

# Data Sufficiency

## LRDI - 04

CEX-D-0276/18

Number of Questions : **30**

**Directions for questions 1 to 27:** Each of the following questions given below is followed by two statements, I and II. Mark the answer using the following instructions:

Mark (1) if the question can be answered by using one of the statements alone, but cannot be answered by using the other statement alone.

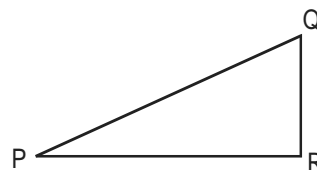
Mark (2) if the question can be answered by using either statement alone.

Mark (3) if the question can be answered by using both the statements together, but cannot be answered by using either statement alone.

Mark (4) if the question cannot be answered even by using both the statements together.

1. Is a ball point pen costlier than an ink pen?
  - I. The cost of 5 sets of 4 ball point and 3 ink pens is the same as the cost of 4 sets of 3 ball point and 5 ink pens.
  - II. The cost of 6 sets of 6 ball point and 4 ink pens is the same as the cost of 12 sets of 3 ball point and 2 ink pens.
2. There are three rods of lengths  $L_1$  cm,  $L_2$  cm and  $L_3$  cm such that no two of them are of the same length. If  $L_1$ ,  $L_2$  and  $L_3$  are integers, can we exactly measure  $X$  cm using the three rods, where  $X$  is an integer?
  - I.  $L_1 + L_2 = 100$  cm
  - II.  $L_2 + L_3 = 201$  cm

3. Is  $\Delta PQR$  a right angled triangle?



I.  $\angle Q - \angle P > 0$

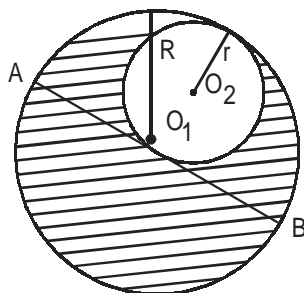
II. The value of  $\frac{\angle P + \angle Q}{\angle R}$  is equal to 1.

4. If  $m$  and  $n$  are consecutive positive integers, is  $m > n$ ?
  - I.  $m - 1$  and  $n + 1$  are consecutive positive integers.
  - II.  $m$  is an even integer.
5. If  $a$ ,  $b$  and  $c$  are integers, is  $(a - b + c)$  greater than  $(a + b - c)$ ?
  - I.  $b$  is positive.
  - II.  $c$  is negative.
6. Harpu, who is a non-vegetarian, eats chicken only on Tuesdays, Saturdays and Sundays. Did he eat chicken today?
  - I. He ate chicken yesterday.
  - II. He ate chicken two days before yesterday.

7. XEN is a three-digit number, where X, E and N are single-digit whole numbers. What is the value of 'X'?

- I. The sum of the square of the first X natural numbers is 55.
- II.  $X^2 + 2X - 15 = 0$ .

8.



Find the area of the shaded portion in the above figure.

- I.  $R - r = 2$  cm
- II. AB, the length of which is 6 cm, is a chord of bigger circle and tangent to the smaller circle.

9. Points P and Q lie on diagonal BD of rectangle ABCD. Find the area of rectangle ABCD.

- I. The lengths of perpendiculars dropped from P on AD and BC are 2 cm and 4 cm respectively. The lengths of perpendiculars dropped from Q on BC and CD are 3 cm and 4 cm respectively.
- II. The lengths of perpendiculars dropped from P on CD and AD are 1 cm and 2 cm respectively. The lengths of perpendiculars dropped from Q on BC and CD are 4 cm and 3 cm respectively.

10. A, B, C are positive integers such that  $A < B < C$ . Is  $C - A$  even?

- I.  $A \times B \times C$  is an odd natural number.
- II.  $AB + BC + CA$  is an even natural number.

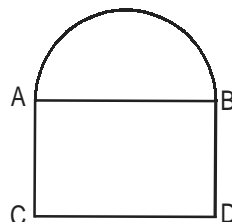
11. What is the area of the region bounded by lines L and M and the coordinate axes in the first quadrant?

- I. The lines L and M intersect at a point that also lies on both the lines,  $3x - 4y = 1$  and  $7x - 8y = 5$ .
- II. The lines L and M are perpendicular to each other and one of them intersects the y-axis with an intercept of 4.

12. In a circle, chord PQ intersects chord AB at N. What is the minimum length of the line segment AB?

- I.  $PN = NQ = 6$  units.
- II. AB is a diameter of the circle,  $\angle PNA = 90^\circ$  and  $NQ = 6$  units.

13. The figure given below shows the shape of a window. If arc AB is a semicircle and ABCD is a rectangle, then what is the perimeter of the window?



- I. The perimeter of the rectangle ABCD is 142 feet.
- II. The length of the diagonal of the rectangle ABCD is 61 feet.

14. The marked price of an article is Rs. 250. Find the net profit percent on the sale of the article.

- I. Successive discounts of 20% and 25% were given on the sale of the article.
- II. The article was sold at Rs. 200.

15. If a, b and c are integers, then what is the value of  $(a^2 + b^2 + c^2)$ ?

- I.  $4a + 3b + 2c = 27$  and  $1 < a < b < c < 8$ .
- II.  $a + b + c = 9$  and  $0 < a < b < c$ .

16. Is  $x > y$ ?
- $(x - y) \times (x - y) > 0$ .
  - $(x + y) \left( \frac{1}{x} + \frac{1}{y} \right) = 4$
17. What is the least value of the expression  $(21x + 14y)$ ?
- $\frac{1}{x} + \frac{1}{y} + \frac{1}{xy} = 1$  and  $x, y$  are prime numbers.
  - The product  $(x \cdot y) = 6$ , where ' $x$ ' and ' $y$ ' are positive integers.
18. In a hockey match, the Indian team was behind by 2 goals with 5 min remaining. Did they win the match?
- Deepak Thakur, the Indian striker, scored 3 goals in the last 5 min of the match.
  - Korea scored a total of 3 goals in the match.
19. Four students were added to a dance class. Would the teacher be able to divide her students evenly into a dance team (or teams) of 8?
- If 12 students were added, the teacher could put everyone in teams of 8 without any leftovers.
  - The number of students in the class is currently not divisible by 8.
20. On a given day a boat ferried 1,500 passengers across the river in 12 hr. How many round trips did it make?
- The boat can carry 200 passengers at any time.
  - It takes 40 min each way and 20 min of waiting time at each terminal.
21. What will be the time for downloading software?
- Transfer rate is 6 kilobytes per second.
  - The size of the software is 4.5 megabytes.
22. A square is inscribed in a circle. What is the difference between the area of the circle and that of the square?
- The diameter of the circle is  $25\sqrt{2}$  cm.
  - The side of the square is 25 cm.
23. Two friends, Ram and Gopal, bought apples from a wholesale dealer. How many apples did they buy?
- Ram bought one-half the number of apples that Gopal bought.
  - The wholesale dealer had a stock of 500 apples.
24. The average weight of students in a class is 50 kg. What is the number of students in the class?
- The heaviest and the lightest members of the class weigh 60 kg and 40 kg respectively.
  - Exclusion of the heaviest and the lightest members from the class does not change the average weight of the students.
25. A small storage tank is spherical in shape. What is the storage volume of the tank?
- The wall thickness of the tank is 1 cm.
  - When an empty spherical tank is immersed in a large tank filled with water, 20 l of water overflow from the large tank.
26. Mr X starts walking northwards along the boundary of a field from point A on the boundary, and after walking for 150 m reaches B, and then walks westwards, again along the boundary, for another 100 m when he reaches C. What is the maximum distance between any pair of points on the boundary of the field?
- The field is rectangular in shape.
  - The field is a polygon, with C as one of its vertices and A as the mid-point of a side.

27. A line graph on a graph sheet shows the revenue for each year from 1990 through 1998 by points and joins the successive points by straight-line segments. The point for revenue of 1990 is labelled A, that for 1991 as B, and that for 1992 as C. What is the ratio of growth in revenue between 1991-92 and 1990-91?
- The angle between AB and X-axis when measured with a protractor is  $40^\circ$ , and the angle between CB and X-axis is  $80^\circ$ .
  - The scale of Y-axis is 1 cm = Rs. 100
- Directions for questions 28 to 30:** Each question is followed by two statements, I and II. Answer each question using the following instructions:
- Mark (1) if the question can be answered by using statement I alone but not by using II alone.
- Mark (2) if the question can be answered by using statement II alone but not by using I alone.
- Mark (3) if the question can be answered by using either statement alone and
- Mark (4) if the question can be answered using both the statements together but not by either statement alone.
28. Four friends — A, B, C and D got the top four ranks in a competitive examination, but A did not get the first, B did not get the second, C did not get the third, and D did not get the fourth rank. Who secured which rank?
- Neither A nor D were among the first 2.
  - Neither B nor C was third or fourth.
29. The members of a local club contributed equally to pay Rs. 600 towards a donation. How much did each one pay?
- If there had been five fewer members, each one would have paid an additional Rs. 10.
  - There were at least 20 members in the club, and each one paid not more than Rs. 30.
30. A family has only one kid. The father says, "After 'n' years, my age will be 4 times the age of my kid." The mother says, "After 'n' years, my age will be 3 times that of my kid." What will be the combined ages of the parents after 'n' years?
- The age difference between the parents is 10 years.
  - After 'n' years the kid is going to be twice as old as she is now.

Visit "Test Gym" for taking Topic Tests / Section Tests on a regular basis.

# LRDI - 04 : DS

## Answers and Explanations

CEX-D-0276/18

1	1	2	3	3	1	4	1	5	3	6	3	7	2	8	4	9	2	10	1
11	3	12	2	13	4	14	4	15	1	16	1	17	2	18	4	19	1	20	1
21	3	22	2	23	4	24	4	25	3	26	3	27	1	28	3	29	1	30	1

1. 1 Let the prices of ink and ball point pen be  $i$  &  $b$  respectively.

The first statement gives  $5 \times (4b + 3i) = 4 \times (3b + 5i)$ . Using this we can find the ratio of the price of a ball-point pen and an ink pen. So statement I alone is sufficient.

From statement II, we get  $6 \times (6b + 4i) = 12 \times (3b + 2i)$ , which will boil down to  $0 = 0$ . Hence using statement II, we cannot answer the question.

2. 3 Neither of the statement alone can be used to answer the question.

Using both the statements:

$$L_2 + L_3 - 2(L_1 + L_2) = 201 - 200 = 1 \text{ cm.}$$

Hence, any integral multiple of length can be measured.

3. 1 Statement I do not provide any information regarding  $\angle R$ . Hence, it's not sufficient alone.

We know that  $\angle R + \angle P + \angle Q = 180^\circ$

Using statement II, we get  $\angle R + \angle R = 180^\circ$

$$\Rightarrow \angle R = 90^\circ$$

$\Rightarrow \angle PQR$  is a right angled triangle.

Hence, statement II alone is sufficient.

4. 1 Note that for two consecutive integers the larger must be 1 more than the smaller.

Considering particular values for  $m$  and  $n$ . For example, if  $m = 4$ , then  $n = 3$  or  $5$  since  $m$  and  $n$  are consecutive. Then  $m - 1 = 3$  and  $n + 1 = 4$  or  $6$ . Since  $m - 1$  and  $n + 1$  are consecutive integers,  $n = 3$ . Thus,  $m = n + 1$ , or  $m > n$ .

$\therefore$  Statement I alone is sufficient.

The fact given in statement II that  $m$  is even is irrelevant.

5. 3  $a - b + c > a + b - c$

$$\Rightarrow c > b$$

Either statements I or II alone is not sufficient to answer the question.

Using both the statements together, we can say for sure that  $c < b$ .

$$\text{Hence, } (a - b + c) < (a + b - c)$$

6. 3 From statement I: Since he had chicken yesterday, today could be either Sunday, Monday or Wednesday. Hence, statement I alone is not sufficient.

From statement II: Today is either Friday, Tuesday or Wednesday.

Hence, statement II alone is not sufficient.

By combining the two statements, it can be deduced that today is Wednesday and so, he did not eat chicken today.

Hence, both the statements together are sufficient.

7. 2 From statement I, we get  $X = 5$ .

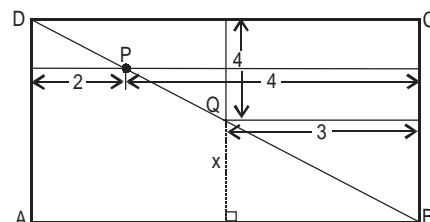
From statement II, we get  $X = 3, -5$ . So, the possible value of  $x$  is 3.

8. 4 From statement I: We cannot determine the area of shaded region as we don't know the exact radii of the two circles.

From statement II: On the basis of the information given in this statement, we cannot calculate the radii of the two circles. Hence, this statement alone is also not sufficient.

Even after by using both the statements together, we cannot find the area of the shaded region.

9. 2 **From statement I:**



As the length of the perpendicular from P to AD = 2 cm and to BC = 4 cm

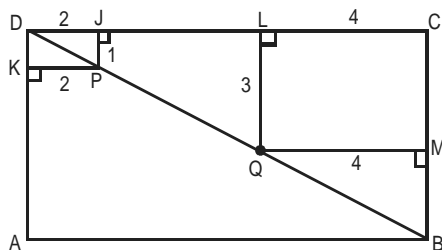
Length of AB = 6 cm

As the length of the perpendicular from Q to AB =  $x$  and to BC = 3 cm

Q is the midpoint of BD

As the length of the perpendicular from Q to CD = 4 cm  
Length of side BC = 8 cm  
Hence, statement I alone is sufficient to answer the question.

**Using Statement II:**



$\triangle DJP$ ,  $\triangle DLQ$  and  $\triangle DCB$  all are similar to each other.

$$\frac{DL}{QL} = \frac{DJ}{PJ} = \frac{2}{1} \quad (\text{As } \triangle DJP \sim \triangle DLQ)$$

$$\Rightarrow DL = 3 \times 2 = 6 \text{ cm}$$

$$\Rightarrow DC = DL + CL = 6 + 4 = 10 \text{ cm}$$

$$\text{and } \frac{DJ}{PJ} = \frac{DC}{BC} = \frac{2}{1} \quad (\text{As } \triangle DJP \sim \triangle DCB)$$

$$\Rightarrow BC = \frac{10}{2} = 5 \text{ cm}$$

Area of the rectangle =  $10 \text{ cm} \times 5 \text{ cm} = 50 \text{ cm}$

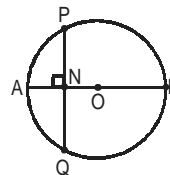
Hence, statement II alone is sufficient to answer the question.

10. 1 Since  $A \times B \times C$  is odd, so each of A, B and C is odd.  
So,  $C - A = \text{even}$ .  
Hence, statement I alone is sufficient to answer the question.  
However, from statement II, best that can be deduced is that at least two among A, B, C, are even.  
Hence, statement II is insufficient.

11. 3 Statement I gives a point through which lines pass.  
So, by itself it is not sufficient.  
Statement II alone also does not give both the lines.  
Combining both the statements, we get the equations of both the lines. Hence area can be computed.

12. 2 **Using statement I:** Given that  $PN = NQ = 6$  units.  
Let  $AN = a$  and  $NB = b$ . Now Applying the secant theorem, we get that  $AN \times NB = a \times b = PN \times NQ$   
 $\Rightarrow a \times b = 36$ .  
 $= 6 \times 6$   
 $\Rightarrow \text{minimum of } a + b = 12$   
It means that the minimum value of AB is 12 units.  
Therefore, statement I alone is sufficient to answer the question.

**Using statement II:**



Value  $\frac{AB}{2}$  will be minimum, when PQ passes through

the center of the circle O.

Minimum value of AB is 12 units.

So, statement II alone is sufficient to answer the question.

13. 4 Let the two sides of rectangle ABCD are 'x' and 'y'.

**Using statement A:**

$$x + y = 71$$

which is not sufficient to answer the question.

**Using statement B:**

$$x^2 + y^2 = 61^2$$

which is not sufficient to answer the question.

**Combining statements I and II:**

$$\text{We get } (x + y)^2 = x^2 + y^2 + 2xy$$

$$(x - y)^2 = x^2 + y^2 - 2xy = 71^2 - 1320 = 2401$$

$$x - y = 49 \quad \dots(i)$$

$$\text{also, } x + y = 71 \quad \dots(ii)$$

solving we get 'x' and 'y' as 60 feet and 11 feet respectively.

Since we do not know that AB is 60 feet or 11 feet, we cannot find the answer.

14. 4 The question cannot be answered even by using both statements together as nothing can be said about the cost price of the article.

15. 1 **Using statement I:**

Since it is given that  $1 < a < b < c < 8$ , it can be verified very easily that c cannot take values from the set {1, 2, 3}.

Further checking 'c' for {4, 5, 6, 7}, there is only one set of values of a, b and c that satisfies  $1 < a < b < c < 8$ . The values of a, b and c are 2, 3 and 5 respectively. Hence, the value of  $a^2 + b^2 + c^2$  equals to 38.

Hence, statement I alone is sufficient to answer the question.

**Using statement II:**

There are multiple sets of values of a, b and c that satisfies

$$a + b + c = 9 \text{ and } 0 < a < b < c.$$

For example ( $a = 1, b = 2, c = 6$ ), ( $a = 1, b = 3, c = 5$ ) and ( $a = 2, b = 3, c = 4$ ).  
Hence we cannot calculate a unique value of  $a^2 + b^2 + c^2$ .  
Hence, statement II alone is not sufficient to answer the question.

16. 1 Statement (I) :  $(x - y)^2 > 0$ .  
On the basis of the given information, nothing can be concluded about  $x$  and  $y$   
So, statement (I) itself is not sufficient.  
Statement (II) :  $(x + y)(x + y) = 4xy$   
 $(x + y)^2 - 4xy = 0 \Rightarrow (x - y)^2 = 0 \Rightarrow x = y$ .  
So,  $x \geq y$ . So, statement (II) in itself is sufficient.

17. 2 **Using statement I:**

$$\frac{1}{x} + \frac{1}{y} + \frac{1}{xy} = 1$$

$$\Rightarrow y + x + 1 = xy \quad \dots(i)$$

Now since  $x$  and  $y$  are prime number, the only prime numbers which satisfy the above equation are  $x = 2, y = 3$  or  $x = 3, y = 2 \Rightarrow xy = 6$

Applying AM  $\geq$  GM inequality

$$\Rightarrow \frac{21x + 14y}{2} \geq 7\sqrt{6xy} \Rightarrow 21x + 14y \geq 84$$

Therefore, the least value of  $21x + 14y$  is 84.

**Using statement II:**

$$xy = 6 = 1.6 = 3.2$$

$$\Rightarrow (x, y) = (1, 6), (6, 1), (3, 2) \text{ or } (2, 3)$$

The value of the given expression will be minimum at  $x = 2$  and  $y = 3$ .

$$\therefore \text{Min}(21x + 14y) = 21 \times 2 + 14 \times 3 = 84.$$

18. 4 Let us consider two cases:  
(a) If 5 min remaining the score was 0 – 2. Then final score could have been 3 – 3. [Assuming no other Indian scored]  
(b) But if the score before 5 min was 1 – 3, then final score could have been 4 – 3.

From statement I, we know only the number of goals made by India in the last 5 minutes. But, as we don't know what the opponent team did in the last 5 minutes, we can't conclude anything. So statement I alone is not sufficient.

Similarly, statement II does not talk about the total number of goals scored by India. So statement II is not sufficient.

Using both the statements, we have two possibilities:

(I) If Korea had scored 3 goals 5 minutes before the end of the match India would have scored 1 goal. In the last 5 minutes as India made 3 goals and Korea on the whole made 3 goals, we can conclude that India had won the game.

(II) If Korea had scored 3 goals 5 minutes before the

end of the match, India would have scored zero goals. In the last 5 minutes, as India made 3 goals and Korea on the whole made 3 goals, we can say the match was drawn.

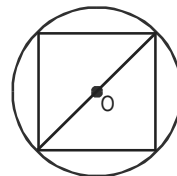
Hence, we cannot answer the question even by using both the statements together.

19. 1 From I, if by adding 12 students, the total number of students is divisible by 8. By adding 4 students, it will be divisible by 8.

20. 1 Statement I gives the capacity of boat and is of no help in finding out the number of round trips.  
From statement II round trips can be calculated since we know the total time taken is 12 hr.

21. 3 Statement I gives the rate and statement II gives the size. It is like statement I gives the speed and statement II the distance and we are to find out time. So both statements are needed.

22. 2



We know that the diameter of circle will be the diagonal of the square.

Thus, from any of the two statements, we can find out the areas of the circle and square.

23. 4 Statement I gives a general figure of Ram and Gopal. Statement II does not give any idea of how many apples Ram and Gopal purchased.  
Both statements together also cannot give any result.

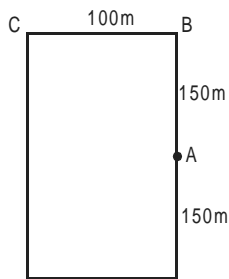
24. 4 Statement I gives the weight of the heaviest and lightest members of the class but no indication as to the number of students in the class or the total weight of the students is there. The second statement is also inconclusive, making our answer choice as (4).

25. 3 Statement I gives the thickness of the wall which is of no use to find the volume of the tank since we do not know the radius of the sphere.

Statement II gives us the answer as the volume of water displaced is equal to the volume of the immersed tank.

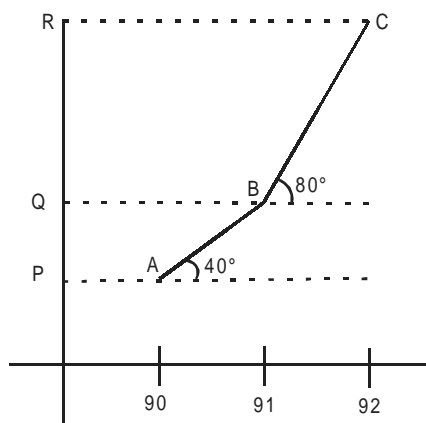
So to find the exact storage volume of the tank both the statements are needed.

26. 3 Statement I by itself does not solve the problem but it does tell us about the shape of the field. However, it fails to give information about the points A, B and C as to whether they be at the end of the field, etc. This data is given by the second statement, from which it is known that



The polygon has the length =  $150 \times 2 = 300$  m and the breadth = 100 m and also that it is a rectangle (from A). Thus, the maximum distance is the diagonal length of the rectangle.

27. 1



$$\text{Ratio of revenues} = \frac{RQ}{QP}$$

Since in a line graph, the years are uniformly spaced

$$\Rightarrow \frac{RQ}{QP} = \frac{\tan 80^\circ}{\tan 40^\circ}$$

So the ratio can be determined from statement I alone.

Statement II is immaterial because we intend to find the ratio and not absolute figures.

28. 3 From statement I, their ranks will be A - 4, B - 1, C - 2, D - 3.

From statement II, also their ranks will be A - 4, B - 1, C - 2, D - 3.

29. 1 Let there be  $n$  members in the club.

$$\text{From statement I, we have } \frac{600}{n-5} = \frac{600}{n} + 10.$$

Solving this equation, we get  $n = 20$ . Therefore, we can find the payment of each member.

Hence, statement I alone is sufficient.

From statement II, we cannot determine anything.

30. 1  $F + n = 4(k + n)$  ... (i)

$$M + n = 3(k + n) \quad \dots (ii)$$

From the above equations

$$F - M = (k + n)$$

From statement I

$$F - M = 10 \Rightarrow k + n = 10$$

$$F + n = 40$$

$$M + n = 30$$

$$\Rightarrow F + M + 2n = 70$$

Hence, from statement I alone, we can get the answer.