	30	60
		$\Sigma f = 40$		$\Sigma fd = -20$

$$\text{Mean} = 64.5 + \frac{-20}{40}$$

$$= 64.0$$

d) The median mark

$$= \frac{1}{2} (20^{\text{th}} \text{ and } 21^{\text{st}}) \text{ marks}$$

$$= \frac{1}{2} \left(59.5 + \frac{5 \times 10}{12} + 59.5 + \frac{6 \times 10}{12} \right)$$

$$= \frac{1}{2} (59.5 + 4.16666 + 59.5 + 5)$$

$$= \frac{1}{2} (128.1666667) = 64.083$$

8. 1, 1, 2, 2, 3, 4, 4, 6

a) Mode = 4

b) Median = 3

c) Mean = $\frac{1 \times 2 + 2 \times 2 + 3 \times 1 + 4 \times 3 + 6 \times 1}{9}$
 $= 3$

9. a) i) Modal class = 60 - 69

ii) class where medium lies
 median class 50- 59

Class	Centre X	Fd	D= x - A
0 - 9	4.5	-50	-50
10 - 19	14.5	-80	-40
20 - 29	24.5	-120	-30
30 - 39	34.5	-140	-20
40 - 49	44.5	-100	-10
50 - 59	54.5	0	0
60 - 69	64.5	200	10
70 - 79	74.5	120	20
80 - 89	84.5	90	30
90 - 99	94.5	40	40
		Σfd -40	

$$\text{Mean} = \frac{54.5 - 40}{70}$$

$$= 53.93$$

10. Cumulative frequency

3, 11, 30, 44, 50

$$\text{Median} = \text{Llt} \left(\frac{n/2 - cfa}{Fn} \right)$$

$$= 8 + \frac{(25 - 11) \times 4}{19}$$

$$= 10.947$$

11.

