

MTP Dec 23 Series II

- (29) The mode of data is 18 and mean is 24, then median is
- a. 18 b. 24
c. 22 d. 21

MTP June 24 Series I

- (30) Find the numbers whose GM is 5 and AM is 7.5:
- a. 12 and 13 b. 13.09 and 1.91
c. 14 and 11 d. 17 and 19

MTP June 24 Series I

- (31) For a moderately skewed distribution, which of the following relationship holds?
- a. Mean - Median = 3 (Median - Mode)
b. Median - Mode = 3 (Mean - Median)
c. Mean - Mode = 3 (Mean - Median)
d. Mean - Median = 3 (Mean - Mode)

MTP June 24 Series I

- (32) If the difference between mean and mode is 69, then the difference between Mean and Median will be _____
- a. 63 b. 31.5
c. 23 d. None of these

MTP June 24 Series II

- (33) Which of the following result hold for a set of distinct positive observations?
- a. A.M. > G.M. > H.M.
b. G.M. > A.M. > H.M.
c. G.M. > A.M. > H.M.
d. G.M. > A.M. > H.M.

MTP June 24 Series II

- (34) _____ & _____ are called ratio averages:
- a. H.M & G.M b. H.M. & A.M
c. A.M. & G.M. d. None of these

MTP June 24 Series II

- (35) The Arithmetic Mean between two numbers is 15 and their G.M. is 9; then the numbers are -
- a. 27, 3 b. 9, 9
c. 16, 9 d. None of these

MTP June 24 Series III

- (36) If the arithmetic mean between two numbers is 64 and the Geometric Mean between them is 16. The Harmonic mean between them is
- a. 64 b. 4
c. 16 d. 40

MTP June 24 Series III

- (37) When the mean is 3.57 and mode is 2.13, then the value of median is _____
- a. 3.09 b. 5.01
c. 5.01 d. None of these

MTP Sep 24 Series I & II

- (38) If the mode of a data is 18 and mean is 24, then median is
- a. 18 b. 24
c. 22 d. 21

MTP Sep 24 Series I

- (39) The HM, H of two numbers is 4 and their AM, $\star$ A and the GM, G satisfy the equation $2A + G^2 = 27$, the numbers are:
- a. (1,3) b. (9,5)
c. (6,3) d. (12,7)

Answer Key

1 b	2 a	3 a
4 b	5 a	6 c
7 a	8 a	9 c
10 a	11 a	12 c
13 a	14 c	15 d
16 b	17 b	18 a
19 c	20 c	21 a
22 a	23 a	24 a
25 b	26 a	27 c
28 a	29 c	30 b
31 c	32 c	33 a
34 a	35 a	36 a
37 a	38 c	39 c

Range

Past Exam Questions

PYQ Nov. 18

- (1) If the range of a set of values is 65 and maximum value in the set is 83, then the minimum value in the set is
- a. 74 b. 9
c. 18 d. None of these

PYQ Nov. 19

- (2) Difference between upper limit and lower limit of a class is known as.
- a. Range
b. Class mark
c. Class size
d. Class boundary

PYQ Jan. 21

- (3) The relationship between P-series and Q-series is given by $2P - 3Q - 10 = 0$. If the range of P-series is 18. What would be the range of Q?

a. 10
b. 15
c. 9
d. 12

PYQ July 21

- (4) If the relationship between x and y is given by $2x + 3y = 10$ and the range of y is 10, then what is the range of x?

a. 10
b. 18
c. 8
d. 15

PYQ Dec. 21

- (5) The marks secured by 5 students in a subject are 82, 73, 69, 84, 66. What is the coefficient of Range

a. 0.12
b. 12
c. 120
d. 0.012

PYQ Dec. 23

- (6) If the range of data is 20 and its smallest value is 5, then what is the largest value of data is?

a. 20
b. 25
c. 5
d. 30

PYQ Dec. 23

- (7) If the range of data is 20 and its smallest value is 5, then what is the largest value of data is?

a. 20
b. 25
c. 5
d. 30

PYQ Sep 24

- (8) What is the coefficient of range for the observations 20, 28, 32, 41, 48, 60?

a. 20
b. 50
c. 40
d. 200

PYQ Sep 24

- (9) What is the range of a data set?

a. The difference between the mean and median of the data set
b. The difference between the highest and lowest values in the data set
c. The number of data points in the data set
d. The standard deviation of the data set

Answer Key

1 c 2 c 3 d
4 d 5 b 6 b
7 b 8 b 9 b

Range

Mock Test Paper Questions

MTP May 18

- (1) If the range of x is 2, find range of $-3x + 50$?

a. 2
b. 6
c. -6
d. 44

MTP May 19

- (2) The range of 15, 12, 10, 9, 17, 20 is

a. 5
b. 12
c. 13
d. 11

MTP May 19 Series II

- (3) The range of 15, 12, 10, 9, 17, 30 is

a. 5
b. 12
c. 13
d. 21

MTP May 19 Series II

- (4) If the range of x is 2, find range of $-3x + 50$?

a. 2
b. 6
c. -6
d. 44

MTP May 20

- (5) If R_x and R_y denote ranges of x and y respectively where x and y are related by $3x + 2y + 10 = 0$, what would be the relation between x and y?

a. $R_x = R_y$
b. $2R_x = 3R_y$
c. $3R_x = 2R_y$
d. $R_x = 2R_y$

MTP Nov 20

- (6) The range of 28, 22, 40, 20, 15, 50 is

a. 40
b. 22
c. 35
d. None of these

MTP Mar 21, MTP Apr 21

- (7) What is the coefficient of range for below:

Class	10-19	20-29	30-39	40-49	50-59
Freq.	11	25	16	7	3

a. 22
b. 50
c. 75.82
d. 72.46

MTP June 2023 Series I

- (8) Which of the following is a correct statement?

a. Range is unaffected by the change in origin or change in scale
b. Range is affected by the change in origin or change in scale
c. Range is unaffected by the change in origin but affected by change in scale
d. Range is affected by the change in origin but unaffected by change in scale

MTP Nov 20 Series II

- (9) If R_x and R_y denote ranges of x and y respectively where x and y are related by $4x + 5y + 12 = 0$, what would be the relation between R_x and R_y ?
- a. $R_x = R_y$ b. $4R_x = 5R_y$
c. $5R_x = 4R_y$ d. None of these

MTP June 24 Series II

- (10) _____ is an absolute measure of dispersion.
- a. Range
b. Mean Deviation
c. Standard Deviation
d. All of the above

MTP Nov 20 Series II

- (11) If the range of x is 2, find range of $-3x + 50$?
- a. 2 b. 6
c. -6 d. 44

Answer Key

1 b	2 d	3 d
4 b	5 c	6 c
7 d	8 c	9 b
10 d	11 b	

Mean Deviation

Past Exam Questions

PYQ Nov. 20

- (1) Which of the following measure of dispersion is based on absolute deviations?
- a. Range
b. S. D
c. Mean deviation
d. Quartile deviation

PYQ Jan. 21

- (2) Find the coefficient of mean deviation about mean for the data: 5, 7, 8, 10, 11, 13, 19
- a. 17.28 b. 28.57
c. 32.11 d. 18.56

PYQ July 21

- (3) If a school has 14 teachers, their heights (in cm) are: 172, 173, 164, 178, 168, 169, 173, 172, 173, 164, 178, 168, 169, 173 then average deviation of this data is:
- a. 2.43 approx. b. 3.93 approx.
c. 3.43 approx. d. 2.92 approx.

PYQ July 21

- (4) The probable value of mean deviation when $Q_3 = 40$ and $Q_1 = 15$ is:
- a. 15 b. 18.75
c. 17.50 d. 0

PYQ July 21

- (5) If every observation is increased by 7 then:
- a. Standard deviation increased by 7
b. Mean deviation increased by 7
c. Not affected at all
d. Quartile deviation increased by 7.

PYQ July 21

- (6) The mean deviation of the numbers 3, 10, 6, 11, 14, 17, 9, 8, 12 about the mean is:
- a. 8.7 b. 4.2
c. 3.1 d. 9.8

PYQ June 22

- (7) Mean Deviation of data 3, 10, 10, 4, 7, 18, 5 from mode is
- a. 4.39 b. 4.70
c. 4.14 d. 5.24

PYQ June 22

- (8) Which of the below is based on absolute deviation?
- a. Standard deviation
b. Mean deviation
c. Range
d. Quartile deviation

PYQ June 23

- (9) If x and y are related as $4x + 3y + 11 = 0$ and mean deviation of y is 7.20, what is the mean deviation of x ?
- a. 2.7
b. 7.2
c. 4.5
d. 5.4

PYQ June

- (10) The mean deviation about the mean for the data 16, 24, 30, 35, 39, 40 is
- a. 9.14
b. 9.41
c. 8.91
d. 9.81

PYQ Jun

- (11) If Mean deviation about Arithmetic Mean is 3.50 and Arithmetic Mean is 3.50 then coefficient Mean deviation about Arithmetic mean is
- a. 50.85 b. 44.33
c. 52.65 d. 51.85

Answer Key

- | | | |
|------|------|-----|
| 1 c | 2 c | 3 c |
| 4 a | 5 c | 6 c |
| 7 c | 8 b | 9 d |
| 10 a | 11 a | |

Mean Deviation

Mock Test Paper Questions

MTP Nov 18

- (1) The MD about the Mean for the data 6, 9, 11, 10, 12, 12
- | | |
|---------|---------|
| a. 1.47 | b. 1.57 |
| c. 1.67 | d. 1.87 |

MTP Nov 20

- (2) The mean deviation about Mode for the numbers 4/11, 6/11, 8/11, 9/11, 12/11, 8/11 is
- | | |
|---------|--------|
| a. 9/15 | b. 12 |
| c. 6/11 | d. 1/6 |

MTP Nov 20

- (3) If the relation between x and y is $5y - 3x = 10$ and the mean deviation about mean for x is 12, then the mean deviation of y about mean is
- | | |
|---------|----------|
| a. 9.20 | b. 6.80 |
| c. 7.20 | d. 15.80 |

MTP March 21

- (4) If two variables x and y are related by $2x + 3y - 7 = 0$ and the mean and mean deviation about mean of x are 1 and 0.3 respectively, then the co-efficient of mean deviation of y about mean is:
- | | |
|-------|-------|
| a. -5 | b. 4 |
| c. 12 | d. 50 |

MTP March 21

- (5) The equation of a line is $5x + 2y = 17$. Mean deviation of y about mean is 5. Calculate mean deviation of x about mean.
- | | |
|-------|---------|
| a. -2 | b. 2 |
| c. -4 | d. None |

MTP March 22

- (6) The deviations are minimum when taken from
- | | |
|---------|-----------|
| a. Mean | b. Median |
| c. Mode | d. GM |

MTP June 22

- (7) The sum of squares of the deviations of the given values from their is minimum.
- | |
|--------------------|
| a. Arithmetic Mean |
| b. Median |

- | |
|------------------|
| c. Mode |
| d. None of these |

MTP Dec 22 - Series I

- (8) Which measure of dispersion is based on the absolute deviation only?
- | |
|-----------------------|
| a. Range |
| b. Standard Deviation |
| c. Mean Deviation |
| d. Quartile Deviation |

MTP March 21

- (9) Find the mean deviation about mean for the numbers: 2, 6, 7, 4, 8, 3
- | | |
|------|------|
| a. 4 | b. 6 |
| c. 5 | d. 2 |

MTP Dec 23 Series II

- (10) If the relation between x and y is $4y - 3x = 10$ and the mean deviation about mean for x is 12, then the mean deviation of y about mean is:
- | | |
|---------|------------------|
| a. 9.00 | b. 7.80 |
| c. 12.5 | d. None of these |

MTP June 24 Series I

- (11) If two variables x and y are related by $2X + 3Y - 7 = 0$ and the mean and mean deviation about mean of X are 1 and 0.3 respectively, then the co-efficient of mean deviation of Y about mean is.
- | | |
|-------|-------|
| a. -5 | b. 4 |
| c. 12 | d. 50 |

MTP June 24 Series II

- (12) The relation between two variables is $2x - 3y + 12 = 0$ If mean deviation of y is 6 then mean deviation of x is
- | | |
|------|------------------|
| a. 9 | b. 6 |
| c. 3 | d. None of these |

MTP June 24 Series II

- (13) If two variables x and y are related by $2x$ and $3y - 7 = 0$ and the mean and mean deviation about mean of x are 1 and 0.3 respectively, then the coefficient of mean deviation of y about mean is:
- | | |
|-------|-------|
| a. -5 | b. 4 |
| c. 12 | d. 50 |

Answer Key

- | | | |
|------|------|------|
| 1 c | 2 d | 3 c |
| 4 c | 5 b | 6 b |
| 7 a | 8 c | 9 d |
| 10 a | 11 c | 12 a |
| 13 c | | |

Standard Deviation

Past Exam Questions

- (1) If the S.D. of the 1st n natural numbers is $\sqrt{30}$ then the value of n is
 a. 19 b. 20
 c. 21 d. None of these
 PYQ May 18
- (2) If the variance of 5, 7, 9 and 11 is 4, then the coefficient of variation is:
 a. 15 b. 25
 c. 17 d. 19
 PYQ Nov. 18
- (3) Standard Deviation for the marks obtained by a student in monthly test in mathematic (out of 50) as 30, 35, 25, 20, 15 is
 a. 25 b. $\sqrt{50}$
 c. $\sqrt{30}$ d. 50
 PYQ Nov. 18
- (4) If the standard deviation for the marks obtained by a student in monthly test is 36, then variance is
 a. 6 b. 36
 c. 1296 d. None of these
 PYQ June 19
- (5) If $\sigma^2 = 100$ & coefficient of variation = 20% then $\bar{x}$
 a. 60 b. 70
 c. 80 d. 50
 PYQ June 19
- (6) S.D of first five consecutive natural numbers is
 a. $\sqrt{10}$ b. $\sqrt{8}$
 c. $\sqrt{3}$ d. $\sqrt{2}$
 PYQ June 19
- (7) If the profits of a company remain same for the last ten months then the S.D. of profits of the company would be:
 a. Positive b. Negative
 c. Zero d. (a) or (c)
 PYQ June 19
- (8) The sum of mean and SD of a series is a + b, if we add 2 to each observation of the series then the sum of mean and SD is
 a. a + b + 2 b. 6 - a + b
 c. 4 + a - b d. a + b + 4

PYQ Nov. 19

- (9) Origin is shifted by 5, what will happen
 a. SD will increase by 5
 b. QD will increase by 5
 c. MD will increase by 5
 d. There will be no change in SD
 PYQ Nov. 19

- (10) Coefficient of variation is equal to:
 a. $\frac{SD}{Mean}$
 b. $\frac{SD}{Mean} \times 100$
 c. $\frac{Mean}{SD} \times 100$
 d. $\frac{Mean}{SD}$
 PYQ Nov. 19

- (11) Find SD of the following
 ☆ 1, 2, 3, 4, 5, 6, 7, 8, 9.
 a. 2.58 b. 60/9
 c. 60/3 d. 3.20
 PYQ Nov. 19

- (12) If mean = 200 and variance = 80. Find coefficient of variation.
 a. 2.56 b. 4.47
 c. 32 d. 0.32
 PYQ Nov. 19

- (13) Which of the below is affected by shifting of scale.
 a. SD b. MD
 c. QD d. All of these
 PYQ Nov. 19

- (14) Coefficient of variation is 80. Mean is 20. Find variance:
 a. 640 b. 256
 c. 16 d. 250
 PYQ Nov. 19

- (15) SD from numbers 1, 4, 5, 7, 8 is 2.45. If 10 is added to each then SD will be:
 a. 12.45
 b. 24.5
 c. 12
 d. Will not change
 PYQ Jan.

- (16) The best statistical measure used for comparison of two series is
 a. Mean absolute deviation
 b. Range
 c. Coefficient of variation
 d. Standard deviation

- (17) It is given that the mean ($\bar{X}$) is 10 and standard deviation (s.d.) is 3.2. If the observations are increased by 4, then the new mean and standard deviations are:

a. $\bar{X}=10, \text{s.d.}=7.2$
 b. $\bar{X}=10, \text{s.d.}=3.2$
 c. $\bar{X}=14, \text{s.d.}=3.2$
 d. $\bar{X}=14, \text{s.d.}=7.2$

PYQ Jan. 21

- (18) The SD of 1 to 9 natural number is:

a. 6.65 b. 2.58
 c. 6.75 d. 5.62

PYQ July 21

- (19) If the numbers are 5, 1, 8, 7, 2 then the coefficient of variation is:

a. 56.13% b. 59.13%
 c. 48.13% d. 44.13%

PYQ July 21

- (20) AM and Coefficient of variation of x is 10 and 40. What is the variance $30 - 2x$

a. 64 b. 56
 c. 49 d. 81

PYQ June 22

- (21) Following are the wages of 8 workers 82, 96, 52, 75, 70, 65, 50, 70. Find range and coefficient of range?

a. 46, 32.70 b. 43, 31.50
 c. 46, 31.50 d. 43, 32.70

PYQ June 22

- (22) Find the standard deviation and coefficient of variation for: 1, 9, 8, 5, 7

a. 2.828, 49.32 b. 2.828, 48.13
 c. 2.828, 47.13 d. 2.828, 50.13

PYQ June 22

- (23) If the coefficient of variation and standard deviation are 30 and 12 respectively, then the arithmetic mean of the distribution is:

a. 40 b. 36
 c. 25 d. 19

PYQ Dec 22

- (24) If the sum of square of the values equals to 3390, Number of observations are 30 and Standard deviation is 7, what is the mean value of the above observations?

a. 14 b. 11
 c. 8 d. 5

PYQ Dec 22

- (25) If the variance of random variable ' x ' is 17, then what is variance of $y = 2x + 5$?

a. 34 b. 39
 c. 68 d. 78

PYQ Dec 22

- (26) If the variance of given data is 12, and their mean value is 40, what is coefficient of variation (CV)?

a. 5.66% b. 6.66%
 c. 7.50% d. 8.65%

PYQ Dec 22

- (27) In a given set if all data are of same value then variance would be:

a. 0 b. 1
 c. -1 d. 0.5

PYQ Dec 22

- (28) If the Standard Deviation of data 2, 4, 5, 6, 8, 17 is 4.47, then Standard Deviation of the data 4, 8, 10, 12, 16, 34 is

a. 4.47 b. 8.94
 c. 13.41 d. 2.24

PYQ Jun 23

- (29) The mean and variance of a group of 100 observations are 8 and 9, respectively. Out of 100 observations, the mean and standard deviation of 60 observations are 10 and 2 respectively. Find the variance of remaining 40 observations?

a. 4.5 b. 3.5
 c. 2.5 d. 1.5

PYQ Jun 23

- (30) For the first 20 natural numbers the standard deviation is _____

a. 5.77 b. 7.75
 c. 5.64 d. 6.54

PYQ Jun 24

- (31) If Arithmetic mean and Coefficient of variations of y are 5 and 20 respectively, the variance of $12 - 3y$

a. 9 b. 81
 c. 3 d. 100

PYQ Jun 24

- (32) Consider the data sets:
 $X = \{-6, 2, -2, 6\}$, $Y = \{4, 8, 2, 6\}$
 $Z = \{103, 100, 102, 101\}$ Let S_x , S_y , S_z be the standard deviations of the sets X , Y and Z respectively. We have the relations,

a. $S_x < S_y < S_z$

PYQ June 24

b. $S_z < S_y < S_x$

c. $S_z < S_x < S_y$

d. $S_x < S_z < S_y$

PYQ Sep 24

(33) If each observation of a set is divided by 10, then the Standard Deviation of the new observation is:

a. $\frac{1}{100}$ of SD of original observation

b. $\frac{1}{10}$ of SD of original observation

c. 100 of SD of original observation

d. 10 of SD of original observation

PYQ Sep 24

(34) The Standard Deviation of the series is 3, 6, 9, 12, 15 is:

a. 6.36

b. 4.24

c. 4.12

d. 3.28

Answer Key

1 a	2 b	3 b
4 c	5 d	6 d
7 c	8 a	9 d
10 b	11 a	12 b
13 d	14 b	15 d
16 c	17 c	18 b
19 b	20 a	21 c
22 c	23 a	24 c
25 c	26 d	27 b
28 b	29 d	30 a
31 a	32 b	33 b
34 b		

Standard Deviation

Mock Test Paper Questions

MTP May 18

(1) The standard deviation of 25, 32, 43, 53, 62, 59, 48, 31, 24, 33 is

a. 13.23

b. 12.33

c. 11.33

d. None of these

MTP May 18

(2) The SD is independent of change of

a. Origin

b. Scale

c. Both (a) & (b)

d. None of these

MTP May 18

(3) If the mean of frequency distribution is 100 and coefficient of variation is 45% then standard deviation is.

a. 45

b. 0.45

c. 4.5

d. 450

MTP May 18

(4) If the mean and SD of X are a and b respectively, then the S.D of $\frac{x-a}{b}$ is

a. a/b

b. -1

c. 1

d. ab

MTP Nov 18

(5) Coefficient of Variation (CV) is calculated

a. $\frac{SD}{AM} \times 100$

b. $\frac{AM}{SD} \times 100$

c. $\frac{AM}{MD} \times 100$

d. None of these

MTP Nov 18

(6) The SD for the data 6, 9, 10, 3, 7 is

a. 2.35

b. 2.45

c. 2.55

d. 2.65

MTP May 19

(7) The standard deviation of, 10, 16, 10, 16, 10, 10, 16, 16 is

a. 4

b. 6

c. 3

d. 0

MTP May 19

(8) If all the observations are multiplied by 2, then

a. New SD would be also multiplied by 2

b. New SD would be half of the previous SD

c. New SD would be increased by 2

d. New SD would be decreased by 2

MTP May 19 Series II

(9) If the profits of a company remain the same for the last ten months, then the standard deviation of profits for these ten months would be?

a. Positive

b. Negative

c. Zero

d. A or C

MTP May 19 Series II

(10) If x and y are related by $2x+3y+4=0$ and SD of x is 6, then SD of y is

a. 22

b. 4

c. 40

d. 9

ICAI SM, MTP May 19 Series II

- (11) If x and y are related by $y = 2x + 5$ and the SD and AM of x are known to be 5 and 10 respectively, then the coefficient of variation of y is
- 25
 - 30
 - 40
 - 20

MTP Nov 19/ MTP Sep 24 II

- (12) If the SD of x is 3, what is the variance of $(5-x)$?
- 36
 - 6
 - 1
 - 9

MTP Nov 19

- (13) If the values of all observations are equal then the Standard Deviation of the given observations is
- 0
 - 2
 - 1
 - None of these

MTP Nov 19

- (14) The Standard Deviation of a set of 50 items is 10. Find the Standard Deviation if every item is increased by 5
- 15
 - 5
 - 10
 - None of these

MTP Nov 19

- (15) Find the coefficient of variation if the sum of squared deviations taken from mean 40 of 10 observations is 360.
- 15
 - 20
 - 40
 - None of these

MTP May 20

- (16) If x and y are related by $2x + 3y + 4 = 0$ and SD of x is 9, then SD of y is
- 22
 - 6
 - 5
 - 24

MTP May 20/ MTP Sep 24 II

- (17) If x and y are related by $y = 2x + 5$ and the SD and AM of x are known to be 5 and 10 respectively, then the coefficient of variation of y is
- 25
 - 30
 - 40
 - 20

MTP Nov 20

- (18) What is the coefficient of variation of the following numbers 53, 52, 61, 60, 64
- 18.09
 - 8.09
 - 12.23
 - 15.45

MTP Nov 20

- (19) The mean and SD for a , b , and 2 are 3 and 1 respectively, the value of ab would be
- 11.5
 - 5
 - 12
 - 13

MTP March 21

- (20) If X and Y are two random variables then $v(x+y)$, when x is independent of y
- $v(x) + v(y)$
 - $v(x) + v(y) - 2v(x,y)$
 - $v(x) + v(y) + 2v(x,y)$
 - $v(x) - v(y)$

MTP March 21

- (21) The sum of squares of deviation from mean of 10 observations is 250. Mean of the data is 10. Find the coefficient of variation
- 10%
 - 25%
 - 50%
 - 0%

MTP March 21

- (22) If variance of x is 5, then find the variance of $(2-3x)$
- 10
 - 45
 - 5
 - 13

MTP March 21

- (23) What is the standard deviation of number recoveries among 48 patients when the probability of recovering is 0.75?
- 36
 - 81
 - 9
 - 3

Note: Theoretical Distribution Chapter

MTP Apr 21

- (24) The standard deviation of 10, 16, 10, 16, 10, 10, 16, 16 is
- 4
 - 6
 - 3
 - 0

MTP Apr 21

- (25) The variance of the data 3, 4, 5, 8 is
- 4.5
 - 3.5
 - 5.5
 - 6.5

MTP Apr 21

- (26) If the profits of a company remains the same for the last ten months, then the standard deviation of profits for these ten months would be?
- Positive
 - Negative
 - Zero
 - A or C

MTP Apr 21

- (27) Which measure of dispersion is based on all the observations?
- Mean Deviation
 - Standard Deviation
 - Quartile Deviation
 - A and B but not C

MTP Apr 21

- (28) The Sum of the squares of the deviations from mean of 10 observations is 250. Mean of the data is 10. Find coefficient of variation.
- a. 10% b. 25%
c. 50% d. 0%

MTP Apr 21

- (29) The Standard Deviation of a variable x is known to be 10. The Standard deviation of $50+5x$
- a. 50 b. 100
c. 10 d. 500

ICAI SM, MTP Apr 21

- (30) The of mean and SD of a series is $a+b$, if we add 2 to each observation of the series then the sum of the mean and SD is
- a. $a+b+2$ b. $6-a+b$
c. $4+a-b$ d. $a+b+4$

MTP Nov 21

- (31) The SD is independent of change of
- a. Scale b. Origin
c. Both (a) and (b) d. None of these

MTP Nov 21

- (32) If all the observations are decreased by 4, find the relation between new SD and old SD.
- a. New SD = Old SD/2
b. New SD = Old SD - 2
c. New SD = Old SD - 4
d. Remains unchanged

MTP Nov 21

- (33) Standard deviation of first n natural number is 2. What is the value of n ?
- a. 7 b. 6
c. 5 d. 8

MTP Nov 21

- (34) Find the variance of $3x+2$ if standard deviation of x is 4
- a. 9 b. 160
c. 16 d. 144

MTP Nov 21

- (35) If the variance of $x = 148.6$ and mean of $x = 40$, then the coefficient of variation is
- a. 37.15 b. 30.48
c. 33.75 d. None of these

MTP Oct 21/ RTP Sep 24

- (36) If x and y are related by $y = 2x+5$ and the SD and AM of x are known to be 5 and 10 respectively, then the coefficient of variation of y is
- a. 25 b. 30
c. 40 d. 20

MTP March 22

- (37) If x and y are related by $y = 2x+5$ and the SD and AM of x are known to be 5 and 10 resp., then the coefficient of variation of y is
- a. 25 b. 30
c. 40 d. 20

MTP June 22

- (38) SD of first five consecutive natural numbers is:
- a. $\sqrt{10}$ b. $\sqrt{8}$
c. $\sqrt{3}$ d. $\sqrt{2}$

MTP June 22

- (39) If the profit of a company remains same for the last 10 months then the SD of profit of the company would be:
- a. Positive b. Negative
c. Zero d. either (a) or (c)

MTP June 22

- (40) The SD of a variable x is to be 10. SD of $50+5x$ is
- a. 50 b. 100
c. 10 d. 500

MTP June 22

- (41) If mean and coefficient of variation of the marks of n students is 20 and 80 respectively. What will be variance of them
- a. 256 b. 16
c. 25 d. None of these

MTP Dec 22 - Series I

- (42) If the standard deviation of 1, 2, 3, 4, ... 10 is σ , then the SD of 11, 12, 13, 14, ..., 20 is:
- a. 10σ b. $10+\sigma$
c. σ d. None of these

MTP Dec 22 - Series I

- (43) What is the SD of the following series :

Meas.	0-10	10-20	20-30	30-40
Freq.	1	3	4	2

- a. 81 b. 7.6
c. 9 d. 2.26

MTP Dec 22 - Series I

- (44) If all observations in a distribution are increased by 6, then the variance of the series will be
- a. Increased b. Decreased
c. Unchanged d. None of these

MTP Dec 22 - Series I

- (45) The arithmetic mean and coefficient of variation of data set x are respectively 10 and 30. The variance of $30-2x$ is
- a. 28 b. 32
c. 34 d. 36

MTP Dec 22 - Series I

- (46) If $2x + 3y + 4 = 0$ and $v(x) = 6$ then $v(y)$ is:
 a. $8/3$ b. 9
 c. -9 d. 6

MTP Dec 22 Series II

- (47) SD of first five consecutive natural numbers is:
 a. $\sqrt{10}$ b. $\sqrt{8}$
 c. $\sqrt{3}$ d. $\sqrt{2}$

MTP Dec 22 Series II

- (48) If the profit of a company remain same for the last 10 months then the SD of profit would be:
 a. Positive b. Negative
 c. Zero d. Either A or C

MTP Dec 22 Series II

- (49) The sum of mean and SD of a series is $a + b$, if we add 2 to each observation of the series then the sum of mean and SD is:
 a. $a + b + 2$ b. $6 - a + b$
 c. $4 + a - b$ d. $a + b + 4$

MTP June 2023 Series I

- (50) If the coefficient of variation and standard deviation are 60 and 12 respectively, then the arithmetic mean of the distribution is
 a. 40 b. 36
 c. 20 d. 19

MTP June 2023 Series I

- (51) If the sum of square of the value equals to 3390, Number of observation are 30 and Standard deviation is 7, what is the mean value of the above observation?
 a. 14 b. 11
 c. 8 d. 5

MTP June 2023 Series I

- (52) If the variance of random variable 'x' is 18, then what is variance of $y = 2x + 5$?
 a. 34 b. 39
 c. 68 d. 72

MTP June 2023 Series I

- (53) If the variance of given data is 12, and their mean value is 40, what is coefficient of variation (CV)?
 a. 5.66% b. 6.66%
 c. 7.50% d. 8.65%

MTP June 2023 Series I

- (54) In a given set if all data are of same value then variance would be:
 a. 0 b. 1
 c. -1 d. 0.5

MTP June 2023 Series II

- (55) There are two startups in ecommerce sector struggling to acquire the market. Following data is for Mean and Standard Deviation of billing amount of bought items per month on their website.

Startup	A	B
No. of customers/month	40	30
Mean billing amount	₹ 2,500	₹ 2,200
SD of billing amount	₹ 10	₹ 11

Which startup has a better consistency when it comes to sales numbers?

- a. Startup A
 b. Startup B
 c. Both A and B
 d. Need more information

MTP June 2023 Series II

- (56) Which of the following is the best measure to calculate the volatility of stock market?
 a. Covariance
 b. Standard Deviation
 c. Variance
 d. All of the above

MTP Dec 2023 Series I

- (57) Origin is shifted by 5, what will happen
 a. SD will increase by 5
 b. QD will increase by 5
 c. MD will increase by 5
 d. There will be no change in SD

MTP Dec 2023 Series I

- (58) If mean and coefficient of variation of the marks of 10 students is 20 and 80 respectively. What will be the variance of them?
 a. 256 b. 16
 c. 25 d. None of these

MTP Dec 2023 Series I

- (59) If the same amount is added or subtracted from all the of an individual series then the standard deviation and variance both shall be ____
 a. Changed b. Unchanged
 c. Same d. None of these

MTP Dec 2023 Series II

- (60) If the S.D. of x is 4, what is the variance of $(5 - 2x)$?
 a. 64 b. 36
 c. 16 d. None of these

MTP Dec 2023 Series II

- (61) Mean and S.D. of a given set of observations' is
 ☆ 1,500 and 400 respectively. If there is an increment of 100 in the first year and each observation is hiked by 20% in 2nd years, then find new mean and S.D.
- | | |
|-------------|-------------|
| a. 1920,480 | b. 1920,580 |
| c. 1600,480 | d. 1600,400 |

MTP Dec 2023 Series II

- (62) If 5 is subtracted from each observation of some
 ☆ certain item then its co-efficient of variation is 10% and if 5 is added to each item then its coefficient of variation is 6%. Find original coefficient of variation.
- | | |
|-------|------------------|
| a. 8% | b. 7.5% |
| c. 4% | d. None of these |

MTP June 24 Series I

- (63) Suppose a population A has 100 observations 101, 102, 103, 200 and another population B has 100 observations 151, 152, 153, 250. If V_A and V_B represents the variance of the two populations respectively, then V_A / V_B _____
- | | |
|--------|--------|
| a. 9/4 | b. 1 |
| c. 4/9 | d. 2/3 |

MTP June 24 Series I

- (64) If variance of x is 5, then find the variance of $(2-3x)$
- | | |
|-------|--------|
| a. 10 | b. 45 |
| c. 5 | d. -13 |

MTP June 24 Series I

- (65) The sum of the squares of deviations of a set of observations has the smallest value, when the deviations are taken from their
- | | |
|---------|------------------|
| a. A.M. | b. H.M. |
| c. G.M. | d. None of these |

MTP June 24 Series II

- (66) The sum of mean and SD of a series is $a+b$, if we add 2 to each observation of the series then the sum of mean and SD is :
- | | |
|------------|------------|
| a. $a+b+2$ | b. $6-a+b$ |
| c. $4+a-b$ | d. $a+b+4$ |

MTP June 24 Series II

- (67) If the Standard Deviation of 10 observations is 4 and if each item is divided by -2 then Standard Deviation of new series is
- | | |
|------|------------------|
| a. 2 | b. -2 |
| c. 4 | d. None of these |

MTP June 24 Series II

- (68) For a set of 100 observations, taking assumed mean as 4, the sum of the deviations is -11 cm, and the sum of the squares of these deviations is 257 cm². The coefficient of variation is:
- | | |
|-----------|------------------|
| a. 41.13% | b. 42.13% |
| c. 40.13% | d. None of these |

MTP June 24 Series II

- (69) Mean and S.D. of x is 50 and 5 respectively, Find mean and S.D. of $\frac{x-50}{5}$
- | | |
|-----------|-----------|
| a. (1,0) | b. (0,1) |
| c. (1,-1) | d. (0,-1) |

MTP June 24 Series III

- (70) The standard deviation of 25, 32, 43, 53, 62, 59, 48, 31, 24, 33 is
- | | |
|----------|------------------|
| a. 13.23 | b. 12.33 |
| c. 11.33 | d. None of these |

MTP June 24 Series III

- (71) The SD is independent of change of
- | | |
|-----------|----------|
| a. Origin | b. Scale |
| c. Both | d. None |

MTP June 24 Series III

- (72) If the mean of frequency distribution is 100 and coefficient of variation is 45% then SD is
- | | |
|--------|---------|
| a. 45 | b. 0.45 |
| c. 4.5 | d. 450 |

MTP June 24 Series III

- (73) if the mean and SD of X are a and b respectively, then the S.D of $\frac{x-a}{b}$ is
- | | |
|----------|---------|
| a. a/b | b. -1 |
| c. 1 | d. ab |

MTP Sep 24 Series I

- (74) Origin is shifted by 5, what will happen
- | |
|----------------------------------|
| a. SD will increase by 5 |
| b. QD will increase by 5 |
| c. MD will increase by 5 |
| d. There will be no change in SD |

MTP Sep 24 Series I

- (75) If mean and coefficient of variation of the marks of 10 students is 20 and 80 respectively. What will be the variance of them?
- | | |
|--------|------------------|
| a. 256 | b. 16 |
| c. 25 | d. None of these |

MTP Sep 24 Series I

- (76) If the same amount is added or subtracted from all the of an individual series then the standard deviation and variance both shall be
- Changed
 - Unchanged
 - Same
 - None of these

MTP Sep 24 Series II

- (77) If all the observations are increased by 6, then the variance of the series will be
- Increased
 - Decreased
 - Unchanged
 - None of these

Answer Key

1 a	2 a	3 a
4 c	5 a	6 b
7 c	8 a	9 c
10 b	11 c	12 a
13 a	14 c	15 a
16 b	17 c	18 b
19 a	20 a	21 c
22 b	23 d	24 c
25 b	26 c	27 d
28 c	29 a	30 a
31 b	32 d	33 a
34 d	35 b	36 c
37 c	38 d	39 c
40 a	41 a	42 c
43 c	44 c	45 d
46 a	47 d	48 c
49 a	50 c	51 c
52 b	53 d	54 a
55 a	56 b	57 d
58 a	59 b	60 b
61 a	62 b	63 b
64 b	65 a	66 a
67 a	68 a	69 b
70 a	71 a	72 a
73 c	74 d	75 a
76 b	77 c	

Quartile Deviation

Past Exam Questions

PYQ May 18

- (1) $\frac{(Q_3 - Q_1)}{(Q_3 + Q_1)}$ is known as

- Coefficient of Range
- Coefficient of Q.D.
- Coefficient of S.D.
- Coefficient of M.D.

PYQ June 19

- (2) The Q.D of 6 numbers 15, 8, 36, 40, 38, 41 is

- ☆
 - 12.5
 - 25
 - 13.5
 - 37

PYQ June 19

- (3) Coefficient of quartile deviation is $1/4$ then Q_3 / Q_1

- ☆
 - $5/3$
 - $4/3$
 - $3/4$
 - $3/5$

PYQ Jan. 21

- (4) Which of the following is a relative measure of dispersion?

- Range
- Mean deviation
- Standard deviation
- Coefficient of quartile deviation

PYQ June 22

- (5) Which is not a measure of central tendency

- Mean
- Median
- Quartile deviation
- Mode

PYQ June 19

- (6) Standard deviation is _____ times of $\sqrt{MD \times QD}$

- ☆
 - $2/3$
 - $4/5$
 - $\sqrt{\frac{15}{8}}$
 - $\sqrt{\frac{8}{15}}$

PYQ Nov. 19

- (7) The approximate ratio of SD, MD, QD is:

- 3 : 4 : 5
- 2 : 3 : 4
- 15 : 12 : 10
- 5 : 6 : 7

PYQ Dec 22

- (8) If the first quartile is 56.50 and the third quartile is 77.50, then the co-efficient of QD is:

- 638.09
- 15.67
- 63.80
- 156.71

PYQ Dec 22

- (9) _____ is based on all the observations and _____ is based on the central fifty percent of the observations.
- Mean deviation, Range
 - Mean deviation, quartile deviation
 - Range, Standard deviation
 - Quartile deviation, standard deviation

PYQ Dec 22

- (10) Which one of the following is not a method of measures of dispersion?
- Standard deviation
 - Mean deviation
 - Range
 - Concurrent deviation method

PYQ June 23

- (11) For a given set of normally distributed data, the following statistical parameters are known: Mean = 6; Standard deviation = 2.6; Median = 5 and Quartile deviation = 1.5, then the coefficient of quartile deviation equals to
- 30
 - 32
 - 25
 - 39

PYQ June 23

- (12) If the first quartile is 42.75 and the third quartile is 74.25, then the coefficient of QD is:
- 29.62
 - 15.75
 - 17.57
 - 26.92

PYQ Dec 23

- (13) If the quartile deviation is 12 and the first quartile is 25, then the value of the third quartile is:
- 37
 - 49
 - 61
 - 60

PYQ Dec 23

- (14) If 'x' and 'y' are related as $3x - 4y = 20$ and the quartile deviation of 'x' is 12, then the quartile deviation of 'y' is:
- 9
 - 8
 - 7
 - 6

PYQ June 24

- (15) If in a data set, 25 percent of values are smaller than 30 and one-fourth of values are larger than 70, then the coefficient of quartile deviation is _____ %
- 40
 - 30
 - 70
 - 50

PYQ Sep 24

- (16) In which of the following there is no impact of presence of extreme observations?
- Range
 - Quartile deviation
 - Standard deviation
 - Variance

PYQ Sep 24

- (17) The Quartile Deviation of the distribution of the following data is:

x	f(x)
2	2
3	4
4	8
5	4
6	1

- 1
- 0
- $\frac{1}{4}$
- $\frac{1}{2}$

Answer Key

- | | | |
|------|------|------|
| 1 b | 2 c | 3 a |
| 4 d | 5 c | 6 c |
| 7 c | 8 b | 9 b |
| 10 d | 11 a | 12 d |
| 13 b | 14 a | 15 a |
| 16 b | 17 a | |

Quartile Deviation

Mock Test Paper Questions

MTP May 19/ RTP Sep 24

- (1) The quartiles of a variable are 45, 52 and 65 respectively. Its quartile deviation is
- 10
 - 20
 - 25
 - 8.30

MTP May 19 Series I

- (2) Quartiles can be determined graphically using
- Histogram
 - Frequency Polygon
 - Ogive
 - Pie chart

MTP May 19 Series I

- (3) Which measures of dispersions is not affected by the presence of extreme observations?
- Range
 - Mean deviation
 - Standard deviation
 - Quartile deviation

MTP May 19 Series II

- (4) Which measure is based on only the central fifty percent of the observations?
- Standard deviation
 - Quartile deviation
 - Mean deviation
 - All these measures

MTP May 20

- (5) The appropriate measure of dispersion for open-end classification is
- Standard deviation
 - Mean deviation
 - Quartile deviation
 - All these measures

MTP May 20

- (6) The quartiles of a variable are 45, 52 and 75 respectively. Its quartile deviation is
- 15
 - 20
 - 25
 - 8.30

MTP May 20

- (7) If x and y are related as $3x+4y=20$ and the quartile deviation of x is 16, then the QD of y is
- 16
 - 14
 - 10
 - 12

MTP Nov 20

- (8) The quartiles of the variables are 45, 52, and 65 respectively, its Quartile Deviation is
- 5
 - 10
 - 25
 - 8.30

MTP Apr 21

- (9) Interval Quartile Range is _____ of QD
- ☆
 - Half
 - Double
 - Triple
 - Equal

MTP Nov 21

- (10) In the equation $4x+2y=3$, quartile deviation for y is 3. Find the quartile deviation for x
- ☆
 - 4.5
 - 6
 - 1.5
 - None of these

MTP Oct 21

- (11) If the quartile deviation of x is 6 and $3x+6y=20$, what is the quartile deviation of y ?
- 3
 - 4
 - 5
 - 6

MTP March 22

- (12) The quartiles of a variable are 45, 52 and 65 respectively. Its quartile deviation is
- 10
 - 20
 - 25
 - 8.30

MTP March 22

- (13) If x and y are related as $3x-4y=20$ then the Quartile Deviation of x is 12, then the Quartile deviation of y is :
- 14
 - 15
 - 16
 - 9

MTP June 22

- (14) The QD from the following observations is
- ☆ 10, 18, 20, 28, 15, 17, 22, 25, 29, 32, 34 is equal to:
- 8
 - 6
 - 10
 - 5

MTP Dec 22 Series II

- (15) The QD of six numbers 15, 8, 36, 40, 38, 41 is equal to:
- 12.5
 - 25
 - 13.5
 - 37

MTP Dec 22 Series II

- (16) Coefficient of Quartile Deviation is $1/4$ then $Q_3/Q_1 = ?$
- $5/3$
 - $4/3$
 - $3/4$
 - $3/5$

MTP Nov 18

- (17) If the SD of a variable X is σ then Quartile Deviation (QD) is
- $4/5 \sigma$
 - $3/2 \sigma$
 - $2/3 \sigma$
 - $5/4 \sigma$

MTP May 19

- (18) Which one is an absolute measure of dispersion?
- Range
 - Mean Deviation
 - Standard Deviation
 - All these measures

MTP Nov 20

- (19) A shift of origin has no impact on
- Mean deviation
 - Standard deviation
 - Quartile deviation
 - All of these

MTP Nov 20

- (20) Which measure is based on all the observations
- Standard deviation
 - Mean deviation
 - Quartile deviation
 - Both (a) and (b)

MTP Apr 21

- (21) Which of the below is affected by shifting of scale
- SD
 - MD

- (4) Which measure is based on only the central fifty percent of the observations?
 a. Standard deviation
 b. Quartile deviation
 c. Mean deviation
 d. All these measures

- (5) The appropriate measure of dispersion for open-end classification is
 a. Standard deviation
 b. Mean deviation
 c. Quartile deviation
 d. All these measures

- (6) The quartiles of a variable are 45, 52 and 75 respectively. Its quartile deviation is
 a. 15
 b. 20
 c. 25
 d. 8.30

- (7) If x and y are related as $3x+4y = 20$ and the quartile deviation of x is 16, then the QD of y is
 a. 16
 b. 14
 c. 10
 d. 12

- (8) The quartiles of the variables are 45, 52, and 65 respectively, its Quartile Deviation is
 a. 5
 b. 10
 c. 25
 d. 8.30

- (9) Interval Quartile Range is ____ of QD
 ☆ a. Half
 b. Double
 c. Triple
 d. Equal

- (10) In the equation $4x+2y = 3$, quartile deviation for y is 3. Find the quartile deviation for x
 ☆ a. 4.5
 b. 6
 c. 1.5
 d. None of these

- (11) If the quartile deviation of x is 6 and $3x + 6y = 20$, what is the quartile deviation of y ?
 a. 3
 b. 4
 c. 5
 d. 6

- (12) The quartiles of a variable are 45, 52 and 65 respectively. Its quartile deviation is
 a. 10
 b. 20
 c. 25
 d. 8.30

- (13) If x and y are related as $3x-4y = 20$ then the Quartile Deviation of x is 12, then the Quartile deviation of y is :
 a. 14
 b. 15
 c. 16
 d. 9

- (14) The QD from the following observations is
 ☆ 10, 18, 20, 28, 15, 17, 22, 25, 29, 32, 34 is equal to:
 a. 8
 b. 6
 c. 10
 d. 5

- (15) The QD of six numbers 15, 8, 36, 40, 38, 41 is equal to:
 a. 12.5
 b. 25
 c. 13.5
 d. 37

- (16) Coefficient of Quartile Deviation is $1/4$ then $Q_3 / Q_1 = ?$
 a. $5/3$
 b. $4/3$
 c. $3/4$
 d. $3/5$

- (17) If the SD of a variable X is σ then Quartile Deviation (QD) is
 a. $4/5 \sigma$
 b. $3/2 \sigma$
 c. $2/3 \sigma$
 d. $5/4 \sigma$

- (18) Which one is an absolute measure of dispersion?
 a. Range
 b. Mean Deviation
 c. Standard Deviation
 d. All these measures

- (19) A shift of origin has no impact on
 a. Mean deviation
 b. Standard deviation
 c. Quartile deviation
 d. All of these

- (20) Which measure is based on all the observations
 a. Standard deviation
 b. Mean deviation
 c. Quartile deviation
 d. Both (a) and (b)

- (21) Which of the below is affected by shifting of scale
 a. SD
 b. MD

c. QD

d. All of these

MTP Oct 21

(22) Which one is an absolute measure of dispersion?

- a. Range
- b. Mean Deviation
- c. Standard Deviation
- d. All these measures

MTP June 22

(23) The Quartile deviation is

- a. $\frac{2}{3}$ of SD
- b. $\frac{4}{5}$ of SD
- c. $\frac{5}{6}$ of SD
- d. None of these

MTP Dec 22 – Series I

(24) The approximate ratio of SD, MD, QD is

- a. 2:3:4
- b. 3:4:5
- c. 15:12:10
- d. 5:6:7

MTP June 2023 Series I

(25) _____ is based on all the observations and _____ is based on the central fifty percent of the observations.

- a. Mean deviation, Range
- b. Mean deviation, quartile deviation
- c. Range, standard deviation
- d. Quartile deviation, standard deviation

MTP June 2023 Series I

(26) Which one of the following is not a method of measures of dispersion?

- a. Standard deviation
- b. Mean deviation
- c. Range
- d. Concurrent deviation method

MTP June 2023 Series I

(27) If the first quartile is 56. and the third quartile is 77. then the co-efficient of quartile deviation is

- a. 18.09
- b. 15.79
- c. 63.8
- d. 56.71

MTP June 2023 Series II

(28) In case of extreme sampling fluctuations, which is the best measure of dispersion?

- a. Quartile Deviation
- b. Standard Deviation
- c. Mean Deviation
- d. Range

MTP Dec 23 – Series I

(29) If Quartile deviation is 7. Find the value of x from the arranged series: 2, x, 6, 7, 9, 16, 18.

- a. 5
- b. 2
- c. 8
- d. 6

MTP Dec 23 – Series I

(30) If the first Quartile is 142 and semi-inter quartile range is 18, then the value of median is:

- a. 151
- b. 160
- c. 178
- d. None of these

MTP June 24 Series I

(31) If X and Y are related as $3X - 4Y = 20$ and the quartile deviation of X is 12, then the quartile deviation of Y is:

- a. 14
- b. 15
- c. 16
- d. 9

MTP Sep 24 Series II

(32) For a moderately skewed distribution, quartile deviation and the standard deviation are related by:

- a. $S.D. = \frac{2}{3} Q.D$
- b. $S.D. = \frac{3}{4} Q.D$
- c. $S.D. = \frac{4}{3} Q.D$
- d. $S.D. = \frac{3}{2} Q.D$

MTP Sep 24 Series II

(33) If the first Quartile is 142 and semi-Inter quartile range is 18, then the value of median is

- a. 18
- b. 24
- c. 22
- d. 21

MTP Sep 24 Series II

(34) Which measures of dispersions is not affected by the presence of extreme observations?

- a. Range
- b. Mean deviation
- c. Standard deviation
- d. Quartile deviation

Answer Key

1 a	2 c	3 d
4 b	5 c	6 a
7 d	8 b	9 b
10 c	11 a	12 a
13 d	14 b	15 c
16 a	17 c	18 d
19 d	20 d	21 d
22 d	23 a	24 c
25 b	26 d	27 b
28 a	29 b	30 b
31 d	32 d	33 b
34 d		