Data Sufficiency

40

INTRODUCTION

Data sufficiency problems as the name suggests test the ability of the students to judge whether the data given in the form of statements is sufficient to answer the question asked. There is no need to solve the problem. All you need to determine is whether it would be possible to answer the question. As soon as you can tell that an answer would be obtainable, you can stop working.

In each of these problems, a question is asked followed by two or three statements. You have to study the question and all the statements given and decide whether any information provided in the statement (s) is/are redundant and can be dispensed with while answering the questions. You have to decide whether the question can be answered with anyone or two of the statements or all the three statements are required to answer the question. The answer number bearing the combination of statements or, single statement which is necessary to answer the question is your answer.

Illustration 1: What is the perimeter of a rectangular garden?

A. The area of the garden is 2400 m^2.

B. The diagonal of the garden is 50 m.

C. The ratio between the length and the breadth of the garden is 3:2.

(a) All *A*, *B* and *C* together are required

(b) Any two of *A*, *B* and *C* are sufficient

(c) Only A and *B* are required

(d) Only *B* and *C* are required

(e) None of these

Solution: **(b)** Let the length and breadth of rectangle be l and b, respectively.

$A \rightarrow l \times b = 2400.$

$B \rightarrow l^2 + b^2 = 2500$

$C \rightarrow l = \frac{3}{2}b.$

Solving any two of the above equations, we get the values of l and b.

Illustration 2: Two friends Anu and Manu earned profit in a business. Find out their shares.

A. Anu had invested her capital for 9 months and Manu for 1 year

B. The ratio of their capitals was 4:3

C. The total profit was ₹27500

(a) Only *B* and *C* together are sufficient

(c) All together are necessary

(d) Either *B* or *A* and *C* together are sufficient

(e) All even together are not sufficient

Solution: **(c)** From (A) and (B), we have

Ratio of profits = 9 × 4:12 × 3 = 36:36 = 1:1.

Now, with the help of (C), share of each of them

$$= \frac{27500}{1+1} \times 1 = ₹13750$$

EXERCISE-I

Directions (1–50): Each of the questions below consists of a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and...

Give answer (a) If the data in statement I alone are sufficient to answer the question, while the data in statement I alone are not sufficient to answer the question.

Give answer (b) If the data in statement II alone are sufficient to answer the question, while the data in statement I alone are not sufficient to answer the question.

Give answer (c) If the data either in statement I alone or in statement II alone are sufficient to answer the question.

Give answer (d) If the data even in both statements I and II together are not sufficient to answer the question.

1. What will be the cost of the second necklace?

I. The cost of the first necklace is $\frac{1}{5}$ more than the second and the cost of the third necklace is $\frac{2}{5}$ more than the second. The total cost of all the three necklaces is ₹120000.

II. The cost of the first necklace is $\frac{2}{5}$ more than the second. The cost of the third necklace is the least and total cost of all the three necklaces is ₹120000.

2. How many items did the distributor purchase?

I. The distributor purchased all the items for ₹4500.
II. If the distributor had given ₹5 more for each item he would have purchased 10 items less.

3. How long will it take to fill a tank?

I. One pipe can fill the tank completely in 3 hrs.
II. Second pipe can empty that tank in 2 hrs.

4. What will be the area of a plot in sq. metres?

I. The length of that plot is 113 times the breadth of that plot.
II. The diagonal of that plot is 30 metres.

5. How much minimum marks will be required to pass an examination?

I. Student *A* secured 32% marks in that examination and he failed by 1 mark. Student *B* secured 36% marks in the same examination and his marks were 1 more than the minimum pass marks.
II. Student *A* secured 30% of full marks in the examination and he failed by 2 marks. If he had secured 5 more marks his percentage of marks would have been 40%.

6. What will be the cost of painting of the inner wall of a room if the rate of painting is ₹20 per.m^2?

I. Perimeter of the floor is 44 feet.
II. Height of the wall of the room is 12 feet.

7. What is the ratio of the number of boys and girls in a school?

I. Number of boys is 40 more than the girls.
II. Number of girls is 80 percent of the number of boys.

8. What is the difference between two numbers?

I. First number is 60 percent of the other number.
II. 50 percent of the sum of first and second numbers is 24.

9. What was the speed of the running train?

I. Length of the train was 120 m.
II. The train crossed the other train whose length was 180 m in 4 sec.

10. What will be the compound interest after 3 years ?

I. Rate of interest is 5 percent.
II. The difference between the total simple interest and the total compound interest after two years is ₹20.

11. How many boys are there in the class?

I. The class has total 45 children and ratio of boys to girls is 4:5.
II. The ratio of girls to boys is 4:5 and boys are nine more than the girls.

12. What is the average monthly income per family member?

I. Each male earns ₹1250 a month and each female earns ₹1050 a month.
II. Ratio of males to females in the family is 2:1.

13. What is the value of $m - n \div 37$?

I. m is the largest possible six-digit number and n is the smallest possible six-digit number.
II. The difference between m and n is known.

14. What selling price should be marked on the article?

I. Discount of 5% is to be given and profit percentage should be double the discount. Purchase cost is in the range of ₹300 ₹400.
II. 10% discount is to be allowed and 15% profit is to be obtained on the purchase cost of ₹200 of the article.

15. What is the cost of polishing the rectangular floor?

I. Room is 9 m long and 7 m wide.
II. Cost of polishing the floor of 10 m by 5 m is ₹112.50.

16. How many marks did Prakash obtain in Mathematics?

I. Prakash secured on an average 55 percent marks in Mathematics, Physics and Chemistry together.
II. Prakash secured 10 percent more than the average in Mathematics.

17. What is the rate of compound interest on a sum of money?

I. The total compound interest at the end of two years is ₹820.
II. The total simple interest at the same rate on ₹5000 at the end of three years is ₹750.

18. Which is the smaller of the two numbers?

I. The difference between these two numbers is one-third of the largest number.
II. The sum of these two numbers is 30.

19. What is the height of a right-angled triangle?

I. The area of the right-angled triangle is equal to the area of a rectangle whose breadth is 12 cm.
II. The length of the rectangle is 18 cm.

20. What is the speed of a running train which takes 9 seconds to cross a signal post?

I. The length of the train is 90 m.
II. The train takes 27 seconds to cross a platform of 180 m.

21. What was the ratio between the ages of P and Q four years ago?

I. The ratio between the present ages of P and Q is 3:4.
II. The ratio between the present ages of Q and R is 4:5.

22. What was the cost price of the suitcase purchased by Samir?

I. Samir got 20 percent concession on the labeled price.
II. Samir sold the suitcase for ₹2000 with 25 percent profit on the labeled price.

23. What is the height of a triangle?

I. The area of the triangle is 20 times its base.
II. The perimeter of the triangle is equal to the perimeter of a square of 10 cm side.

24. What percentage rate of simple interest per annum did Ashok pay to Sudhir?

I. Ashok borrowed ₹8000 from Sudhir for four years .
II. Ashok returned ₹8800 to Sudhir at the end of two years and settled the loan.

25. What is the speed of a running train?

I. The train crosses a signal post in 6 seconds.
II. The train crosses another train running in the opposite direction in 15 seconds.

26. Train 'A' running at a certain speed crosses another train 'B' running at a certain speed in the opposite direction in 12 seconds. What is the length of train 'B'?

I. The length of both the trains together is 450 m.
II. Train 'A' is slower than train 'B'.

27. The area of a rectangle is equal to the area of a right-angled triangle. What is the length of the rectangle?

I. The base of the triangle is 40 cm.
II. The height of the triangle is 50 cm.

28. What was the total compound interest on a sum after three years ?

I. The interest after one year was ₹100 and the sum was ₹1000.
II. The difference between simple and compound interest on a sum of ₹1000 at the end of two years was ₹10.

29. What is the two-digit number where the digit at the unit's place is smaller?

I. The difference between the digits is 5.
II. The sum of the two digits is 7.

30. What is the speed of the boat in still water?

I. It takes 2 hours to cover the distance between A and B downstream.
II. It takes 4 hours to cover the distance between A and B upstream.

31. What is the rate of simple interest per annum?

I. The sum triples in 20 years at simple interest.
II. The difference between the sum and the simple interest earned after 10 years is ₹1000.

32. What is the sum which earned interest?

I. The total simple interest was ₹7000 after 7 years.
II. The total of sum and simple interest was double of the sum after 5 years .

33. A train crosses a signal post in *X* sec. What is the length of the train?

I. The train crosses a platform of 100 m in *Y* sec.
II. The train is running at the speed of 80 Km/h.

34. What is the area of a circle?

I. The circumference of the circle is 308 m,
II. The radius of the circle is 28 m.

35. *A*, *B* and C are integers. Is *B* an even number?

I. *(A + B)* is an odd number.
II. (C + *B)* is an odd number,

36. How many children are there in the class?

I. Numbers of boys and girls are in the respective ratio of 3:4.
II. Number of girls is more than the number of boys by 18.

37. What was the population of State '*A*' in 1999?

I. Population of the State increases every year by 20% and its population in 1997 was 120000.
II. Population of State *A* in 1997 was twice that of State *B* in the same year.

38. What is the cost of laying carpet in a rectangular hall?

I. Cost of the carpet is ₹450 per m^2,
II. Perimeter of the hall is 50 metre.

39. What is the rate of interest p.c.p.a.?

I. Difference between compound interest and simple interest on an amount or ₹10,000 for two years is ₹225.
II. The amount doubles itself on simple interest in $6\frac{2}{3}$ years.

40. What is a two-digit number?

I. The number obtained by interchanging the digits is smaller than the original number by 63.
II. Sum of the digits is 11.

41. By selling a product for ₹100 how much profit was earned?

I. 20% profit would have been earned if it had been sold for ₹90.
II. The profit was one-third of the purchase price.

42. A train crosses another train running in the opposite direction in *x* seconds. What is the speed of the train?

I. Both the trains are running at the same speed.
II. The first train is *y* cm long.

43. The difference between the two digits of a number is 6. What is the number?

I. The digit at the units place is bigger than the other digit.
II. The sum of the two digits is 12.

44. *X*, *Y* and *Z* are integers, is *X* an odd number?

I. An odd number is obtained when *X* is divided by 5.
II. *(X + Y)* is an odd number.

45. What is the capacity of a cylindrical tank?

I. Radius of the base is half of its height, which is 28 m.
II. Area of the base is 616 m^2. and height is 28 m.

46. What will be the compounded amount?

I. ₹200 were borrowed for 192 months at 6% compounded monthly.
II. ₹200 were borrowed for 16 years at 6%

47. What would have been the selling price per Kg of rice?

I. 50 Kg of rice was purchased for ₹3350 and ₹150 was spent on transport.
II. Profit earned was 5%

48. What will be ratio of men to women and children in the town?

I. Population of the town is 93280 of which 56100 are men.
II. The ratio of men to children is 5:2 and women are double in number than the children.

49. What will be the average weight of the remaining class?

I. Average weight of 30 children out of total 46 in the class is 22.5 Kg and that of the remaining children is 29.125 Kg. A child having weight more than 40 Kg is excluded.
II. Average weight of a class of 46 children is 23.5 Kg. A child weighing 46 Kg is dropped out.

50. What will be the number?

I. One-fifth of a number is equal to 20% of that number.

II. Thirty-five percent of a number is $\frac{7}{20}$ of that number.

Directions (51–70): Each of the questions below consists of a question and three statements numbered I, II and III given below it. You have to study the questions and decide the data in which of the statements are sufficient to answer the questions.

51. What is the speed of the train '*A*'?

I. Train *A* crosses 200-metre-long train *B* running in opposite direction in 20 seconds.

II. Speed of the train *B* is 60 Km/h.

III. Length of train *A* is twice that of train *B*.

(a) I and II only (b) II and III only

(c) I and III only (d) All, I II and III

(e) Question cannot be answered even within formation in all three statements.

52. What is the area of the isosceles triangle?

I. Perimeter of the triangle is 14 m.

II. Base of the triangle is 14 m.

III. Height of the triangle is 5 m.

(a) I and II only

(b) II and III only

(c) I and II only or, II and III only

(d) I and III only

(e) All I, II and III

53. Who earns most among *M*, *N*, *P*, *Q* and *R*?

I. *M* earns less than *P* but not less than *R*.

II. Q earns more than *M* but not equal to *N*.

III. *N* earns more than *M* and *R*.

(a) Question cannot be answered even within formation in all three statements

(b) I and II only

(c) Only I and II or only I and III

(d) Only I and III

(e) All the three statements I, II, III together are necessary for answering the question

54. What is the price of 1 dozen oranges?

I. Price of 2 dozen oranges and 1 dozen banana is ₹110.

II. Price of 3 dozen apples and 1 dozen banana is ₹170.

III. Price of 1 dozen oranges and 1 dozen apples is ₹95.

(a) Only I and II or only I and III

(b) Only I and III or only II and III

(c) Only I and II or only II and III

(d) Only II and III

(e) All the three statements I, II and III necessary for answering the question.

55. The cost of carpeting a rectangular hall will be how much?

I. Perimeter of a rectangle is 60 m.

II. Angle between width and hypotenuse is 60°.

III. The cost of carpeting the surface floor is ₹125 per m^2.

(a) Only I and II

(b) Only II and III

(c) Only I and III or only II and III

(d) Question cannot be answered even within formation in all three.

(e) All the three statements I, II and III together are necessary for answering the question.

56. What is Sudha's present salary?

I. The salary increases every year by 15%

II. Her salary at the time of joining was ₹10000.

III. She had joined exactly 5 years ago.

(a) II and III only (b) I and II only

(c) All I, II and III (d) I and III only

(e) None of these

57. What was the amount of profit earned?

I. 10% discount was offered on the labelled price.

II. Had there been not discount, profit would have been 30%

III. Selling price was more than the cost price by 20%

(a) I and either II or III

(b) Any two of the three

(c) All I, II and III

(d) Either I or II and III

(e) Question cannot be answered even with the information in all three statements.

58. How many students are there in all in the institute of Arts, Commerce and Science?

I. 20% of the students study Science.

II. The numbers of students studying Arts and Commerce are in the ratio of 3:5.

III. The number of students studying Commerce is more than that studying Science by 375.

(a) II and III only

(b) III and either I or II only

(c) Any two of the three

(d) All I, II and III

(e) Question cannot be answered even with the information in all three statements.

59. What is the cost of flooring a rectangular hall?

I. Perimeter of the hall is 76 m
II. Area of the hall is 336 m^2.
III. Cost of flooring per square metre is ₹550.
(a) I and III only (b)II and III only
(c) Any two of the three (d)All I, II and III
(e) None of these

60. In how many days can a work be completed by *A* and *B* together?

I. *A* alone can complete the work in 8 days.
II. If *A* alone works for 5 days and *B* alone works for 6 days, the work gets completed.
III. *B* alone can complete the work in 16 days.
(a) Any two of the three
(b) II and either I or III
(c) I and II only
(d) II and III only
(e) None of these

61. What is the cost of flooring a rectangular hall?

I. The length and the breadth of the hall are in the ratio of 3:2.
II. The length of the hall is 48 m and the cost of flooring is ₹850 per m^2.
III. The perimeter of the hall is 160 m and the cost of flooring is ₹850 per m^2.
(a) Only I and II (b) Only I and III
(c) Only III (d) Only I and either II or III
(e) Any two of the three.

62. What is the rate of interest p.c.p.a.?

I. The amount doubles itself in 5 years on simple interest.
II. Difference between the compound interest and the simple interest earned on this amount in two years is ₹400.
III. Simple interest earned per annum is ₹2000.
(a) Only I
(b) Only II and III
(c) Any two of the three
(d) All I, II and III
(e) Only I or only II and III

63. What is a two-digit number?

I. The difference between the two-digit number and the number formed by interchanging the digits is 27.
II. The difference between the two digits is 3.
III. The digit at unit's place is less than that at ten's place by 3.
(a) Only I and II
(b) Only I and either II or III
(c) Only I and III
(d) All I, II and III
(e) Even with all the three statements the answer cannot be given.

64. What is the present age of Subir?

I. The present age of Subir is half that of his father.
II. After 5 years the ratio of Subir's age to his father'swill be 6:11.
III. Subir is 5 years younger than his brother.
(a) Only I and II (b) Only I and III
(c) Only II and III (d) All I, II and III
(e) Even with all the three statements answer cannot be given.

65. In how many days can 10 women finish a work?

I. 10 men can complete the work in 6 days.
II. 10 men and 10 women together can complete the work in $3\frac{3}{7}$ days.
III. If 10 men work for 3 days and thereafter 10 women replace them, the remaining work is completed in 4 days.
(a) Only I and II.
(b) Any two of the three
(c) Only I and III
(d) Only II and III
(e) None of these

66. In how many days can a work be completed by *A*, *B* and *C* together?

I. *A* and *B* together can complete the work in 6 days.
II. B and *C* together can complete the work in $3\frac{3}{4}$ days.
III. *A* and *C* together can complete the work in $3\frac{1}{3}$ days.
(a) Only I (b) Only II
(c) Only III (d) Anyone of the three
(e) Information in all the three statements is necessary to answer the question.

67. What is the cost of painting the two adjacent walls of a hall which has no windows or doors?

I. The area of the hall is 24 m^2.
II. The breadth, length and the height of the hall are in the ratio of 4:6:5.

III. Area of one wall is 30 m^2.
(a) Only I (b) Only II
(c) Only III (d) Either I or III
(e) Data inadequate.

68. What is the total compound interest earned at the end of three years ?
I. Simple interest earned on that amount at the same rate and for the same period is ₹4500.
II. The rate of interest is 10 p.c.p.a.
III. Compound interest for three years is more than the simple interest for that period by ₹465.
(a) OnlyI and II (b) Only II and III
(c) Only I and III (d) Anyone of the three
(e) Either II or III only.

69. What is the per cent profit earned by a shopkeeper on selling the articles in his shop?
I. Labelled price of the articles sold was 130% of the cost price.
II. Cost price of each article was ₹550.
III. A discount of 10% on labelled price was offered.
(a) Only I (b) Only II
(c) Only III (d) All the three are required.
(e) Question cannot be answered even with the information in all the three statements.

70. What is the average salary of 15 employees?
I. Average salary of 7 clerical cadre (out of the 15 employees) employees is ₹8500.
II. Average salary of 5 officer cadre (out of the 15 employees) employees is ₹10000.
III. Average salary of the 3 sub-staff employees (out of the 15 employees) is ₹2500.
(a) None (b) Only I
(c) Only II (d) Only III
(e) Question cannot be answered even within formation in all three statements.

Directions (71–85): In each of the following questions, a question is asked followed by three statements. You have to study the questions and all the three statements given and decide whether any information provided in the statement(s) is/are redundant and can be dispensed with while answering the questions.

71. What will be the cost of fencing a circular plot?
$\left(\pi = \frac{22}{7}\right)$...
A. Area of the plot is 616 m^2.
B. Cost of fencing a rectangular plot whose perimeter is 120 m is ₹780.
C. Area of a square plot with side equal to the radius of the circular plot is 196 m^2.
(a) *A* only (b) C only
(c) *A* or C only (d) *B* only
(e) Question cannot be answered even within formation in all three statements.

72. What will be the sum of the ages of father and the son after five years?
A. Father's present age is twice son's present age.
B. After ten years the ratio of father's age to the son's age will become 12:7.
C. Five years ago the difference between the father's age and son's age was equal to the son's present age.
(a) *A* or *B* only (b) *B* or C only
(c) *A* or *C* only (d) C only
(e) *A* or *B* or *C* only

73. The difference between the compound interest and the simple interest at the same rate on a certain amount at the end of two years is ₹12.50. What is the rate of interest?
A. Simple interest for two years is ₹500.
B. Compound interest for two years is ₹512.50.
C. Amount on simple interest after two years becomes ₹5500.
(a) *A* or *B* only (b) *A* or *C* only
(c) *C* only (d) *C* and either *A* or *B*
(e) Any two of (*A*), (*B*) and (*C*)

74. 12 men and 8 women can complete a piece of work in 10 days. How many days will it take for 15 men and 4 women to complete the same work?
A. 15 men can complete the work in 12 days.
B. 15 women can complete the work in 16 days.
C. The amount of work done by a woman is three-fourth of the work done by a man in one day.
(a) *A* or *B* or C only (b) *B* or *C* only
(c) *C* only (d) Any two of the three
(e) *B* only

75. *P*, *Q* and *R* together invested an amount of ₹20000 in the ratio of 5:3:2. What was the per cent profit earned by them at the end of one year?
A. *Q's* share in the profit is ₹2400.
B. The amount of profit received by *P* is equal to the amount of profit received by *Q* and *R* together.
C. The amount of profit received by *Q* and *R* together is ₹4000.
(a) *B* and *A* or *C* only (b) *A* or *C* only
(c) *A* and *B* both (d) *B* and *C* both
(e) Information in all the three statements is required to answer the question.

76. 8 men and 14 women are working together in a field. After working for 3 days, 5 men and 8 women leave the work. How many more days will be required to complete the work?

A. 19 men and 12 women together can complete the work in 18 days.
B. 16 men can complete two-third of the work in 16 days.
C. In a day, the work done by three men is equal to the work done by four women.
(a) Any two of the three together are sufficient
(b) *B* and *C* only (c) *C* only
(d) *B* or *C* only (d) *A* or *B* or *C*

77. Which is the area of the given right-angled triangle?

A. Length of the diagonal is 5 cm.
B. Perimeter of the triangle is four times its base.
C. One of the angles of the triangle is of 60°.
(a) *C* only (b) *A* and *C* only
(c) *B* or *C* only (d) *B* and *C* both
(e) *A* or *B* or *C*

78. Three friends *X*, *Y* and *Z* started a partnership business investing money in the ratio of 5:4:2, respectively for a period of 3 years. What is the amount received by *X* as the share in the total profit?

A. Total amount invested in the business is ₹22000/-.
B. Profit was distributed after a period of 2 years.
C. The average amount of profit earned per year is ₹2750.
(a) *A* only (b) *B* only
(c) *C* only (d) *A* or *C* only
(e) *A* or *B* or *C*

79. How much time will the train '*X*' take to cross another train '*Y*' running in opposite direction?

A. Train '*X*' crosses a signal pole in 6 seconds.
B. Ratio of the speeds of trains '*X*' and '*Y*' is 3:2.
C. Length of the two trains together is 500 m.
(a) *A* only (b) *B* only
(c) *C* only (d) *A* and *B* only
(e) The question cannot be answered even with the information in all the three statements.

80. What will be the cost of painting the four walls of a room with length, width and height 5 m, 3 m and 8 m respectively? The room has one door and one window.

A. Cost of painting per m^2 is ₹25.00
B. Area of window of 2.25 m^2 is half of the area of the door.
C. Area of the room is 15 m^2.
(a) *A* only (b) *B* and *C* together
(c) *A* and *B* together (d) *C* only
(e) All are required to answer the question.

81. What is *R*'s share of profit in a joint venture?

A. *Q* started a business investing ₹80000/-.
B. *R* joined him after 3 months.
C. *P* joined after 4 months with a capital of ₹120000 and got ₹6000 as his share of profit.
(a) Only *A* and *C* are required
(b) Only *B* and *C* are required
(c) All *A*, *B* and *C* together are required
(d) Even with all *A*, *B* and *C* the answer cannot be arrived at.
(e) None of these

82. What is the area of a right-angled triangle?

A. The perimeter of the triangle is 30 cm.
B. The ratio between the base and the height of the triangle is 5:12.
C. The area of the triangle is equal to the area of rectangle of length 10 cm.
(a) Only *B* and *C* together are required
(b) Only *A* and *B* together are required
(c) Only either *A* or *B* and *C* together are required
(d) Only *A* and *C* together are required
(e) None of these

83. What is the sum of two numbers?

A. The bigger of these two numbers is 6 more than the smaller number.
B. 40% of the smaller number is equal to 30% of the bigger number.
C. The ratio between half of the bigger number and one-third of the smaller number is 2:1.
(a) Only *B* and C together are required
(b) Only *A* and *B* together are required
(c) Any two of *A*, *B* and *C* together are required
(d) All *A*, *B* and *C* together are required
(e) None of these

84. How many marks did Arun get in English?

A. Arun secured an average of 60 marks in four subjects including English.
B. He secured a total of 170 in English and Mathematics together.
C. He secured a total of 180 in Mathematics and Science together.
(a) All *A*, *B* and *C* together are required
(b) Only *A* and *B* together are required

(c) Only *B* and *C* together are required
(d) Only *A* and *C* together are required
(e) None of these

85. What was the profit earned on the cost price by Mahesh by selling an article?

A. He got 15% concession on labelled price in buying that article.
B. He sold it for ₹3060/-
C. He earned a profit of 2% on the labelled price.
(a) Only *A* and *B* together are required
(b) Only *B* and *C* together are required
(c) Only either *A* or *C* and *B* together are required
(d) Even with all *A*, *B* and *C* the answer cannot be arrived at.
(e) All *A*, *B* and *C* together are required.

ANSWER KEYS

EXERCISE-I

1. (a)	**2.** (e)	**3.** (d)	**4.** (e)	**5.** (c)	**6.** (d)	**7.** (b)	**8.** (e)	**9.** (e)	**10.** (e)	**11.** (c)	**12.** (e)	**13.** (a)
14. (b)	**15.** (e)	**16.** (d)	**17.** (b)	**18.** (e)	**19.** (d)	**20.** (c)	**21.** (d)	**22.** (e)	**23.** (d)	**24.** (e)	**25.** (d)	**26.** (d)
27. (d)	**28.** (c)	**29.** (e)	**30.** (d)	**31.** (a)	**32.** (e)	**33.** (c)	**34.** (c)	**35.** (d)	**36.** (e)	**37.** (a)	**38.** (d)	**39.** (c)
40. (e)	**41.** (c)	**42.** (d)	**43.** (e)	**44.** (a)	**45.** (c)	**46.** (c)	**47.** (e)	**48.** (b)	**49.** (b)	**50.** (d)	**51.** (d)	**52.** (b)
53. (a)	**54.** (e)	**55.** (e)	**56.** (c)	**57.** (e)	**58.** (d)	**59.** (b)	**60.** (a)	**61.** (e)	**62.** (e)	**63.** (e)	**64.** (a)	**65.** (b)
66. (e)	**67.** (e)	**68.** (d)	**69.** (b)	**70.** (b)	**71.** (c)	**72.** (e)	**73.** (e)	**74.** (d)	**75.** (a)	**76.** (e)	**77.** (b)	**78.** (d)
79. (e)	**80.** (d)	**81.** (d)	**82.** (b)	**83.** (e)	**84.** (e)	**85.** (c)						

EXPLANATORY ANSWERS

EXERCISE-I

1. (a) From statement I,
Ratio of the costs of first, second and third necklace is 6:5:7.
Hence, the price of second necklace can be calculated.

2. (e) From Statement I,

$$\text{Rate of an item } = \frac{4500}{x} \qquad \cdots(1)$$

Here, x = total number of items
Combining statement II and (i), we have

$$\left(\frac{4500}{x}+5\right)(x-10)=4500$$

$$\text{or, } x^2-10x-9000=0 \quad \therefore \quad x=100$$

Hence, both statements together are sufficient

4. (e) Combining statements (I) and (II),
$l^2 + b^2 = 9000$

$$\frac{25}{9}b^2+b^2=900 \quad \therefore \quad b=15 \text{ m and } l=25 \text{ m}$$

$\therefore$ Area = 375 m^2.

5. (c) From statement I,
32% + 1 = 36% − 1 = Minimum pass marks
$\therefore$ Minimum pass marks = 17
From statement II,
Minimum pass marks = 30% + 2 and
(40 − 30)% = 5 $\therefore$ 30% = 15
$\therefore$ Minimum pass marks = 15 + 2 = 17
Hence, either *A* or *B* alone is sufficient.

6. (d) From the statement I, we will get the sum of length and breadth, but we need individual values of length and breadth.

7. (b) I → $B - G = 40$

II → $G = 80\%$ of $B = \frac{4}{5}B$

$\therefore \quad B:G = 5:4$

8. (e) I → $a = 60\%$ of b,

where a and b are the first and second numbers, respectively.

$$a = \frac{6}{10}b,$$

II → $7\ (a + b)50\% = 24 \quad \therefore \quad a + b = 48$

After combining these two statements we get the difference between two numbers as 12.

9. (e) Combining both the statements, we get the speed of

$$\text{train} = \frac{180+120}{4} \times \frac{18}{5} = 270 \text{ Km/h.}$$

10. (e) I → $R = 5\%$

II → ($CI - SI$) for two years = ₹20

Combining I and II and using

$$\text{Sum} = \frac{\text{Diff} \times 100 \times 100}{\text{Rate} \times \text{Rate}} = \frac{20 \times 100 \times 100}{25}$$
$$= ₹8000$$

$$\text{So, } CI = 8000\left(1 + \frac{5}{100}\right)^3 - 8000 = ₹1261.$$

11. (c) I → Number of boys in the class $= \frac{4}{9} \times 45 = 20$

II → $\frac{B}{G} = \frac{5}{4}$ and $B - G = 9$

Solving, the above two, we get $B = 45$.

12. (e) I → $M = 1,250$ and $F = 1050$

II → $M:F = 2:1$

On combining both the statements,

$$\text{Average} = \frac{2K \times 1250 + K \times 1050}{3K} = \frac{2500 + 1050}{3}$$
$$= 1183.33.$$

13. (a) 1 → $m = 999999$, $n = 1000000$

$\therefore \quad m - n$, $37 = 999999 - 1000000 \div 37$

$= 999999 - 2702.70 = 997296.30$

II → $m - n$ = known, but neither the value of *'m'* is known nor the value of *'n'* is known. So, we cannot find the value of $m - n + 37$ by this statement.

14. (b) I → The fixed value of CP is not given, so SP of the article cannot be determined.

II → Let, x be SP of an article

$$x \times \frac{90}{100} = \frac{200 \times 115}{100} \quad \therefore \quad x = \frac{200 \times 115}{90} = ₹255.55.$$

15. (e) I → Area of the room = $9 \times 7 = 63$ m^2

$$\text{II} \rightarrow \text{Rate} = \frac{\text{Cost of polishing the floor}}{\text{Area of floor}}$$
$$= \frac{112.50}{10 \times 5} = 2.25 \text{ per m}^2$$

$\therefore$ Combining both the statements, cost of polishing the rectangular floor = 63×2.25 = ₹141.75.

16. (d) I. $M + ph + ch = 165\%$

II. $Pr \rightarrow M + 10\%$ (average)

17. (b) I. CI in two years = ₹820

$$\text{II. Rate} = \frac{250}{5000} \times 100 = 5\%$$

18. (e) I. $x - y = \frac{1}{3}x$, or, $2x - 3y = 0$

II. $x + y = 30$

By combining I and II, we get $y = 12$.

19. (d) I. Area of right-angled triangle = $12 \times L$

II. $L = 18$ cm.

$\therefore$ By combing I and II we can find the area of right-angled triangle, but the height cannot be determined in absence of the base of the triangle.

21. (d) For solving this question, we want two equations in terms of P and Q.

22. (e) Combing both the statements together, let the labelled price be ₹100.

Now, SP of the suitcase = 125% of 100 = ₹125

$$\therefore \quad \text{Labelled price} = \frac{2000}{125} \times 100 = ₹1600$$

$$\therefore \quad \text{CP of the suitcase} = 1600 \times \frac{3}{4} = ₹1200.$$

23. (d) Here, we do not know the type of triangle. If the triangle is right-angled, then the height can be determined with the help of statement I alone.

24. (e) Combining both the statements together,

$$\text{Rate of interest} = \frac{800}{2 \times 8000} \times 100 = 5\%$$

26. (d) Here, neither the speed of the train nor the individual length of the train is given. Hence, (d) is the correct answer.

27. (d) When we combine statements I and II together, we can find the area of the triangle, which is also the area of the rectangle. But without knowing the breadth of the rectangle, length of the rectangles cannot be determined.

28. (c) I. $\rightarrow$ Rate of interest $= \frac{100}{1000} \times 100 = 10\%$

$\therefore$ CI at the end of 3 years $= 1000 \times \frac{33.1}{100} = ₹331$

II. $\rightarrow$ Rate of interest $= \sqrt{\frac{10 \times 100 \times 100}{1000}} = 10\%$

$\therefore$ CI at the end of 3 years $= 1000 \times \frac{33.1}{100} = ₹331.$

29. (e) Let, the two-digit number be $10x + y (y < x)$

I. $x - y = 5$

II. $x + y = 7$

When we combine both statements together value of *'x'* and *'y'* can be determined. Hence, both statements together are sufficient to answer the question.

30. (d) Let, the distance between A and B be D Km and the speed of the boat and current in still water be x Km/h and y Km/h, respectively.

I. $\rightarrow D = (x - y)^2$

II. $\rightarrow D = (x - y)^4$

Even if we combine both statements, we cannot find out the answer, because we have two equations and three variables.

31. (a) I. $R = (3-1) \times \frac{100}{20} = 10\%$

II. Here, the sum is not given. Therefore, statement I alone is sufficient.

32. (e) From I, we can calculate the SI after 5 years. When we combine with II, we can get the value of the sum.

i.e., $(P + 5000) = 2P$ or, $P = ₹5000$.

33. (c) Let, the length of the train be *'d'* m.

Speed of the tram $= \frac{d}{X}$

I. We know that when a train crosses a platform, it crosses not only its length but also the length of the platform.

i.e., $\frac{d}{X} = \frac{d+100}{Y}$ or, $d = \frac{100X}{Y-X}$

II. Length of the train $(d) = 80 \times \frac{5}{18} X = \frac{200X}{9}$

Therefore, either I alone or II alone is sufficient to answer the question.

34. (c) I. Radius of circle $= \frac{308 \times 7}{2 \times 22} = 49$ m

Area of circle $= \frac{22}{7} \times 49 \times 49 = 7546$ m^2

II. Area of circle $= \frac{22}{7} \times 28 \times 28 = 2464$ m^2

Hence, either I alone or II alone is sufficient for answering the question.

35. (d) I. $A + B$ is odd $\Rightarrow$ If A is an even number then B will be an odd number and vice versa.

II. $C + B$ is odd $\Rightarrow$ if B is an even number then C will be an odd number and vice versa.

So, even by combining the two statements together, we are not able to say that B is an even integer.

36. (e)

From I: Ratio of boys and girls $= 3k : 4k$

From II: Number of girls − Number of boys = 18

From I and II: $4k - 3k = 18$ $\therefore$ $k = 18$

$\therefore$ $4k + 3k = 18 \times 7 = 126$.

37. (a) Only I alone is sufficient.

38. (d) To find out the cost of laying carpet we need (i) cost of carpet per m^2 and, (ii) Area of the floor tobe carpeted. Both the information even together are not sufficient to fulfil our need.

39. (c) We know, if we have been given difference of CI and SI during two years, then this difference (D) is equal to

$\frac{P \times r^2}{100^2}$

where, P = Principal, r = rate of interest

From I: We get the value of P and D. Hence, I alone is sufficient.

Again, we known SI $= \frac{P \times r \times T}{100}$

where, P = principal

r = rate of interest

T = time period

From II: We get value of $P = x$(say).

Then, SI = x and $T = 6\frac{2}{3}$ years

Hence, using the above formula we can get rate of interest from II alone also.

40. (e) Suppose units place of number is occupied by y and tens place by x.

From I: $(10x + y) - (10y + x) = 63$

$\Rightarrow$ $9x - 9y = 63$

$\Rightarrow$ $x - y = 7$ ...(1)

From II: $x + y = 11$ ...(2)

From equations (i) and (ii), $x = 9$, $y = 2$

Hence, required number = 92

Basically, to answer these type of questions we need the following information:

A. Difference of units and tens digits of the two-digit number.

B. Sum of units and tens digits.

C. Comparison of the value of units and tens digits.

With the help of the information in statements I and II together we get the required information.

41. (c) I. CP $= 90 \times \frac{100}{120} = ₹75$

Profit = 100 − 75 = ₹25

II. SP = CP + Profit

or, $x + \frac{x}{3} = 100$ or, $x = \frac{100 \times 3}{4} = 75$

∴ Profit = 75/3 = ₹25

Therefore, either statement I or II alone is sufficient to answer the question.

42. (d) The length of the other train is not given inany of the statements.

43. (e) Let, the digits be x and y. We are given $x - y = 6$ (Assume $x > y$)

From statement I: x occupies units place

From statement II: $x + y = 12$

With the help of information in the question part and in statement II, we can find the value of x and y easily because there are two equations to know about two unknowns. But to determine the number we need the help of statement I.

44. (a) Statement I alone is sufficient to answer the question .We know that whenever any odd number is divided by any odd number, it gives an odd number.

45. (c) We know the capacity of a cylindrical tank can be found out by using the following formula:

Area of the base of cylinder × height of cylinder or, 10 $r^2 \times h$, where r = radius of cylinder

h = height of cylinder

Now,

Statement I gives the value of r and h. Hence, statement I alone is sufficient. Again, statement II gives information about area of the base and height. Hence, statement II alone is also sufficient.

47. (e) $\text{SP} = \frac{(3350 + 150) \times \frac{105}{100}}{50}$ per kg.

48. (b) Ratio of men:women:children = 5:4:2

51. (d) I. $V_A + V_B = \frac{D_A + 200}{20}$

II. V_B = 60 Km/h

III. D_A = 2 ₹200 = 400 m.

Putting the values of II and III in I, we get the value of V_A = 48 Km/h.

52. (b) I. $a + b + c = 14$ where, $b = c$

II. a = 14 cm

III. h = 5 cm

So, by combining I and II, we are getting the values of b and c as zero, which is not possible. So, only by combing II and III we get the value of the area, which is equal to 35 cm^2.

53. (a) I. $P > M$, $M > R$ or, $M = R$

II. $Q > M$, $Q > N$ or, $Q < N$

III. $N > M/R$

So, by combining anyone with the other or even by combining all, we cannot reach any conclusion about who earns most.

54. (e) Let, the price of 1 dozen oranges, 1 dozen banana and 1 dozen apples be x, y and z, respectively.

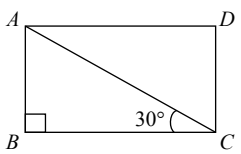
I. $2x + Y = 110$

II. $3z + Y = 170$

III. $x + z = 95$

So, by combining all, we get the values of x = 45.

55. (e)



I. $2(L + b) = 60$

∴ $L + b = 30$ ···(1)

II. In ΔABC

$\tan 30° = \frac{b}{L}$ ∴ $L : b = \sqrt{3} : 1$

Combining I and II, we get the value of $L \approx 19$ and $b \approx 11$ m

∴ Area of rectangle = 19 × 11 = 209 m^2

III. Cost = ₹125 per m^2

∴ total cost of carpeting = 125 × 209 = ₹26125.

56. (c) By combining all the three statements together,

Sudha's present salary $= 10000\left(1 + \frac{15}{100}\right)^5$.

57. (e) None of the statements give the amount of labelled price or SP. So, even by combining all the statements together, question cannot be answered.

58. (d) Statements I and II give the percentage number I of students studying in different disciplines. Combining this with (iii), the total number of students can be determined.

59. (b) Combining (ii) and (iii),

total cost = 336 × 550 = ₹184800.

60. (a) With the help of I and II, part of work done by A in 5 days $= \frac{5}{8}$, Remaining $= \frac{3}{8}$

Therefore, B alone can do the work in $6\times\frac{8}{3}=16$ days

$\therefore \quad A+B=\frac{8\times16}{24}=\frac{16}{3}$ days

Similarly, by combining any two of the three, the required number of days can be determined.

61. (e) With the help of any two statements, the value of length and breadth can be calculated. And, combing this with the cost per m^2 we get the total cost of flooring the rectangular hall.

62. (e) From I alone,

$$\text{Rate of interest } =\frac{(2-1)\times100}{5}=20\%$$

From II and III,

$$\text{Rate of interest } =\frac{2\times \text{ diff. in CI and SI}}{\text{SI}}$$

[For 2 years only]

$$=\frac{2\times400}{4000}\times100=20\%$$

Hence, either I alone or II and III together are sufficient.

63. (e) Let, the two-digit number be $10x + y$.

I. $\Rightarrow$ $|\ 10x + y - 10y - x\ | = 27$ or, $|x - y| = 3$

II. $\Rightarrow$ $|x - y| = 3$

III. $\Rightarrow$ $x - y = 3$

Here, by taking any two, the values of x and y cannot be determined. So, choice (e) is the correct answer.

64. (a) Let, the present age of Subir and his father be S and F, respectively.

I. $S = F/2$

II. $\frac{S+5}{1+5}=\frac{6}{11}$ or, $6F-11S=25$

III. $B - S = 5$[B = age of Subir's brother]

Now, with the help of I and II together, the value of S and F can be determined.

67. (e) Cost of painting is not given, hence data inadequate.

68. (d) Let, the sum be ₹x

From the statements, I and II

$$\frac{x\times10\times3}{100}=4500 \quad\Rightarrow\quad x=₹15000$$

$$\therefore \quad \text{CI}=15000\left(1+\frac{10}{100}\right)^3-15000$$

$$= 19965 - 15000 = ₹4965$$

From the statements, I and III,

CI − SI = 465

$\therefore$ CI = 465 + 4500 = ₹4965

From the statements, II and III,

CI = ₹4965

Hence, any of them can be dispensed with.

69. (b) From the statements, I and II,

Let, the cost price of the article be ₹100.

$\therefore$ Labelled price = 130

$$\therefore \quad SP=130\times\frac{90}{100}=₹117$$

Hence, II can be dispensed with.

71. (c) (B) is necessary because only this statement gives the rate of fencing. Anyone of (A) or (C) gives the value of radius, which enables us to find the circumference.

Hence, either (A) or (C) can be dispensed with.

72. (e) Any two of the three statements are sufficient to answer the question (As to find the two unknowns we need two equations). Hence, anyone of the statements can be dispensed with.

73. (e) Anyone of the three statements is alone sufficient to answer the question. So, any two can be dispensed with.

From (A) alone:

$$\text{Rate}=\frac{(\text{CI}-\text{SI})\times2}{\text{SI}}\times100=\frac{25}{500}\times100=5\%$$

From (B) alone:

CI = ₹512.5

$\therefore$ SI = ₹512.5 − ₹12.5 = ₹500

Again, Rate

$$=\frac{(\text{CI}-\text{SI})\times2}{\text{SI}}\times100$$

$$=\frac{25}{500}\times100=5\%$$

From (C) alone:

Suppose Principal = P and Rate of Interest = r%

Then, $P\left(1+\frac{r}{100}\right)^2=5500+12.5=5512.5$ ...(1)

and, $P+\frac{2rP}{100}=5500$

or, $P\left[1+\frac{2r}{100}\right]=5500$ ...(2)

Dividing (1) by (2) we have

$$\frac{\left(1+\frac{r}{100}\right)^2}{1+\frac{2r}{100}}=\frac{5512.5}{5500} \qquad \ldots(3)$$

This is a quadratic equation which has only one variable, r. It can be solved. Hence, value of r can be obtained.

Note: is satisfied with the value $r = 5$.

So, it confirms that equation is solvable.

75. (a) Statement *(B)* is useless because it is the same as the given statement. [Profit is distributed in the same ratio as their investment. Since their investments are in ratio 5:3:2, the profit of P (= 5) is equal to the profit of Q and R together (3 + 2 = 5)]

Statement (A) alone is sufficient to answer.

(Q's share = ₹2400

$$\text{Total profit of } P+Q+R = \frac{2400}{3}\times(5+3+2)$$
$$= ₹8000$$

$$\therefore \quad \%\ \text{profit} = \frac{8000}{20000}\times 100 = 40\%$$

Similarly, statement (C) alone is sufficient to answer the question.

Hence, (B) and (A) or (C) can be dispensed with.

77. (b) Let, the length and breadth of the rectangle be l and b, respectively.

$A \rightarrow l^2 + b^2 = 25$

$B \rightarrow l + b + h = 4b$ or, $l = 3b - 5$

C $\rightarrow$ Ratio between l and b is given. After combining any of the above two statements, we get the values of l and b. Hence, any of them can be dispensed with.

78. (d) When investment ratio is given, the amount of profit can be found out with the help of C only.

80. (d) The area off our walls can be easily determined with the help of the data given in the question. Now,the area of the windows and door with the help of (B) can be subtracted in the calculated area and then multiplied with the cost given in (A).

81. (d) Investment ratio or amount is not given, hence even all statements together are not sufficient.

82. (b) Let, the base, height and hypotenuse of a right-angled triangle be b, p and h, respectively.

From A, $b + P + h = 30$ ···(1)

From B, $b{:}p = 5{:}12$ ···(2)

We know that

$h^2 = p^2 + b^2 = 25x^2 + 144x^2 = 169x^2$

$\therefore \quad h = 13x$ ···(3)

Combining equations (i), (ii) and (iii), we get

$5x + 12x + 13x = 30 \quad \Rightarrow \quad x = 1$

$$\therefore \quad \text{Area of triangle } = \frac{1}{2}\times 5\times 12 = 30 \text{ cm}^2$$

Hence, only A and B together are sufficient.

83. (e) Let, the bigger and smaller numbers be x and y, respectively.

From A, $x - y = 6$

From B, 40% of y = 30% of x or; $4y = 3x$ ···(2)

From C, $\frac{x}{3} : \frac{y}{3} = 2:1$ or, $3x = 4y$ ···(3)

We see tha equations (ii) and (iii) are same. Hence, A and either B or C is required.

85. (e) From A and B,

$$\text{Labelled price} = \frac{3,060\times 100}{85} = ₹36000 \qquad \cdots(1)$$

Combining (i) and Statement C,

$$\text{Profit} = 36000\times\frac{2}{100} = ₹72 \qquad \cdots(2)$$

Combining (ii) and Statement B,

CP = 3,060 − 72 = ₹2988

$$\therefore \quad \%\ \text{profit} = \frac{72}{2988}\times 100 = 2.40\%$$

Hence, all statements are required.