DATA INTERPRETATION & DATA SUFFICIENCY

DATA INTERPRETATION

Data interpretation questions are based on information given in tables, graphs or diagrams. These questions test the ability of the solver to interpret the information presented and select the appropriate data for answering the question.

The good news about these questions is that no new topics are tested on these sections; the same topics are tested in a different way. They test your ability to work with percentages, ratios and averages in a different context; but the ideas and principles are the same.

Data Interpretation questions require a strong understanding of fractions and percentages, and good attention to detail.

TYPES OF DATA

In Aptitude Tests, data can be presented in various forms. The most common kinds are tables, bar graphs, line graphs, pie charts, and caselets.

Tables

Tables are one of the most versatile methods for systematic presentation of quantitative data. In fact, the amount of data that can be presented in a table is much higher than that which can be presented in other graphs or charts.

Here's an example of a very simple one:

Tara's Income, 2010 to 2015

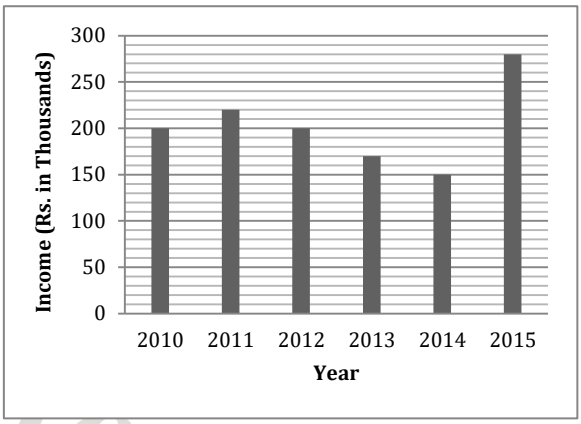
Year	Income
2010	Rs.200,000
2011	Rs.220,000
2012	Rs.200,000
2013	Rs.170,000
2014	Rs.150,000
2015	Rs.280,000

A simple question on this table may ask for Tara's earnings in a specific year, or for the change in income between two years. For this, you would basically find the amounts for both years and subtract. A more complex question may be on Tara's average yearly income over the six given years; where you would need to add the incomes of six years, and divide to locate the average.

Bar Graphs

While tables have less visual appeal, graphs and charts give a bird's eye view of the entire data, thus facilitating easier understanding and comparison. On a bar graph, the height of each column shows its value. Here's the information from the table above presented as a bar graph.

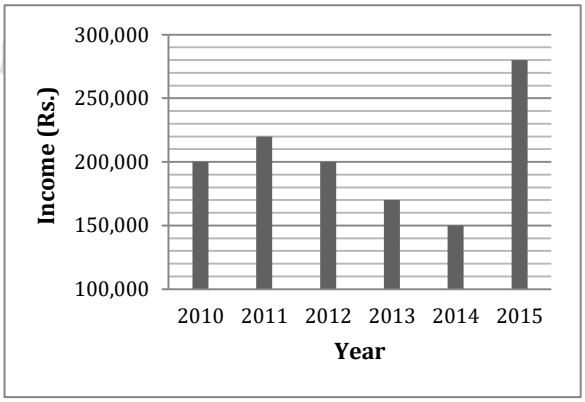
Tara's Income, 2010 to 2015



What to look out for?

1. Very often in bar charts, different colours, shades, dots, dashes, etc. are used in the bars to distinguish between continuous variables represented. Watch out for the explanatory index that shows what each colour or marking stands for.
2. The title of the bar chart at the top or bottom will indicate what the chart is all about. And there could be footnotes at the bottom to give additional information that may not be there above.
3. One axis (normally the X-axis) will represent a discrete variable while the other represents the scale for one or more continuous variables.

What's helpful about a bar graph is that you can see the relative values by looking at the heights of the bars. By looking at the graph above, for instance, it's simple to see that Tara's income in 2015 was nearly twofold her income in 2014. However, we can see this only because the scale begins at zero; the scale could simply begin some place other than zero as well.



This above graph displays the same data, however since the scale does not begin from zero, we cannot jump to conclusions on the face of it. It is evident that the income of 2015 is significantly higher than that of 2014, but we cannot immediately estimate ratios and proportions.

To figure out numerical values from a bar chart, locate the right bar, (for example, 2015 income), and move on a level plane across the highest point of the bar to the value on the scale on the left. Try not to stress over getting too precise a value; a rough value will suffice most often.

Line Graphs

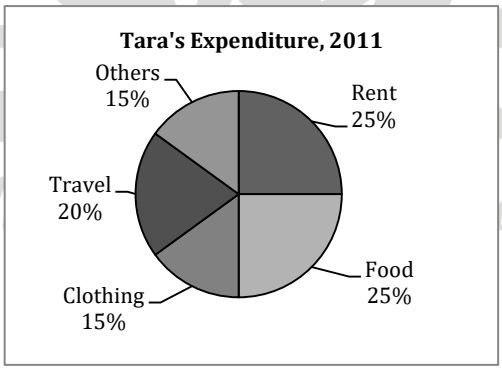
While bar charts score for their visual appeal, data related to time-series and frequency distribution are best represented through line charts. Time series is arrangement of data in chronological order, where the time may be a year, quarter, month, day or even hour. Most data related to economic or business performance are given in the form of line chart.

Line graphs follow the same principle as bar graphs, except the values are presented as points, rather than bars.

Similar to bar graphs, the value of a particular year is the vertical distance from the bottom of the graph to the line. And also as with bar graphs, you can see the relative values by looking at their heights—with the condition discussed before, that the base must be zero in order to estimate ratios.

Pie Charts

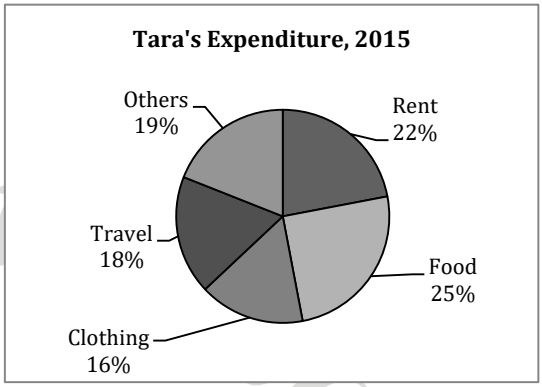
In a pie chart, data is presented in a circle that is divided into sections or segments to depict distribution. The fraction of a circle occupied by each piece of the "pie" indicates what fraction of the whole it represents. Usually, the pie chart will identify what percent of the whole each piece represents.



100% = Rs.220,000

The total size of the whole pie is usually given under the graph; either as "TOTAL = some value" or "100% = same value" or whatever. If asked to find the approximate amount of a particular piece of the pie, we should multiply the appropriate percent by the whole. For instance, to find the amount spent on rent, identify the segment labeled "Rent," and we see that rent represented 25 percent of Tara's expenditures. Since the whole was Rs.220,000, we find that her rent expenses in 2011 was 25 percent of Rs.220,000 or $\frac{1}{4}$ x Rs.220,000 = Rs.55,000

Pie charts often travel in pairs. If that is the case, be sure that you do not attempt to compare slices from one chart with slices from another. For instance, suppose we were given another pie chart for Tara's expenditures; one covering 2015.



100% = Rs.280,000

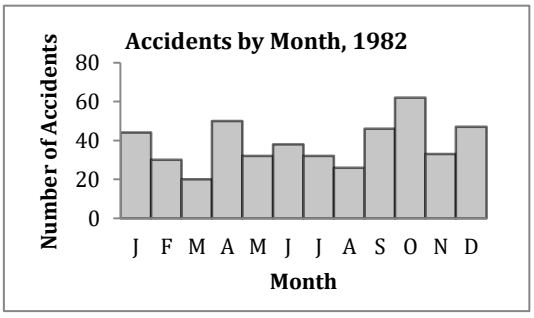
A careless glance might suggest that Tara spent less on rent in 2015 compared to 2011. Wrong! Her rent expense in 2011 was a greater percentage of her income than in 2015, but her 2015 income was much greater than her 2011 income. In fact, she paid Rs.6600 more for rent in 2015 than in 2011. Since the totals for the two charts are different, the pieces of the pie are not directly comparable.

Double Graphs

Very often you could be presented two graphs for the same set of questions, or one graph and a table. The two charts or graphs will be related in some way.

Accidents in Crazy Town

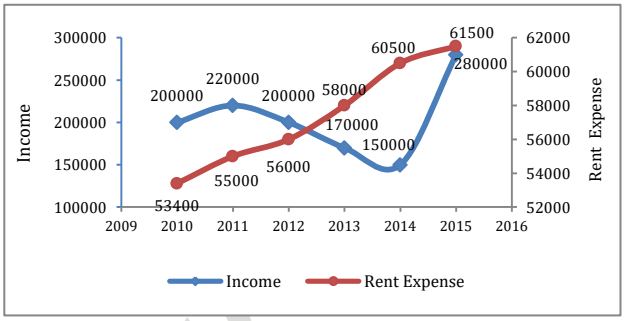
Year	No. of Accidents
1980	311
1981	342
1982	460
1983	473



Here, the table covers number of accidents year-wise, while the accompanying bar graph breaks the information down month-wise for the year 1982.

What can be more confusing is when they give two graphs (either two line graphs or two bar graphs) occupying the same space. Sometimes both graphs will refer to the same vertical scale; other times, one graph will refer to a scale on the left, the other graph to a scale on the right.

Tara's Income and Rent Expense, 2010 to 2015



Here we see the same graph of Tara's income, but with new information added. We now see at a glance not only Tara's income for a given year, but also the amount of rent expenses for that year. The income refers to the left-hand scale; the rent expenses to the right-hand scale. At this point, obviously, the number of potential questions has risen dramatically.

Double graphs are not really any more difficult than single graphs as long as you don't mix up the scales. Learn to double check that you're using the correct scale when working with double graphs. If you find yourself getting confused, slow down and give yourself a chance to sort things out.

Caselets

In this type, data is presented in the form of a paragraph. The paragraph may be based on reasoning or numerical data, which typically needs to be converted to a table format by the test taker for quicker data manipulation.

Here's a caselet on numerical data based on the previous figures.

Tara started her career as a training consultant in 2010 and earned Rs.200,000 that year, thanks to the booming business trend and her strong networking skills. Her income grew by 10% the following year and everything appeared to be on the right track. That year, 25% of her income went towards rent, 25% towards food, 20% for travel, and a sum of Rs.33000 for clothes and accessories. However, owing to a bout of illness, her efficiency in 2012 took a hit and her income was back to the 2010 figure. A further decline of 15% occurred in the yearly income of 2013, another Rs.20,000 drop in 2014, and finally a dramatic turnaround in 2015 when her income rose to Rs.280,000.

DATA SUFFICIENCY

Introduction

In data sufficiency questions, usually a question is given followed by two or three statements. These two or three statements contain data or some pieces of information using which the question can possibly be solved. We are required to judge whether the data given is sufficient to answer the question or not. Data sufficiency questions may be covering any of the topics already covered.

When a data-sufficiency question is attempted, a systematic approach should be followed. Let us first look at the way in which such questions are usually asked.

Two statements data sufficiency

Directions: The questions below consist of a question followed by two statements labeled as (I) and (II). You have to decide if these statements are sufficient to answer the question. Give answer

(a) if statement I alone is sufficient to answer the question, but statement II alone is not sufficient to answer the question.

(b) if statement II alone is sufficient to answer the question, but statement I alone is not sufficient to answer the question.

(c) if you can get the answer from I and II together although neither statement by itself suffices.

(d) if statement I alone is sufficient and also statement II alone is sufficient.

(e) if you cannot get the answer from even both the statements I and II put together.

For example,

What is the volume of a rectangular box R?

I: The total surface area of R is 12 m^2

II: The height of R is 50 cm.

Here, from statement I, we see that the total surface area of $R = 2(lb + bh + hl) = 12\ m^2$.

This data is not sufficient to find the variables *l*, b and h.

Hence, statement I alone is not sufficient to answer the question.

From statement II only the height h is known and so statement II alone is not sufficient to answer the question.

Combining both the statements I and II also, it is not possible to answer the question.

Hence the answer is (e)

Application 1

What is the profit percent on the article sold?

I: The selling price of the article is Rs.800

II: The profit obtained by selling the article is equal to one-fifth of the selling price.

Solution

Statement I alone is not sufficient to answer the question, since either the selling price or profit is needed to find the profit percent.

∴ Statement I alone is not sufficient.

From statement II, we find that the profit and the selling price are given. Since profit is one-fifth of the selling price, if the selling price is Rs.x, profit is Rs$\frac{x}{5}$ and cost price is $\frac{4x}{5}$.

∴ Profit percent $= \frac{\frac{x}{5}}{\frac{4x}{5}} = 100\% = \frac{1}{4} \times 100\% = 25\%$

Hence statement II alone is sufficient to answer the question and so the option is (b)

Application 2

What was the speed of the running train?

I: The train crosses a single post in 6 seconds.

II: The train crosses another train running in the opposite direction in 15 secs.

Solution

From statement I, we see that the train crosses a signal post in 6 seconds and since the length of the train is not known, the speed cannot be found out.

∴ Statement I alone is not sufficient to answer the question.

From statement II also the speed cannot be found out since the length of the train is not given.

∴ Statement II alone is not sufficient to answer the question.

Combining statement I and II also, the speed cannot be found out and so both the statements together also not sufficient to answer the question.

Hence, the option is (e)

Application 3

What is the average weight of the class?

I: The average weights of boys and girls in the class are 35 kg and 32 kg respectively.

II: the ratio of number of boys and girls in the class is 2:3.

Solution

Using statement I, since the number of boys and girls are not known, the question cannot be answered. So statement I alone is not sufficient to answer the question.

Using statement II, the ratio of the number of boys and girls alone is not of any use to find the answer.

So, statement II alone is not sufficient to answer the question.

Combining, statement I and II, using both if we assuming the number of boys to be 2x and girls 3x.

Then, $average = \frac{35 \times 2x + 32 \times 3x}{2x + 3x} = \frac{166}{5} = 33.2\ kg$

Hence, statements I and II together is sufficient to get the answer. The option is (c)

Application 4

The HCF of two numbers is 15. What is the LCM of the two numbers?

I: The sum of 2 numbers is 195.

II: The difference between the two numbers is 75.

Solution

Let the 2 numbers be 15x and 15y where x and y are co-primes.

From statement I, 15x + 15y = 195 $\Rightarrow$ x + y = 13

The pairs of numbers satisfying the above condition are (1, 12), (2, 11), (3, 10), (4, 9), (5, 8), (6, 7).

We cannot find the exact numbers.

So statement I alone is not sufficient.

From statement II, $15(x - y) = 75 \Rightarrow x - y = 5$

Here also x, y can take different values.

So statement II alone is not sufficient.

Using both the statements I and II, we get $x + y = 13,\ x - y = 5$

$\Rightarrow x = 9,\ y = 4$

∴ The numbers are 135 and 60.

Hence, statements I and II together is sufficient to answer the question. The option is (c)

Application 5

What is the relative speed of two trains running in opposite directions?

I: They take 15 seconds to cross each other.

II: The speed of one of the trains is 60 km/h

III: The total length of the trains 360 m.

(a) Only I and II together are sufficient

(b) Only II and III together are sufficient

(c) Only III and I together are sufficient

(d) Any 2 statements together are necessary

(e) All together are necessary

Solution

Relative speed $= \frac{\text{Total length of the trains}}{\text{Time taken to cross each other}}$

From statements I and II, we cannot get the length of the train.

So, statements I and II are not sufficient to answer the question.

From statements II and III, the time taken cannot be obtained.

So, statements II and III are not sufficient to answer the question.

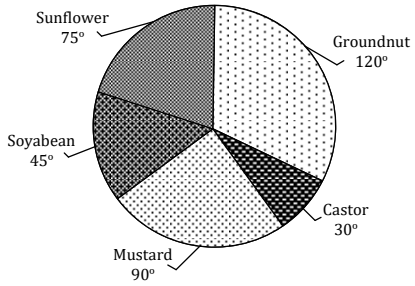
Relative speed $= \frac{\text{Total length}}{\text{Time taken}} = \frac{360}{15} = 24 \text{ m / sec}$

So, statements I and III are sufficient to answer the question.

∴ The option is (c)

CLASS WORK

Directions for Q1 to Q5: Answer these questions based on the following pie chart which represents the production of certain types of oil seeds in the year 2008.



Total Production = 540 tonnes

1. What is the production of castor seeds? (in tonnes)
   (a) 36 (b) 45 (c) 54 (d) 63

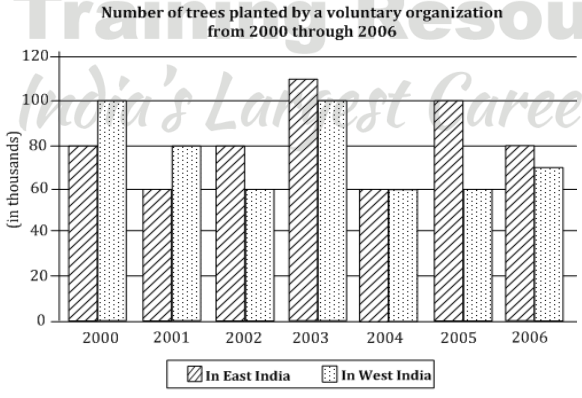
2. By how much (in tonnes) is the production of soyabean seeds less than that of groundnut seeds?
   (a) 75 (b) 85 (c) 92.50 (d) 112.50

3. The production of how many types of oil seeds is more than 108 tonnes?
   (a) 2 (b) 1 (c) 4 (d) 3

4. The production of sun flower seeds was approximately what percentage of the total oil seeds production?
   (a) 20% (b) 21% (c) 22% (d) 23%

5. If the ratio of the number of hectares in which mustard seeds and sunflower seeds are grown is 7:8, then what is the ratio of production per hectare of mustard and that of sunflower seeds?
   (a) 25:14 (b) 36:35 (c) 48:35 (d) 18:7

Directions for Q6 to Q10: Answer these questions based on the following graph



6. What is the percentage increase or decrease in the number of trees planted by the voluntary organization in West India from 2000 to 2006?
   (a) 25% (b) 50% (c) 20% (d) 30%

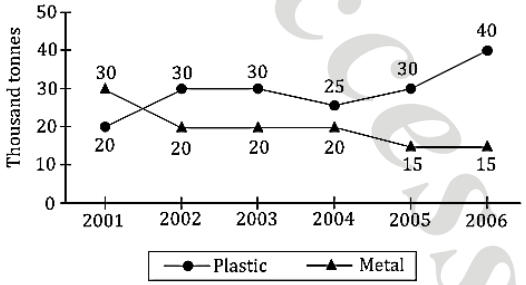
7. In which of the following years was the trend of alternate increase or decrease in the number of trees planted by the voluntary organization in East India not observed?
   (a) 2002 (b) 2003 (c) 2001 (d) 2004

8. What is the total number of trees (in thousands) planted in East and West India in the years 2003 and 2006 together?
   (a) 360 (b) 535 (c) 480 (d) 465

9. By what percentage is the number of trees planted in East India in 2000 more than that in West India in 2005?
   (a) 66.66% (b) 50% (c) 40% (d) 33.33%

10. What is the average number of trees (in thousands) planted in West India from 2000 to 2004?
    (a) 84 (b) 75 (c) 80 (d) 70

Direction for Q11 to Q15: Answer the questions given as per details given in the graph, which provides the consumption of metal and plastic across 6 years.



11. What is the number of years for which the consumption of metal was less than the consumption of plastic over the given period?
    (a) 4 (b) 2 (c) 3 (d) 5

12. For how many years has the consumption of metal and plastic put together showed a decrease over the previous year's consumption?
    (a) 2 (b) 1 (c) 3 (d) 4

13. What is the ratio of the total consumption of metal to that of plastic in the given period?
    (a) 4:5 (b) 18:23
    (c) 19:23 (d) 24:35

14. What is the percentage increase in the total consumption of the products in 2006, over that in 2005?
    (a) 33 1/3% (b) 22 2/9%
    (c) 16 2/3% (d) 37.5%

15. During which period did the consumption of both the products, shows a similar trend (both increasing / decreasing / constant)?
    (a) 2330–04 (b) 2002–03
    (c) 2001–02 (d) 2005–06

Directions for Q16 to Q25: Each of the questions below consists of a question and two statements numbered I and II are 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 answer the question.

16. Tower 'P' is in which direction with respect to tower 'Q'?
    I. P is to west of H, which is to the South of Q.
    II. F is to west of Q and to the North of P.
    (a) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question.
    (b) if the data in Statements II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question.
    (c) if the data in Statement I alone or in Statement II alone are sufficient to answer the question.
    (d) if the data in both the Statements I and II are not sufficient to answer the question.
    (e) if the data in both the Statements I and II are sufficient to answer the question.

17. What is Suneeta's rank from the top in the class?
    I. In the class of 42 children Suneeta is 29th from the bottom.
    II. Suneeta is ten ranks below Samir.
    (a) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question.
    (b) if the data in Statements II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question.
    (c) if the data in Statement I alone or in Statement II alone are sufficient to answer the question.
    (d) if the data in both the Statements I and II are not sufficient to answer the question.
    (e) if the data in both the Statements I and II are sufficient to answer the question.

18. How is K related to N?
    I. N is the brother of M, who is the daughter of k.
    II. F is the husband of K.
    (a) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question.
    (b) if the data in Statements II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question.
    (c) if the data in Statement I alone or in Statement II alone are sufficient to answer the question.
    (d) if the data in both the Statements I and II are not sufficient to answer the question.
    (e) if the data in both the Statements I and II are sufficient to answer the question.

19. Who reached the station first among L, M J, T and R if no two person reached together.
    I. M reached only after J and T.
    II. L reached before R.
    (a) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question.
    (b) if the data in Statements II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question.
    (c) if the data in Statement I alone or in Statement II alone are sufficient to answer the question.
    (d) if the data in both the Statements I and II are not sufficient to answer the question.
    (e) if the data in both the Statements I and II are sufficient to answer the question.

20. What is the code for 'walks' in the code language?
    I. In the code language 'she walks fast' is written as 'he ka to'
    II. In the code language 'she learns fast' is written as 'jo ka to'
    (a) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question.
    (b) if the data in Statements II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question.
    (c) if the data in Statement I alone or in Statement II alone are sufficient to answer the question.
    (d) if the data in both the Statements I and II are not sufficient to answer the question.
    (e) if the data in both the Statements I and II are sufficient to answer the question.

21. How is A related to B?
    I. A is the sister-in law of C. who is the daughter-in-law of B, who is the wife of D.
    II. B is the mother of A's son's only uncle's son
    (a) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question.
    (b) if the data in Statements II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question.
    (c) if the data in Statement I alone or in Statement II alone are sufficient to answer the question.
    (d) if the data in both the Statements I and II are not sufficient to answer the question.
    (e) if the data in both the Statements I and II are sufficient to answer the question.

22. Amongst A, B, C, D, E and F, each are having a different height. Who is the shortest?

I. C is shorter than only B.

II. A is taller than only D and F.

(a) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question.

(b) if the data in Statements II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question.

(c) if the data in Statement I alone or in Statement II alone are sufficient to answer the question.

(d) if the data in both the Statements I and II are not sufficient to answer the question.

(e) if the data in both the Statements I and II are sufficient to answer the question.

23. Point X is in which direction with respect to Y?

I. Point Z is at equal distance from both point X and point Y.

II. Walking 5 km to the East of the point X and taking two consecutive right turn 9. After walking 5 kms before each turn leads to point Y.

(a) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question.

(b) if the data in Statements II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question.

(c) if the data in Statement I alone or in Statement II alone are sufficient to answer the question.

(d) if the data in both the Statements I and II are not sufficient to answer the question.

(e) if the data in both the Statements I and II are sufficient to answer the question.

24. How is 'must' written in a code language?

I. 'you must see' is writer as 'la pa ni' and 'did you see' is written as 'jo ni pa' in that code language.

II. 'you did that' is written as 'pa si jo' in that code language.

(a) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question.

(b) if the data in Statements II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question.

(c) if the data in Statement I alone or in Statement II alone are sufficient to answer the question.

(d) if the data in both the Statements I and II are not sufficient to answer the question.

(e) if the data in both the Statements I and II are sufficient to answer the question.

25. On which day of week does Arti's birthday fall?

I. Sonu correctly remembers that Arti's birthday falls after Wednesday but before Sunday.

II. Raj correctly remembers that Arti's birthday falls after Friday but before Tuesday.

(a) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question.

(b) if the data in Statements II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question.

(c) if the data in Statement I alone or in Statement II alone are sufficient to answer the question.

(d) if the data in both the Statements I and II are not sufficient to answer the question.

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