F.5 Mathematics

MC Exercise

5B10 Measures of Dispersion I

1. Find the range for the following set of data.

11, 12, 14, 16, 18, 19, 27

A. –16
B. –7
C. 7
D. 16

2. Find the range for the following set of data.

–54, –39, –21, –10, 7, 18, 43

A. 11
B. 21
C. 57
D. 97

3. Find the range for the following set of data.

6, 8, 7, 3, 100, 15, 33

A. 27
B. 94
C. 97
D. 100

4. Find the range for the following set of data.

12, –14, 17, –18, –5, 23, 9

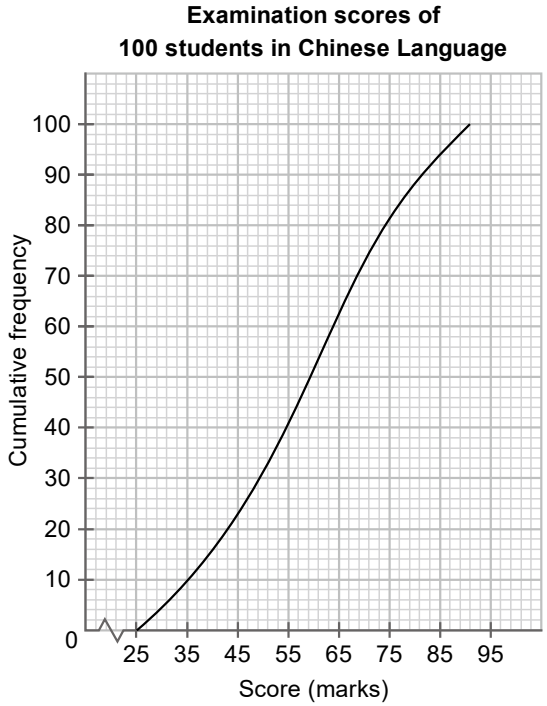
A. 3
B. 26
C. 37
D. 41

5. Find the range for the following grouped data.

Volume (cm^3)	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59
Frequency	3	2	4	8	1

A. 50 cm^3
B. 49 cm^3
C. 31 cm^3
D. 30 cm^3

6. The cumulative frequency curve shows the examination scores of 100 students in Chinese Language. Find the range of the scores.



A. 25 marks
B. 66 marks
C. 91 marks
D. 100 marks

7. Find the inter-quartile range for the following set of data.

12, 15, 17, 18, 18, 20, 26, 29

A. 5
B. 7
C. 9
D. 11

8. Find the inter-quartile range for the following set of data.

4, 5, 3, 2, 8, 2, 6, 7, 8

A. 2.5
B. 4
C. 5
D. 6

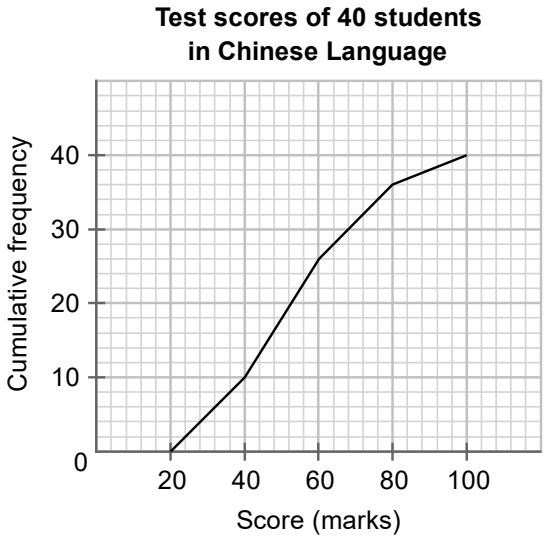
9. The following table shows the numbers of stamps used daily in an office in a month.

Number of stamps used	10	11	12	13	14	15
Frequency	5	3	6	7	4	5

Find the inter-quartile range of the numbers of stamps used daily in the office.

A. 2
B. 3
C. 4
D. 5

10. The cumulative frequency polygon shows the test scores of 40 students in Chinese Language. Find the inter-quartile range of the scores.



A. 20 marks
B. 26 marks
C. 28 marks
D. 80 marks

11. The stem-and-leaf diagram shows the lengths (in cm) of the pencil cases, where x is a non-negative integer less than 10. If the inter-quartile range of the lengths of the pencil cases is 13 cm, find the difference between the upper quartile and the median.

Stem (tens)	Leaf (units)
1	8 8 9
2	0 2 4 4 4 6 8 8
3	1 2 x 8 8 8 9

A. 5 cm
B. 7 cm
C. 8 cm
D. 9 cm

12. If the median of the data 19, 24, 31, 16, 33, 29, x, 23 is 25, find the inter-quartile range.

A. 9
B. 12
C. 17
D. 26

13. $\{x-2,\ x-1,\ x,\ x+2,\ x+2,\ x+3\}$ and $\{x-5,\ x-4,\ x-2,\ x-2,\ x-1,\ x\}$ are two sets of data.

Which of the following are true?

I. The two sets of data have the same range.

II. The two sets of data have the same median.

III. The two sets of data have the same inter-quartile range.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

14. Which of the following can be obtained from a box-and-whisker diagram?

I. Median

II. Mode

III. Range

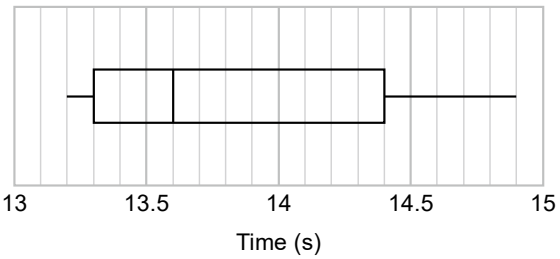
A. I and II only

B. I and III only

C. II and III only

D. I, II and III

15. The box-and-whisker diagram shows the times taken by a group of students to finish a 100 m race.



Find the inter-quartile range of the times taken by the group of students.

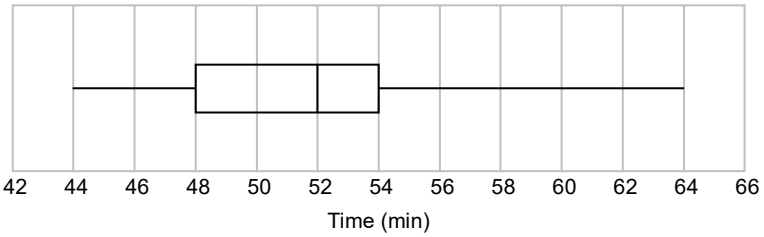
A. 1.1 s

B. 1.2 s

C. 1.6 s

D. 1.7 s

16. The box-and-whisker diagram shows the times taken by a group of students to finish writing a computer program.



In this diagram, 75% of the students have taken

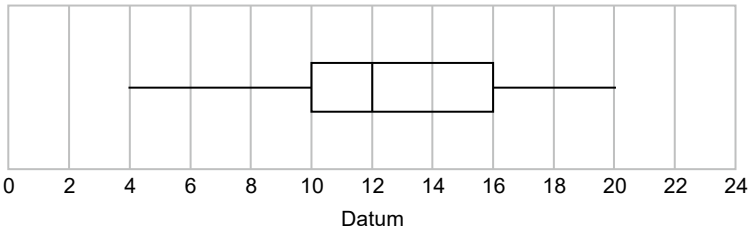
A. at least 52 min.

B. less than 54 min.

C. at least 44 min but less than 48 min.

D. at least 48 min but less than 54 min.

17. The box-and-whisker diagram shows the distribution of 200 data.



How many data are less than 10?

A. 25

B. 50

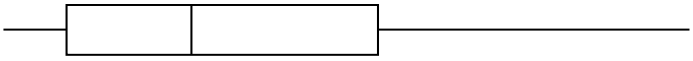
C. 75

D. 150

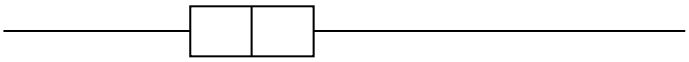
18. Consider a set of data 10, 16, 13, 7, 5, 9, 10, 12, 13.

Which of the following box-and-whisker diagrams may represent the set of data?

A.



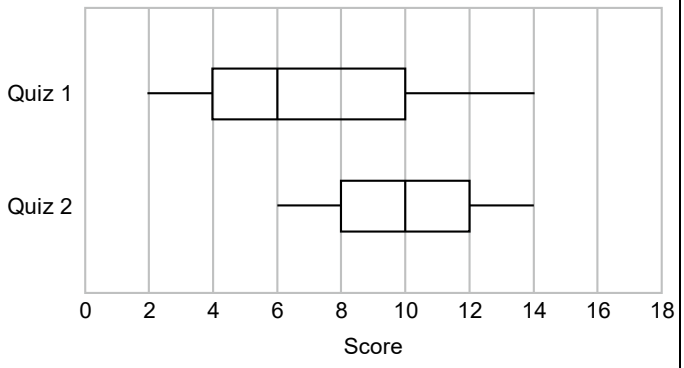
B.



C.

D.

19. The box-and-whisker diagrams show the scores of a class of students in two Mathematics quizzes.



Which of the following must be true?

I. Range of the scores in quiz 1 < Range of the scores in quiz 2

II. Median of the scores in quiz 1 < Median of the scores in quiz 2

III. Inter-quartile range of the scores in quiz 1 < Inter-quartile range of the scores in quiz 2

A. II only
B. III only
C. I and II only
D. II and III only

20. Consider the following box-and-whisker diagram.

Which of the following must be true?

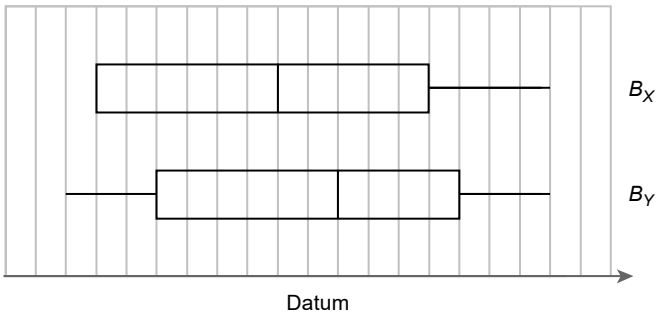
I. Range $= g - a$

II. Mean $= d$

III. Inter-quartile range $= e - c$

A. III only
B. I and II only
C. II and III only
D. I, II and III

21. In the figure, B_X and B_Y are the box-and-whisker diagrams for distributions X and Y respectively. Let m_1, r_1 and q_1 be the median, range and inter-quartile range of distribution X respectively, while m_2, r_2 and q_2 be the median, range and inter-quartile range of distribution Y respectively.



Which of the following must be true?

I. $m_1 < m_2$

II. $r_1 < r_2$

III. $q_1 > q_2$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

22. Which of the following must be correct?

I. For a set of ungrouped data, range = maximum value − minimum value

II. Inter-quartile range = Third quartile − Second quartile

III. Standard deviation is a measure of central tendency.

A. I only

B. I and II only

C. II and III only

D. I, II and III

23. Which of the following can be negative?

A. Range

B. Inter-quartile range

C. Standard deviation

D. Median

24. Find the standard deviation of −3, 9, −10, −1, −2, 7, 4, 8, correct to 3 significant figures.

A. 1.50

B. 1.75

C. 6.12

D. 6.18

25. The stem-and-leaf diagram shows the times taken (in s) by a group of students to finish 20 push-ups.

Stem (tens)	Leaf (units)
3	0 0 2 5 6 8 8 9
4	1 3 3 4 7 9
5	0 1 2 4 5 6 8 9 9
6	0 0

Find the standard deviation of the times taken correct to 3 significant figures.

A. 2.77 s

B. 3.30 s

C. 8.47 s

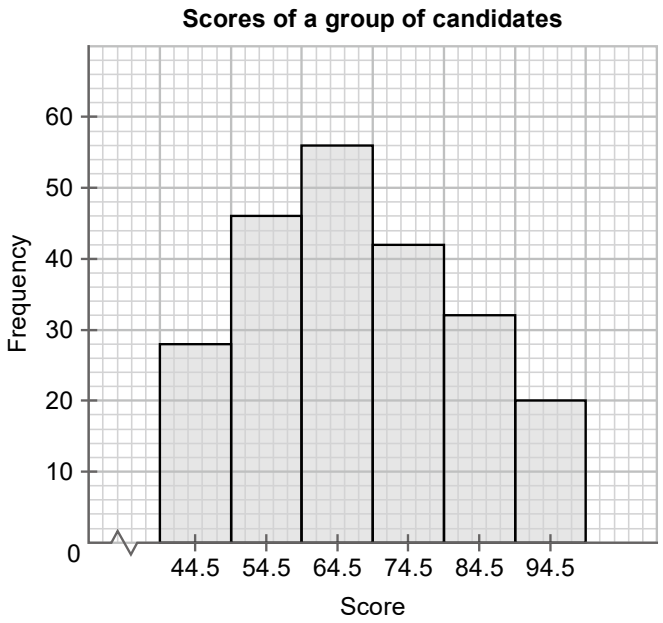
D. 9.71 s

26. Find the mean and standard deviation of the following set of data correct to 3 significant figures.

11, 12, 12, 15, 17, 17, 18, 19, 21, 24, 25, 27, 27

	Mean	Standard deviation
A.	18.9	5.13
B.	18.8	5.40
C.	5.40	18.8
D.	5.13	18.9

27. The histogram shows the scores of a group of candidates in a public examination.



Find the standard deviation of the scores correct to 3 significant figures.

A. 9.62
B. 12.5
C. 14.8
D. 67.4

28. For a set of data 4, 4, 4, 6, 6, 8, 8, 10, 10, 10, which of the following must be true?

I. Mean = Median
II. Range = Inter-quartile range
III. Standard deviation = 2

A. I only
B. I and II only
C. II and III only
D. I, II and III

29. The following table shows the heights of the closets in a showroom.

Height (cm)	170 - 179	180 - 189	190 - 199	200 - 209	210 - 219
Frequency	4	3	6	7	12

Find the variance of the heights of the closets correct to 3 significant figures.

A. $13.9\ \text{cm}^2$
B. $27.7\ \text{cm}^2$
C. $192\ \text{cm}^2$
D. $195\ \text{cm}^2$

30. Find the standard deviation of the six numbers $x+3$, $x+3$, $x+5$, $x+7$, $x+9$, $x+9$.

A. $\frac{\sqrt{19}}{3}$
B. $\frac{\sqrt{57}}{3}$
C. 2.5
D. 5

31. Find the variance of the four numbers $x+4$, $x+8$, $x-7$, $x-9$.

A. 1.5
B. 7.18 (corr. to 3 sig. fig.)
C. 19.5
D. 51.5

32. Two groups of data are given as follows:

Group A: $a-1,\ a,\ a+1$

Group B: $a-2,\ a,\ a+2$

If the means of the data in groups A and B are m_1 and m_2 respectively, and the standard deviations are σ_1 and σ_2 respectively, which of the following must be true?

A. $2m_1 = m_2$ and $2\sigma_1 = \sigma_2$

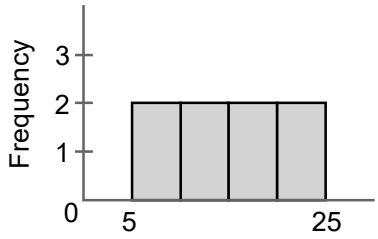
B. $m_1 = m_2$ and $\sigma_1 = \sigma_2$

C. $m_1 = m_2$ and $\sigma_1 = 2\sigma_2$

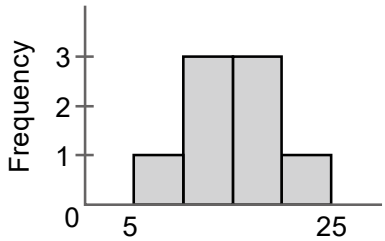
D. $m_1 = m_2$ and $2\sigma_1 = \sigma_2$

33. The figures show the histograms of three frequency distributions. Arrange them in descending order of magnitude of their standard deviations.

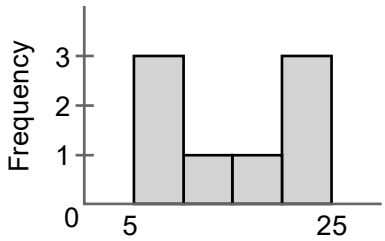
I.



II.



III.



A. I, II, III

B. I, III, II

C. II, III, I

D. III, I, II