

REV-DISP-2324-ASM-SET 1-MATH**Suggested solutions****Multiple Choice Questions**

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. D | 2. B | 3. C | 4. A | 5. D |
| 6. C | 7. A | 8. A | 9. D | 10. C |
| 11. C | 12. A | 13. C | 14. D | 15. C |
| 16. B | 17. B | 18. D | | |

1. ☐ D

- A. ✗. Mode = 3
- B. ✗. Median = 3
- C. ✗. Lower quartile = 2.5
- D. ✓.

2. ☐ B

- I. ✗. m could be 4.
- II. ✓.
- III. ✗. Maximum value of $x = 6.9 - 3.0 = 3.9 < 34$.

3. ☐ C

$$\text{Range} = (40 + k) - (20 + h) \geq 24$$

$$k - h \geq 4$$

- I. ✗. It is possible that $h = 3$ and $k = 9$ such that $\text{range} = 26 \geq 24$.
- II. ✓. $k \geq 4 + h \geq 4 + 0 = 4$ and $k \leq 9$ obviously.
- III. ✓. $k - h \geq 4$ as proved above. Also, $k - h \leq 9 - 0 = 9$

4. ☐ A

$$\text{By simple calculation, } a = x + 0.875, b = x + 0.5, c = x, d = 4$$

- I. ✓. $a - c = 0.875 > 0$
- II. ✗. $b - d = x - 3.5$, which can be positive or negative.
- III. ✗. $d - c = 4 - x$, which can be positive or negative.

5. ☐ D

No steps involved.

6. C

Median = 90

Range = $100 - 40 = 60$

Inter-quartile range = $100 - 60 = 40$

7. A

I. ✓.

II. ✓. Interquartile range = $26 - 20 = 6^\circ\text{C}$

III. ✗. Range = $30 - 16 = 14^\circ\text{C}$

8. A

I. ✗. Mean is not obtainable through box-and-whisker diagram.

II. ✓.

III. ✗. Range = $90 - 45 = 45\text{ kg}$

9. D

I. ✓.

II. ✓.

III. ✓.

10. C

I. ✓. Upper quartile of Class A > maximum of Class B.

II. ✓.

III. ✗.

11. C

A. ✓. Range = $21 - 16 = 5$

B. ✓. I.Q.R. = $20 - 18 = 2$

C. ✗. Percentage of members aged under 18 $\approx 25\%$.

D. ✓ or ✗.

✗: total number of people is not a multiple of 4

Then the percentage can never be 25% .

✓: total 8 people with ages 16, 18, 18, 19, 19, 19, 21, 21

This example matches all info given in the question.

12. ☐ A

I. ✓.

II. ✓.

III. ✗. Number of data cannot be obtained in box-and-whisker diagrams. It could happen that the total number of boys is 9 999 999 999 while there are only 5 girls.

13. ☐ C

The data is concentrated near larger weights.

The maximum, upper quartile and median should appear closed to each other.

The answer is C.

14. ☐ D

In the cumulative frequency curve, steeper \Rightarrow more data in the corresponding class.

So, the data is more concentrated in the lower part.

Minimum, lower quartile, median and upper quartile will be closed to each other.

15. ☐ C

I. ✓.

II. ✓.

III. ✗.

16. ☐ B

Simple calculator work.

17. ☐ B

Calculator work.

18. ☐ D

Scores of students in class Y are higher and less dispersed.

So, I is incorrect while the others are correct.

Conventional Questions

19. Median = 1 1A
 Mode = 1 1A
 Standard deviation ≈ 0.886 1A
20. (a) $57 = \frac{41 + 47 + \dots + (70 + a)}{12}$ 1M
 $a = 5$ 1A
 (b) Range = $75 - 41 = 34$ kg 1A
 Interquartile range = $66 - 49.5 = 16.5$ kg 1A
 Standard deviation ≈ 10.7 kg 1A
21. (a) (i) $\frac{(20 + b) + 30}{2} = 29$
 $b = 8$ 1A
 $43 - (10 + a) = 27$
 $a = 6$ 1A
 (ii) Mean = $\frac{16 + 17 + 18 + \dots + 43}{20}$
 $= 28.8$ 1A
- (b) (i) Sum of ages of the new member = $16 + 43 = 59$ 1M
 If the ages of them are 29 and 30, the new median is 29.5.
 It is possible that the median of the distribution is changed. 1A
- (ii) As the mode has two values in the new distribution, there are only three cases of the ages of the new members: (18, 41), (21, 38) and (25, 34)
 In any of the case, new range = $42 - 17 = 25 \neq 27$ 1M
 It is impossible to keep the range unchanged. 1A

22. (a) (i) Mode = 39
 Thus, $a = b = 9$. 1A
- (ii) $\frac{(50 + c) + 51}{2} - \frac{(30 + d) + 30}{2} = 21$ 1M
- $$c - d = 1$$
- Range = $(60 + d) - (20 + c)$
 $= 40 - (c - d)$
 $= 39$ 1A
- (b) Mean = $\frac{(20 + c) + 25 + 26 + \dots + (60 + d)}{20}$ 1M
- $$= \frac{830 + 2(c + d)}{20}$$
- Since $c - d = 1$, $1 \leq c \leq 5$ and $2 \leq d \leq 5$, we have $3 \leq c + d \leq 9$. 1M
- $$\frac{830 + 2(3)}{20} = 41.8 \leq \text{mean} \leq \frac{830 + 2(9)}{20} = 42.4$$
- Thus, mean = 42 and $c + d = 5$. 1A
- Solving, we have $c = 3$ and $d = 2$.
- Standard deviation ≈ 11.9 1A
23. (a) Maximum possible mark = $47 + 26 - 1 = 72$ 1A
- Minimum possible mark = 49 1A
- Remark:**
 Newton's score is lower than the upper quartile.
- (b) It is possible that more than one student scores 89 marks. 1A
- In such cases, deleting Clara's mark will not change the maximum mark and hence the range.
 The claim is disagreed. 1A