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# SOLUTIONS: STATISTICS

Mathematics | Class IX (2026/STATIS/09/003)

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## Section A: Multiple Choice Questions

1. **Answer: (a) 47 and 37**

**Solution:** Let lower limit be  $l$  and upper limit be  $u$ .

$$\text{Class mark} = \frac{l+u}{2} = 42 \implies l + u = 84.$$

$$\text{Class size} = u - l = 10.$$

$$\text{Solving these equations: } 2u = 94 \implies u = 47; l = 47 - 10 = 37.$$

2. **Answer: (b)  $5\bar{x}$**

**Solution:** If every observation  $x_i$  is multiplied by a constant  $k$ , the new mean is  $k\bar{x}$ . Here  $k = 5$ .

3. **Answer: (c) 35**

**Solution:** Five continuous classes of size 5: 10–15, 15–20, 20–25, 25–30, 30–35. The upper limit of the highest class is 35.

4. **Answer: (b) 13**

**Solution:** Cumulative frequency of 10–20 = Freq(0–10) + Freq(10–20) = 5 + 8 = 13.

5. **Answer: (c) 18**

**Solution:** New mean = Old Mean – 2 = 20 – 2 = 18.

6. **Answer: (c) Difference between two consecutive limits**

**Solution:**  $d$  represents the gap between the upper limit of one class and the lower limit of the next (usually  $d = 1$  in discrete data).

7. **Answer: (a) 21**

**Solution:** Multiples are 7, 14, 21, 28, 35. Mean =  $\frac{7+14+21+28+35}{5} = \frac{105}{5} = 21$ .

8. **Answer: (c) Range**

**Solution:** Range is defined as the difference between the highest and lowest observations.

## Section B: Very Short Answer Questions

1. **Solution:** Sum of 5 obs =  $5 \times 15 = 75$ .

Sum of first 3 obs =  $3 \times 14 = 42$ . Sum of last 3 obs =  $3 \times 17 = 51$ .

Third observation = (Sum of first 3 + Sum of last 3) – Total Sum =  $(42 + 51) - 75 = 18$ .

2. **Solution:**  $d = 20 - 19 = 1$ . Adjustment factor =  $d/2 = 0.5$ .

New intervals: 9.5–19.5, 19.5–29.5, 29.5–39.5, 39.5–49.5.

3. **Solution:** Class mark =  $\frac{\text{Lower Limit} + \text{Upper Limit}}{2}$ .

$$\text{(i) } \frac{15.5+20.5}{2} = \frac{36}{2} = 18. \quad \text{(ii) } \frac{100+150}{2} = \frac{250}{2} = 125.$$

4. **Solution:**  $\sum x_i - 5n = 20$  (Eq 1) and  $\sum x_i - 8n = -10$  (Eq 2).

Subtracting Eq 2 from Eq 1:  $3n = 30 \implies n = 10$ .

From Eq 1:  $\sum x_i - 5(10) = 20 \implies \sum x_i = 70$ . Mean  $\bar{x} = \frac{70}{10} = 7$ .

## Section C: Short Answer Questions

1. **Solution:**

Height ( $x$ )	140	145	148	150	152
Frequency ( $f$ )	4	4	3	3	1

$$\text{Mean} = \frac{(140 \times 4) + (145 \times 4) + (148 \times 3) + (150 \times 3) + (152 \times 1)}{15} = \frac{560 + 580 + 444 + 450 + 152}{15} = \frac{2186}{15} \approx 145.73 \text{ cm.}$$

2. **Solution:** (Refer to the graph provided in the question paper).

The bars represent the frequency (Seats Won) for each category (Political Party).

3. **Solution:** Mean =  $\frac{\sum fx}{\sum f} = 20.2 \implies \frac{(10 \times 6) + (15 \times 8) + (20 \times p) + (25 \times 10) + (30 \times 6)}{6 + 8 + p + 10 + 6} = 20.2$ .

$$\frac{60 + 120 + 20p + 250 + 180}{30 + p} = 20.2 \implies 610 + 20p = 20.2(30 + p).$$
$$610 + 20p = 606 + 20.2p \implies 4 = 0.2p \implies p = 20.$$

## Section D: Long Answer Questions

1. **Solution:** The histogram is drawn by taking Marks on the X-axis and Frequency on the Y-axis. Since class widths are uniform (10), heights are proportional to frequency.

2. **Solution:**  $A = 40$ .

$x_i$	25	30	35	40	45	50	Total
$f_i$	4	8	12	10	9	7	50
$d_i$	-15	-10	-5	0	5	10	-
$f_i d_i$	-60	-80	-60	0	45	70	-85

$$\text{Mean } \bar{x} = 40 + \frac{-85}{50} = 40 - 1.7 = 38.3 \text{ years.}$$

## Case Study Solutions

1. **Answer:** (B) 20 – 30 kg (Frequency is 30, highest in the chart).
2. **Answer:** (B) 25 kg (Class mark of the 20–30 interval is 25).
3. **Answer:** (C) 40 ( $15 + 25 = 40$ ).
4. **Answer:** (B) 20 – 30 kg (In exclusive form, lower limit is inclusive, upper is exclusive).
5. **Answer:** (C) The mean will increase (85.5 kg is significantly higher than the current mean).