

## SELF ASSESSMENT TEST SOLUTIONS

1.  $\frac{29.5 + 30.5}{2} = 30$

2.  $30 - 40$

3. 13<sup>th</sup> observation.

4. mode = 3 median - 2 mean

3 median = mode + 2 mean = 80 + 220

$\therefore$  median =  $\frac{300}{3} = 100$

5.

$x_i$ (Class marks)	$f_i$	$f_i x_i$
25	5	125
35	6	210
45	10	450
55	5	275
65	3	195
75	1	75
	30	1330

$$\bar{x} = \frac{\sum x_i f_i}{\sum f_i} = \frac{1330}{30} = 44.33$$

6.

$x_i$ (class marks)	$f_i$	$u_i = \frac{x_i - a}{h}$	$f_i u_i$
45	10	-2	-20
55	25	-1	-25
65 $\rightarrow$ a	28	0	0
75	P	1	P
85	10	2	20
95	15	3	45
	88 + P		20 + P

$$a = 65, h = 10, \bar{x} = 68.2, \bar{u} = \frac{\sum f_i u_i}{\sum f_i}$$

$$\bar{x} = a + h \cdot \bar{u}$$

$$68.2 = 65 + 10 \times \frac{20 + P}{88 + P}$$

$$3.2 = 10 \times \frac{20 + P}{88 + P}$$

### SELF ASSESSMENT TEST SOLUTIONS

$$\frac{3.2}{10} = \frac{20 + P}{88 + P} \Rightarrow \frac{32}{100} = \frac{20 + P}{88 + P}$$

$$\Rightarrow 88 \times 32 + 32p = 2000 + 100p$$

$$68p = 816$$

$$\therefore p = \frac{816}{68} = 12$$

7. Modal class = 50 - 60

$$l = 50, f_0 = 15, f_1 = 25, f_2 = 15, h = 10$$

$$\text{Mode} = l + \left( \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) h$$

$$= 50 + \left( \frac{25 - 15}{50 - 15 - 15} \right) 10 = 50 + \frac{10}{20} \times 10 = 55$$

8. Modal class is 45 - 55

$$l = 45, f_0 = 31, f_1 = 33, f_2 = 17, h = 10$$

$$\text{Mode} = l + \left( \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) h$$

$$= 45 + \left( \frac{33 - 31}{66 - 31 - 17} \right) 10 = 45 + \left( \frac{2}{18} \right) 10$$

$$= 45 + 1.11 = 46.11$$

9.

C.I.	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
f	3	2	6	15	8	7	5	4
C.f	3	5	11	26	34	41	46	50

$$\frac{N}{2} = \frac{50}{2} = 25$$

Median class = 50 - 60,  $f = 15$ ,  $cf = 11$ ,  $h = 10$

$$\text{Median} = \left( \frac{\frac{N}{2} - cf}{f} \right) h = \left( \frac{25 - 11}{15} \right) 10 = \frac{140}{15} = 9.33$$

Maximum frequency = 15

$\Rightarrow$  Modal class = 50 - 60

$$l = 50, f_0 = 6, f_1 = 15, f_2 = 8$$

$$\text{Mode} = l + \left( \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) h$$

**SELF ASSESSMENT TEST SOLUTIONS**

$$= 50 + \left( \frac{15 - 6}{30 - 6 - 8} \right) + 10 = 50 + \frac{90}{16}$$

$$= 50 + 5.625 = 55.625$$

10.

Class	$f$	$cf$
2500 - 3500	5	5
3500 - 4500	$x$	$5 + x$
4500 - 5500	$y$	$5 + x + y$
5500 - 6500	12	$17 + x + y$
6500 - 7500	6	$23 + x + y$
7500 - 8500	2	$25 + x + y$
	$\sum f_i = 60$	

Given,  $25 + x + y = 60$

i.e.,  $x + y = 35$

i.e.,  $y = 35 - x \rightarrow (1)$

$N = 60, \frac{N}{2} = 30$

since median = 5000, median class = 4500 - 5500

$f = y, cf = 5 + x$

$$\text{median} = l + \left( \frac{\frac{N}{2} - cf}{f} \right) h$$

$$5000 = 4500 + \left( \frac{30 - (5 + x)}{y} \right) 1000$$

$$500 = \left( \frac{25 - x}{y} \right) 1000$$

$$500y = 25000 - 1000x$$

$$500(35 - x) = 25000 - 1000x \quad [\text{from (1)}]$$

$$17500 - 500x = 25000 - 1000x$$

$$500x = 7500$$

$$\therefore x = 15$$

$$(1) \Rightarrow y = 20$$