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Explanations



Fundamentals of Logical Reasoning & Data Interpretation (Part-I)

Fundamentals of Logical Reasoning & Data Interpretation (Part-I)



Dear Student,

The journey to achieve success has begun. The CL Educate team brings to you an offering, which incorporates **theme based learning** that revolves around different concepts with **diverse applications**. The outcome is an enriching learning experience.

Our integrated thematic methodology is driven by latest research, undertaken to enhance learning. Numerous practice exercises and tests have been incorporated to reinforce the conviction in one's ability. Our teaching experience coupled with extensive research has lent credence to our conviction that learning is at its best when concept based understanding and applications go hand in hand.

To enhance your learning and assimilation of relevant concepts, our attempt has been to identify the basic concepts (or themes) that are required to solve different questions in MBA entrance examinations. Our class exercises integrate the different types of questions requiring application of these concepts. Each set of concepts along with relevant question types therefore, forms a module. At the end of each module we expect the student to:

- 1) Clearly understand a concept through its repeated application in different question types.
- 2) Quickly and effectively apply the relevant concept to different question types in a time-bound examination scenario.
- 3) Develop long-lasting skills by imbibing each concept that is clearly covered through a module.

Armed with the latest tools for success, along with your diligence and positive attitude, you have begun your march towards success. Have faith in yourself!

The woods are lovely, dark and deep,

But I have promises to keep,

And miles to go before I sleep,

And miles to go before I sleep

(Robert Frost)

How to use this book

1. Before you enter the class read the topics that are to be covered beforehand. This will help you immensely in understanding the concepts when they are taught in the class.
2. After each class, once again go through the relevant topics very carefully, in order to understand the concepts and relate them to what was taught in the class.
3. Do not directly jump to the practice problems but go through the solved examples first as they will enhance your problem solving skills and help in further clarifying concepts.
4. After you are through with the fundamentals and the solved examples, move on to the unsolved problems given at the end of the book and the practice exercises.



1 Data Representation

Introduction

A major part of a manager's daily routine is to analyze data. The amount of data that a manager comes across is mind-boggling, to say the least. Financial data as in P&L sheet, cost sheets, marketing and sales data, divided across product groups and regions and further across quarters and years, compared with previous years' figures; competition and market information of market shares, value wise and volume wise; data on productivity; data on performance appraisal; data on each and every process that you can imagine. There exists an entire department in most companies, MIS (Management Information Systems), which generates and manages every conceivable data that one can imagine.

For a manager to gather worthwhile information from this overwhelming amount of data, the data needs to be presented in a lucid and concise manner. Duplicating data has to be avoided and at the same time no detail has to be lost out. The data representation should immediately be able to provide the overall scenario and also should be sufficient to compute any detailed information. This is where data representation plays a very important role.

While there can be any number of ways a data can be represented, in this chapter we will look at the standard ones only.

Learning Objectives

By the end of the chapter, you should be able to

1. Understand the various standard ways of representing data.

2. Understand how certain types of data are more suited to a particular form of data representation.

Tables

A table is one of the simplest and the most convenient tools used for summarizing data. In a table, data is systematically arranged in columns and rows. All the columns and the rows have a particular heading that defines the information contained in the respective columns and rows. The column and the row heading may also define the units of measurements, if any. While a tabular data can offer a lot of information, it lacks a pictorial representation and hence it may demand some time (and calculations) to give an idea of the overall scenario.

Annual Sales of 2-wheelers in India, 2000 - 2004

Type	Number of vehicles sold in year (in '000s)				
	2000	2001	2002	2003	2004*
Mopeds	580	490	450	380	330
Scooters	520	640	720	680	830
Motorcycles	460	540	750	840	930
Total	1560	1670	1920	1900	2090

* Figures for 2004 are projected numbers

While reading a table, or for that matter any representation of data, it is imperative that you read everything about the data i.e. the heading for the data, the column headings, any foot notes, units of the data, etc. and not giving just a cursory glance to the actual numbers.

For example on reading the head note of the data, it should be kept in mind that the data is about sales and not production. Thus any information on production cannot be assumed or derived from this unless further data or piece of information in the form of text is given.

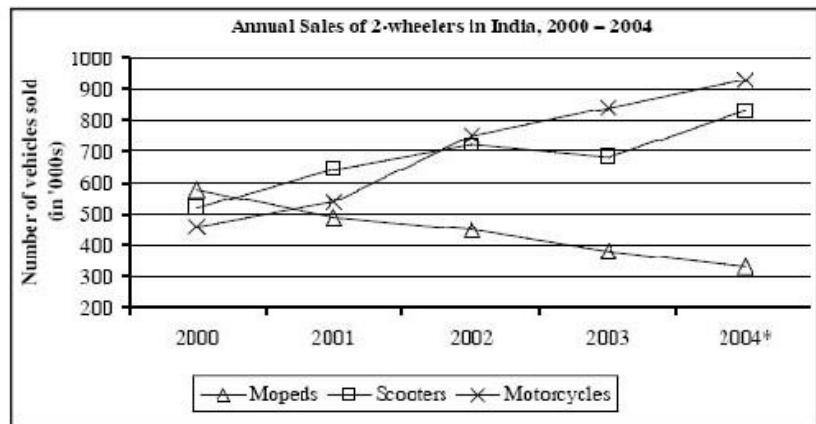
Another point to note is that the figures correspond only to India and only to 2-wheelers and not to any other kind of automobile. The units suggest that the sale of mopeds in the

year 2000 is not 580 but 580000.

The column heading should have made it clear that the data refers to the number of vehicles and not the revenue generated through sales (a very common mistake would have been to assume 580 as Rs. 580,000). The actual number of mopeds sold in 2004 is NOT 330. This is clear as the figures for 2004 are projections and not the actual, as stated in the foot-note.

Line graph

The data given in the table, on previous page, could have also been represented in a line graph as follows:

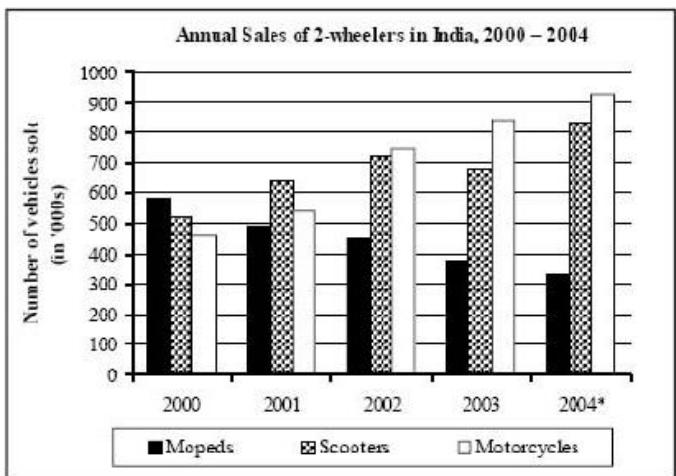


data in table or this data in line graph remains the same because the underlying data remains the same. Thus all questions that could have been asked on the tabular data can also be asked on this representation.

What a line graph achieves over a table is that it is a pictorial representation and hence can give an immediate overall picture of trend. Thus it is very obvious that the sales of mopeds have continuously decreased over the period whereas the sales of motorcycles have shown the highest growth rate over the period. Not only this, it is also immediately clear that the highest growth rate in any year, by any product group, is shown by motorcycles in the period 2001-2002 as the line is the steepest in this period. What is lost out in the process is the accuracy as one would have to ascertain the value of any point looking at the scale of the Y axis. However the actual values could also be mentioned in the same graph adding accuracy although it will make the graph look more cluttered. Apart from these differences, any minute information that could be calculated using the

Bar Graph

Bar graph is very similar to a line graph and can appear in various forms one of which is shown below:

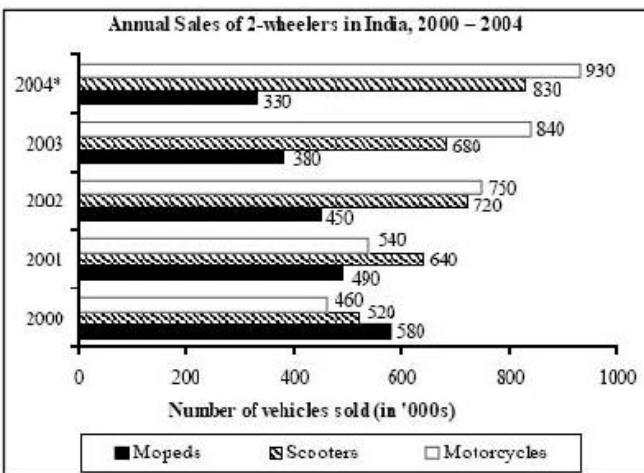


* Figures for 2004 are projected numbers.

This type of graph is more correctly called a column chart rather than a bar chart. As the underlying data is exactly the same as in the tabular data and in the line graph, there is no information lost and any of the three representations can be used interchangeably. Lest you start wondering why then are there so many varied ways of representations, a moments glance can help you understand that this type of graph is more visually appealing when we have to compare the sales across product groups in any particular year whereas the line graph was more visually appealing for the growth rates or trends across years for a particular product group.

Please note that in such a graph, it is only the height of the bar that matters and the width of the bar does not hold any significance.

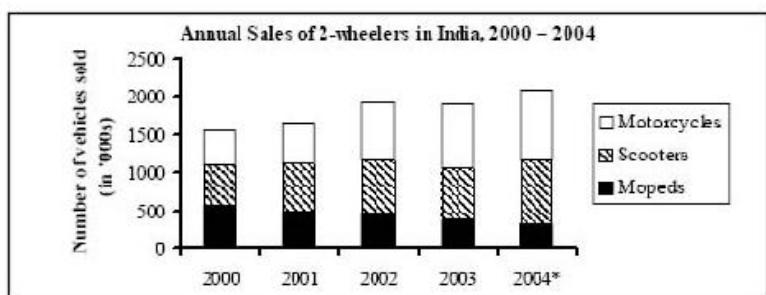
An exactly similar representation can also be given with horizontal bars as follows:



* Figures for 2004 are projected numbers

Cumulative Bar Graph

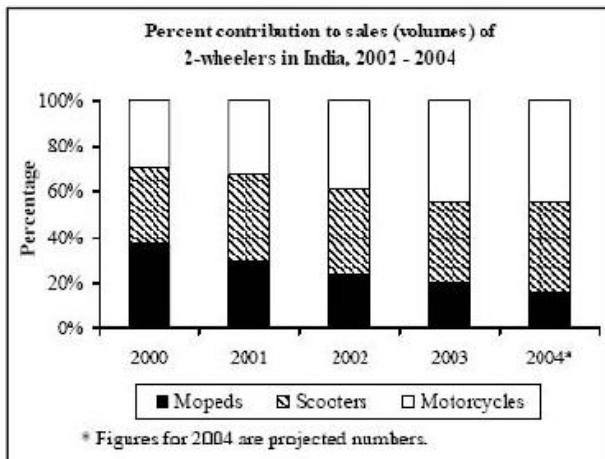
To calculate the total sales in any year, one would need to add the figures across each product groups in the above bar and line graph. A cumulative bar graph is one in which the total as well as the individual category figures are pictorially represented. This is achieved by stacking the bars corresponding to individual categories one over the other as follows:



* Figures for 2004 are projected numbers.

Thus, here it becomes very obvious that in 2003, the total sales of the three product groups, cumulatively, was lower than that in 2002 which was not so obvious in the earlier graph. At the same time the graph also gives a good visual idea of the distribution of the total sales across the three product groups. But here to ascertain the values for individual categories one needs to do some subtraction. Thus the sales of scooters in 2000 is not 1100 as the bar of scooters ends at 1100 but is $1100 - 600 = 500$.

An intellectually stimulating graph (and often used to add difficulty to the questions asked) is a cumulative bar graph of not the sales figures but that of the percent share of each product group, as shown:



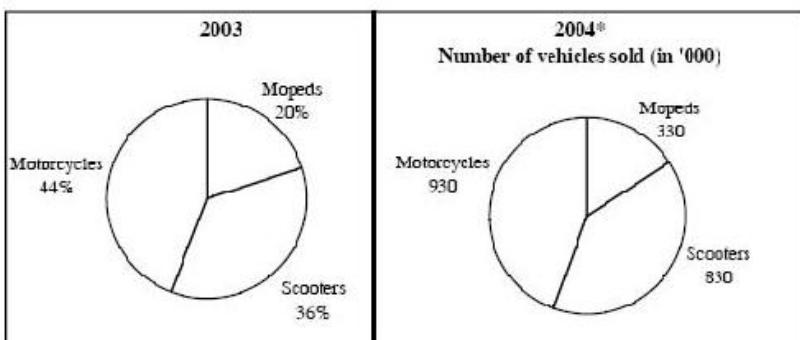
An immediate and important observation should be that all the bars are of same length (and obviously so as all the bars represent a total of 100%). As we will see in the next chapter on data interpretation, with this kind of graph, we can get just an idea of the share of a product group, e.g. scooters accounted for $70 - 38 = 32\%$ of the total 2-wheeler sales in 2000.

We cannot infer the actual sales figures for 2000 unless some additional data is given.

Pie chart

The cumulative bar graph of the percent contribution of each category introduced the idea of a percent share of the total. A more appropriate graph to depict this is the pie chart. The name itself suggests that this graph basically shows the manner in which an entire pie is divided among different groups.

Share of 2-wheelers sold (volumes) in India for 2003 and 2004



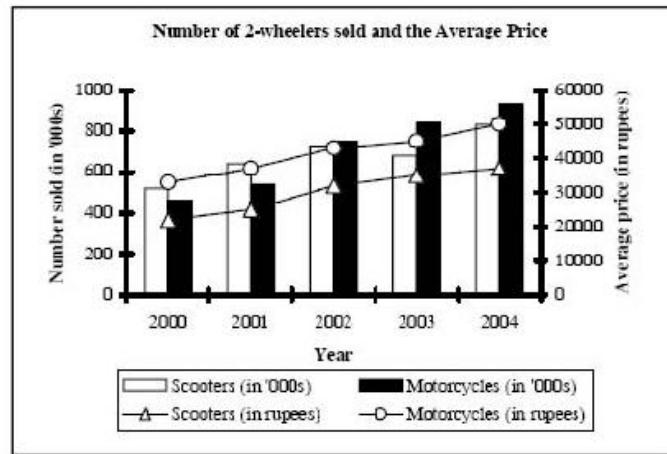
* Figures for 2004 are projected numbers

Thus, when using pie-charts, each pie generally corresponds to a particular year. Also worth noting is that the pie on the left has just the percentages whereas the pie on the right has the actual sales figures given. Thus for the year 2003, we cannot find the actual sales figures as the total value of the pie (cumulative sales of the three product groups) is not known for 2003. But for 2004, we can calculate the expected share of each product group in percentage as we can sum the individual figures to know the total sales of 2-wheelers.

Pie charts are easier to compare the share of various product groups, visually. Thus it is very clear just by visual observations that the share of mopeds has declined at the expense of an increase in share of scooters, with the share of motorcycles remaining almost the same.

Combination graphs

Any of the above types of graphs can be combined to form a combination graph. An example of a combination graph is shown below. The line graph shown has additional data of the average price of a product group.



In this chapter we have discussed only the standard types of data representation. Data can be represented in many more unusual ways (in the past, CAT papers have had a variety of data representation styles, many of which were unfamiliar). We will come across these unusual types throughout the study material. Irrespective of the type of graph, if one reads the instructions, head notes and foot notes carefully, one can very easily decipher the graphs.

Learning Outcomes :

By now, one should be aware that most of the data can be depicted in any form of representation. And with any form of representation, one can calculate a detail which may not be directly visible on the graph. Thus even if data is given in tabular form or as a line graph, say of the sales value, one can calculate the share in percentages even though it is not given directly. And while a pie chart may give the share in percentages directly, knowing the value of the total pie, one can calculate the values of individual categories.

Another aspect learnt is that with different forms of data representation, one can visually gather different inferences. Thus, to gain speed, it would be wise to pay heed to why a data represented in a particular format, whenever one comes across a data in everyday life while reading newspapers, magazines, etc. Without doing any calculation, one should try to gather as much data as one can. Emphasis should be laid on understanding the overall scenario rather than a minute detail.

Assignment:

Start reading a business magazine regularly. While reading the articles, do pay attention to the format in which facts and figures are given. Take a particular data set and then represent the same data in various other standard forms of representation. See what sort of hurdles you face while representing the data from one form to another.

Assume any five values e.g. sales of a company for five consecutive years. On an Excel sheet, fill in these values and then plot different types of graphs. Excel offers all the standard types of graphs and sub-graphs and would give you a clear understanding of the various types of graphs.

2 Data Interpretation

Introduction

Data is just like loads of ammunition with you. It can come to your aid or else may overwhelm you in a negative sense. Just as a tool is just as good as the craftsman, data itself is of no use unless we can interpret it meaningfully to gather valuable information.

Though the interpretation would depend on the actual data given, this chapter tackles some of the general interpretations that you will come across in most of the data sets.

Learning Objectives

- Difference between Growth and Growth rates
- Growth rate in Line graphs.
- Market Share : Value wise and Volume wise
- Simplifying two pie charts

Growth Rates

Consider the following data :

Snapshot of ABC Corporation, (1999 - 2003)

All figures are in Rs. Lacs

	1999	2000	2001	2002	2003
Sales	200	240	290	320	350
Profit	40	50	55	70	50

Note: Profit = Sales - Costs

Growth refers to just the increase in the underlying value. Thus growth in sales from 1999 to 2000 would be 240 - 200 i.e. Rs. 40 lacs. And growth in sales over the entire period would be 350 - 200 i.e. Rs. 150 lacs.

Growth rate refers to the percentage increase. Thus while reading a question one must make a distinction between the growth and growth rate.

Thus the growth rate of sales in 2000 would be $\frac{240 - 200}{200} \times 100 = 20\%$. Unless otherwise stated in the question growth would be over the previous year and the base would be the previous year's value.

Similarly growth rate in sales over the period 1999 - 2003 would be $\frac{350 - 200}{200} \times 100 = 75\%$

Annual Growth Rate

There are two ways in which annual growth rates, over a period of time, can be calculated viz. the Simple Annual Growth Rate (also called average annual growth rate) and the

Compounded Annual Growth Rate (CAGR).

If the initial value is P and the final value is A after n time periods then the two growth rates are defined as

$$\text{Simple growth rate} = \frac{A - P}{P} \times 100 \times \frac{1}{n}$$

$$\text{Compounded growth rate} = \left(\left(\frac{A}{P} \right)^{\frac{1}{n}} - 1 \right) \times 100$$

The two formulae come straight from the theory of simple and compound interest.

It is important to note that n is the time periods and not the number of years. i.e. if we are considering the growth from 1999 to 2000, it is just one annual time period and not two.

Thus the simple annual growth rate of sales of ABC Corp over the period 1999 to 2003 will be $\frac{75\%}{4} = 18.75\%$ i.e. the growth rate over the period divided by the number of time periods. Once again attention is drawn to the fact that though 1999 to 2003 is 5 years, the time period is just 4 i.e. 1999-2000, 2000-2001, 2001-2002 and 2002-2003. If one is still unsure, just think if growth is to be found over two successive years, say in 2000 over 1999, would one divide the growth rate by 2?

The compounded annual growth rate of sales of ABC Corp over the period 1999 to 2003 will be $\left(\left(\frac{350}{200} \right)^{\frac{1}{4}} - 1 \right) \times 100 = \left(\left(\frac{7}{4} \right)^{\frac{1}{4}} - 1 \right) \times 100 \approx \left(\left(\frac{2.64}{2} \right)^{\frac{1}{2}} - 1 \right) \times 100 \approx (\sqrt{1.32} - 1) \times 100 \approx (1.148 - 1) \times 100 = 14.8\%$

As in the case of SI and CI, unless the question specifically mentions compounded annual growth rate, we will calculate simple annual growth rate. But for case of population and increase/decrease in monetary value of asset, it will be CAGR always.

Compounded Annual Growth Rate (CAGR).

If the initial value is P and the final value is A after n time periods then the two growth rates are defined as

$$\text{Simple growth rate} = \frac{A - P}{P} \times 100 \times \frac{1}{n}$$

$$\text{Compounded growth rate} = \left(\left(\frac{A}{P} \right)^{1/n} - 1 \right) \times 100$$

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$$\approx (1.148 - 1) \times 100 = 14.8\%$$

As in the case of SI and CI, unless the question specifically mentions compounded annual growth rate, we will calculate simple annual growth rate. But for case of population and increase/decrease in monetary value of asset, it will be CAGR always.

Profit Percentages

What is the profit percentage of ABC Corp in the year 1999?

The profit percentage is not $\frac{40}{200} \times 100 = 20\%$. Please recollect profit percentage is always as a percentage of Cost Price. In this case the cost will be 160 and the profit percentage will be 25%.

What is the percentage change in profit percentage in the year 2003 over that in 2002.

$$\text{Profit percentage in 2002} = \frac{70}{250} \times 100 = 28\%$$

$$\text{Profit percentage in 2003} = \frac{50}{300} \times 100 = 16.66\%$$

Thus percentage change in profit percentage in the year 2003 over that in the year 2002

$$= \frac{16.66 - 28}{28} \times 100 = \frac{-11.33}{28} \times 100 = -40.5\%$$

Calculations would be simpler if we just took the ratio of profit percentage as:

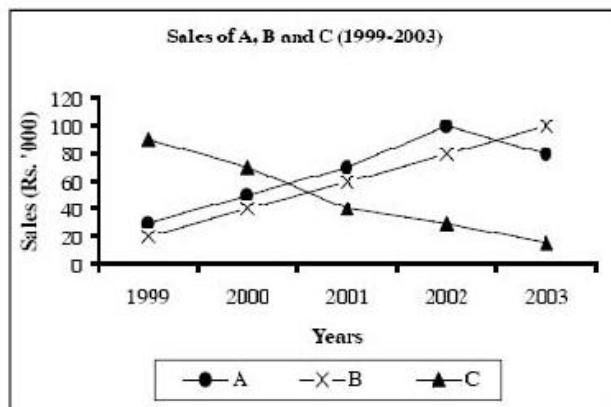
$$\frac{16.66}{28} = \frac{100}{28} = \frac{100}{168} = 0.595 \text{ i.e. a decrease of } 40.5\%$$

Remember, the percentage change in profit percent is not $16.66\% - 28\%$

$= -11.33\%$. The profit percentage has decreased by 11.33 percentage points and by 40.5 percent.

Growth rates in Line graph

Consider the following line graph



The growth rate is related to the slope of a line. Yet the relation is not really as simple as steeper the line, higher is the growth rate. Few points worth understanding in the above graphs are

1. Though the sales of B is a straight line, i.e. the slope of each segment is same across all years, the growth rate is not the same in all years. The same slope simply means that the sales grows by a constant amount each year, in this case by 20 every year. But the growth rate keeps decreasing every year as the base value keeps increasing.
2. Though the slope of the line depicting sales of A and B is same for 1999 to 2001, their growth rates are not the same. Again in this case too, the actual growth of sales is same but the base value is different.

3. Though the line representing sales of A in 2001-02 is steeper, 2002 is not the year with highest growth rate of sales of A. The highest growth rate of sales of A occurs in year 2000.

4. Similarly, though the line segment of sales of C is steepest (in downward direction) in 2000-2001, the year with highest growth rate (in negative sense) is in the year 2003 which is a 50% decline.

While in most of the cases, the steepest line will mean the highest growth rate, it is not always so. It would always pay, to spend a moment getting an idea of the base value over which the growth occurs to get the right answer.

Market Share : Value and Volume

Sales figures can either be in value terms (in Rs. or \$ or similar value units) or in volume terms (in nos. or kgs or similar volume units). E.g. consider the following data:

Sales of PCs in India (2003)

Company	Sales (in Rs. cr.)	Sales (in '000s)
LCH	130	40
Pom qac	150	30
MBI	240	30
Pinnacle	180	50

Assume these are the only sellers in India.

The value-wise sales and the volume-wise sales are linked together with the average price per unit. E.g. in the above case the data says that LCH has sold 40,000 PCs and earned a revenue of Rs. 130 cr. Thus the average price per PC sold will be $\frac{130 \times 10^7}{40,000}$ i.e. Rs. 32,500

Thus, Sales in value terms = (Sales in volume terms) × (Price/unit)

Thus for the above data, we can actually calculate price per unit for all the companies and the data will now look like

Company	Sales (in Rs. cr.)	Sales (in '000s)	Avg. Price/unit (in Rs.)
LCH	130	40	32,500
Pom qac	150	30	50,000
MBI	240	30	80,000
Pinnacle	180	50	36,000
Total Market	700	150	46,666

The last row is nothing but the data for the entire market. Since these are the only sellers in India, we can conclude that in India 150,000 PCs were sold in 2003 and revenue generated was Rs. 700 cr, thus giving an average price per unit of Rs. 46,666.

Market Share

Market share of any company is defined as the percentage of the total market that the company accounts for. The total market is nothing but the sum of the market shares all the companies in that market. Since the market itself can be specified in either value terms or in volume terms, market share of a company can also be specified value-wise or also volume-wise.

Thus the market share of LCH will be $\frac{130}{700} \times 100 = 18.57\%$ in value terms and $\frac{40}{150} \times 100 = 26.66\%$ in volume terms. This means is that although LCH sells 26.66% of the total number of PCs sold in India, it accounts for only 18.57% of the total revenue of the entire PC market.

Thus the market share for all the companies can be calculated as

Company	Mkt Share of value	Mkt. share of volume	Avg. Price/unit
LCH	18.57%	26.66%	32,500
Pom qac	21.42%	20%	50,000
MBI	34.28%	20%	80,000
Pinnacle	25.71%	33.33%	36,000
Total Market	100%	100%	46,666

An important aspect to understand is that companies which have a higher price/unit than the industry wide average price/unit (Rs. 46,666) e.g. Pomqac and MBI, both have a higher market share in value terms and a lower market share in volume whereas companies which have a lower average price/unit than the industry wide average price/unit have a higher volume share but lower value share. And this should be obvious too as a company which sells less number of units but yet makes more money would be

doing so because it would have been selling the units at a higher price. In fact there is a deeper relation and just based on the market share (value and volume) one can also deduce by what percentage is a company's price per unit higher or lower than the industry average.

$$\text{Sales of LCH}_{\text{value}} = \text{Total sales}_{\text{value}} \times \text{Market share of LCH}_{\text{value}}$$

$$\text{Sales of LCH}_{\text{volume}} = \text{Total sales}_{\text{volume}} \times \text{Market share of LCH}_{\text{volume}}$$

Similarly,

Dividing the two, we get

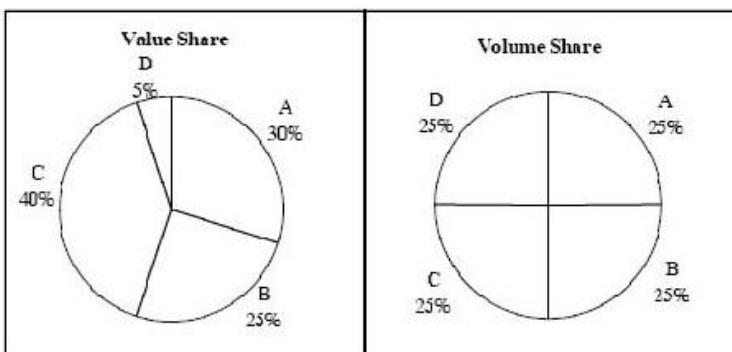
$$\frac{\text{Sales of LCH}_{\text{value}}}{\text{Sales of LCH}_{\text{volume}}} = \frac{\text{Total sales}_{\text{value}}}{\text{Total sales}_{\text{volume}}} \times \frac{\text{Market share of LCH}_{\text{value}}}{\text{Market share of LCH}_{\text{volume}}} \text{ i.e.}$$

$$\text{Price/unit of LCH} = \text{Price/unit of Market} \times \frac{\text{Market share of LCH}_{\text{value}}}{\text{Market share of LCH}_{\text{volume}}} \text{ i.e.}$$

$$\frac{\text{Price/unit of LCH}}{\text{Price/unit of Market}} = \frac{\text{Market share of LCH}_{\text{value}}}{\text{Market share of LCH}_{\text{volume}}}$$

Thus if numerator of RHS is higher than denominator, price per unit of the company will be higher than the industry average and vice-versa.

To assess, what we have just learnt, check if you can answer the questions following the data:



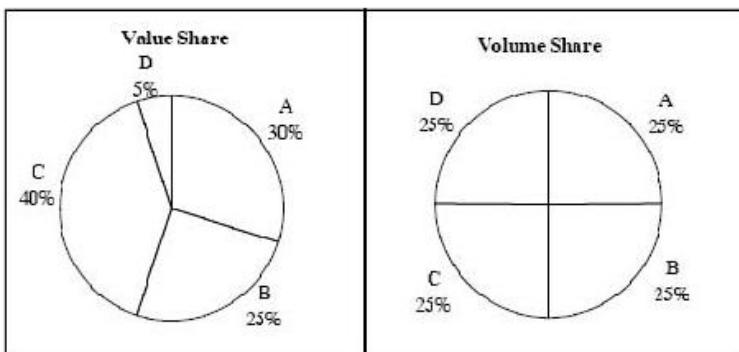
Value and Volume share of A, B, C and D in 2003

- For the year 2003, rank the four companies in decreasing order of price/unit.
- By what percentage is the price/unit of company C higher than the average price per unit of the industry in the year 2003?
- What is the ratio of the price per unit of company A to that of company B in the year 2003?

Solutions: The questions should have been solved orally and one must have just done the following observations in mind.

- The ratio of value share to volume share for A, B, C and D are 1.2, 1, 1.6 and 0.2 and thus the order in decreasing order of price/unit would be C, A, B and D
- The ratio of value share to volume share of company C is 1.6 and this means the price/unit of company C is 60% more than the average price per unit of the market.
- The required ratio is simply 1.2 : 1 i.e. 6 : 5

If these oral calculations are not clear, assume the total market is of Rs. R and of V units. For each company now calculate the value and volume sales and then the price per unit.



You will realize that you are basically calculating the ratio of value and volume shares.

Value and Volume share of A, B, C and D in 2003

1. For the year 2003, rank the four companies in decreasing order of price/unit.
2. By what percentage is the price/unit of company C higher than the average price per unit of the industry in the year 2003?
3. What is the ratio of the price per unit of company A to that of company B in the year 2003?

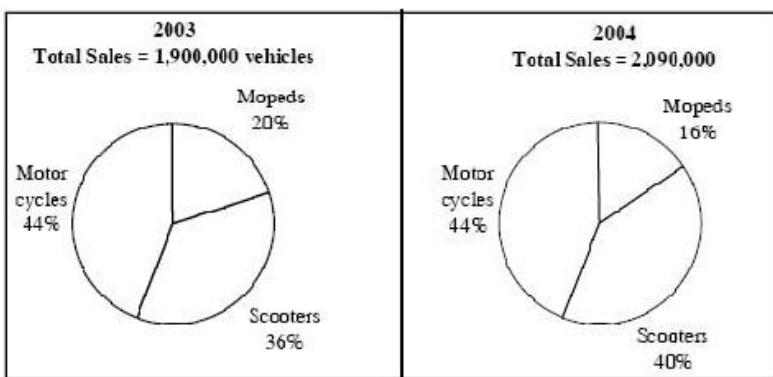
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1. The ratio of value share to volume share for A, B, C and D are 1.2, 1, 1.6 and 0.2 and thus the order in decreasing order of price/unit would be C, A, B and D
2. The ratio of value share to volume share of company C is 1.6 and this means the price/unit of company C is 60% more than the average price per unit of the market.
3. The required ratio is simply 1.2 : 1 i.e. 6 : 5

If these oral calculations are not clear, assume the total market is of Rs. R and of V units. For each company now calculate the value and volume sales and then the price per unit.

Simplifying two pies

Consider the pie chart given in the first chapter. The pie chart is reproduced here with the same data.



If we calculate the growth rate in the total number of vehicles sold in 2004 over that in 2003, we can use this data very effectively for further questions. In this case the growth rate is $\frac{209}{190} = 1.1$ i.e. a growth rate of 10%. Now each of the percentage figures of the right hand pie chart could be increased by 10% and then all the figures in percentages appearing in both the pies would be as a percent of 1,900,000 and comparison of sales across the two years would be easier.

To clarify further, in 2004, sales of scooters were 40% of 2,090,000 which is same as 40% of $1.1 \times 1,900,000$ i.e. 44% of 1,900,000.

Thus in questions, say , what is the ratio of the number of scooters sold in 2004 to the number of mopeds sold in 2003, one can mentally think that scooters sold in 2004 is 44% of 1,900,000 and mopeds sold in 2003 is 20% of 1,900,000 and thus the ratio is 44 : 20

i.e. 11 : 5. Another example, what is the percentage increase in the number of scooters sold in 2004 over those sold in 2003? Here one just needs to find the percentage increase between 36 and 44 i.e. a percentage increase of $\frac{8}{36}$ i.e. $\frac{2}{9}$ i.e. 22.22%

Thus in pie charts where there are two pies given, showing the same data over two different time periods, calculating the percentage increase in the size of the pie can help us in ignoring the actual value of the pies while comparing two sectors or calculating the growth rate of individual sectors over the time period.

Learning Outcomes:

To effectively tackle Data Interpretation questions, the prime skill needed is that of gathering information from raw data. Even before you start worrying of calculations and speed, adequate attention has to be given to understanding the data. Read everything about the data - the title, headings, units, footnotes, etc. before moving to questions. This way, you should have a fair idea of the expected questions simply by analyzing the data. If this is not so, your understanding of the data is not complete. Do few questioning about the data and only when you have understood the data fully, attempt the questions.

While reading the questions, take appropriate pauses, referring back to the data while reading the questions to gather the relevant numbers and thus proceed. Do not read the question mechanically at one go and then look for relevant data. Both reading and identify relevant data has to happen simultaneously.



Practice exercises

Introduction

This section contains a total of 8 practice exercises and each practice exercise consists of various kinds of questions that can be asked from a set of given information. The objective of these practice exercises is just to make you comfortable with the different types of concepts used in Data Interpretation.

At the end of each practice exercise, there is a scoring table to assess your performance in 'concept building', instantly. Since practice exercises are concept-oriented, you are advised not to worry too much regarding time spent.

Any rough work if required, should be done on a separate sheet of paper. Force yourself to do mental calculations and use the pen only when it is absolutely necessary.

How to score:

The process of scoring is very simple. For every right answer add one mark, and for every wrong answer deduct one-fourth mark.

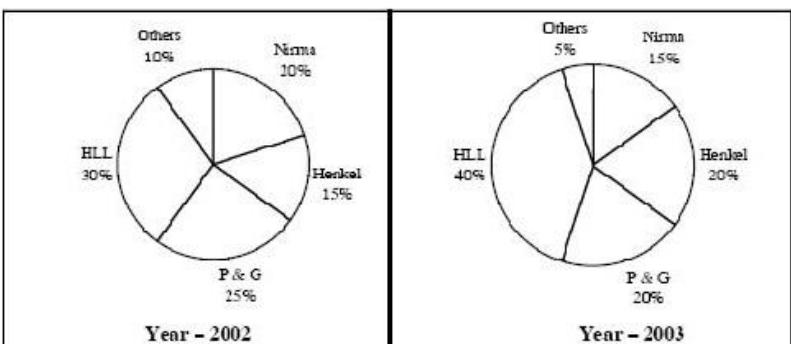
DI is an application of the concepts of Arithmetic, especially percentages, simple and compound interest, profit, loss and discount and ratio, along with your ability to calculate. In case you get a net score of less than 80% in any practice exercise, do not forget to revise the above mentioned concepts.

All the best !

Practice exercise - A1

Directions for questions 1 to 10: Study the pie charts given below and answer the following questions.

The percentage market share (on value basis) of the companies in the detergent market for 2002 and 2003 is given below.



The total size of the market has increased from Rs. 150 crore in 2002 to Rs. 375 crore in 2003.

1. What is the percentage increase in sales of the overall detergent market in 2003 over 2002?

- a. 100% b. 150% c. 200%
- d. 250% e. None of these

2. Which of the following recorded the minimum growth in sales in the year 2003 over the year 2002?

- a. P & G b. HLL c. Henkel
 - d. Nirma e. Others
3. What is the growth rate of HLL detergents in 2003?
- a. 133% b. 233% c. 333%
 - d. 433% e. None of these
4. What is the ratio of sales of P & G in the year 2003 to its sales in year 2002?
- a. 5 : 2 b. 3 : 2 c. 1 : 2
 - d. 2 : 5 e. 2 : 1
5. If the sales value of all the companies in 2002 would have been higher by 10%, then the detergent market would have been larger by how much value ?
- a. 15 crore b. 25 crore c. 30 crore
 - d. 10 crore e. 20 crore
6. In 2004, if each company increases its sales value by 10%, then what is the percentage growth of the detergent market?
- a. 10% b. 20% c. 30%
 - d. 8% e. more than 30%
7. If the detergent industry grows at 10% per annum for the next two years starting from year 2003 then what would be the value of the detergent market be in 2005?
- a. 453.75 crore b. 450.25 crore c. 451.50 crore
 - d. 452.25 crore e. None of these

8. If, in the year 2001 the expenditure of HLL is 30 crore and if it increases by 10% every year then what are the values for the following in the year 2002 for HLL?

Profit =; Profit% =; Margin =

- a. Profit = Rs. 15 crore; Profit% = 36.4%; Margin = 25.9%
- b. Profit = Rs. 18 crore; Profit% = 28.5%; Margin = 23.8%
- c. Profit = Rs. 12 crore; Profit% = 35.6%; Margin = 25.6%
- d. Profit = Rs. 12 crore; Profit% = 36.4%; Margin = 26.67%
- e. None of these

9. What is the difference in the growth rates of Henkel and P & G in 2003 over 2002?

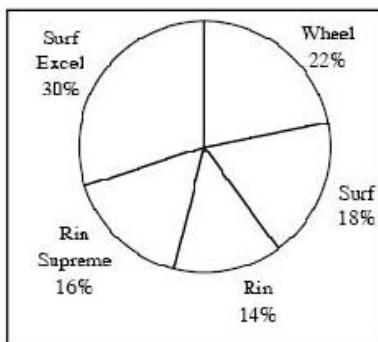
- a. 133.33% b. 33.33% c. 233.33%
- d. 3.3% e. None of these

10. If the total sales of detergent market is doubled in 2002 and in 2003 then what will be the ratio of sales of Nirma for 2003 to 2002?

- a. 7 : 8 b. 16 : 5 c. 15 : 8
- d. 12 : 7 e. None of these

Directions for questions 11 to 15: Use the following additional information.

Share of revenues earned by different products of HLL in 2002



11. What is the market share of Surf Excel in the detergent market in 2002?

- a. 7.5% b. 12% c. 9%
- d. 14.5% e. Cannot be determined

12. What is the profit earned by Henkel for 2002?

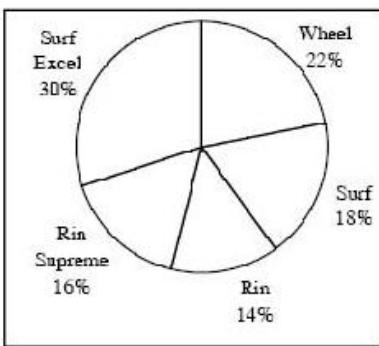
(Assume profit percentage = 25)

- a. Rs. 9 crore b. Rs. 15 crore c. Rs. 4.5 crore
- d. Rs. 6.5 crore e. Cannot be determined

13. Which company has the highest profit in 2002, if all of them have the same expenditure?

- a. HLL b. P & G c. Henkel
- d. Nirma e. Cannot be determined

14. If expenditure of Henkel grows at the rate of 10% per annum then what is the profit percentage in 2003 (Refer to data in question 12)?



11. What is the market share of Surf Excel in the detergent market in 2002?

- a. 7.5% b. 12% c. 9%
- d. 14.5% e. Cannot be determined

12. What is the profit earned by Henkel for 2002?

(Assume profit percentage = 25)

- a. Rs. 9 crore b. Rs. 15 crore c. Rs. 4.5 crore
- d. Rs. 6.5 crore e. Cannot be determined

13. Which company has the highest profit in 2002, if all of them have the same expenditure?

- a. HLL b. P & G c. Henkel
- d. Nirma e. Cannot be determined

14. If expenditure of Henkel grows at the rate of 10% per annum then what is the profit percentage in 2003 (Refer to data in question 12)?

- a. 404% b. 304% c. 379%

- d. 278% e. Cannot be determined

15. In 2003, expenditure of P & G is 80% of sales of P & G in that year. What is the profit percentage in 2004 if both sales and expenditure increase by 10% in 2004?

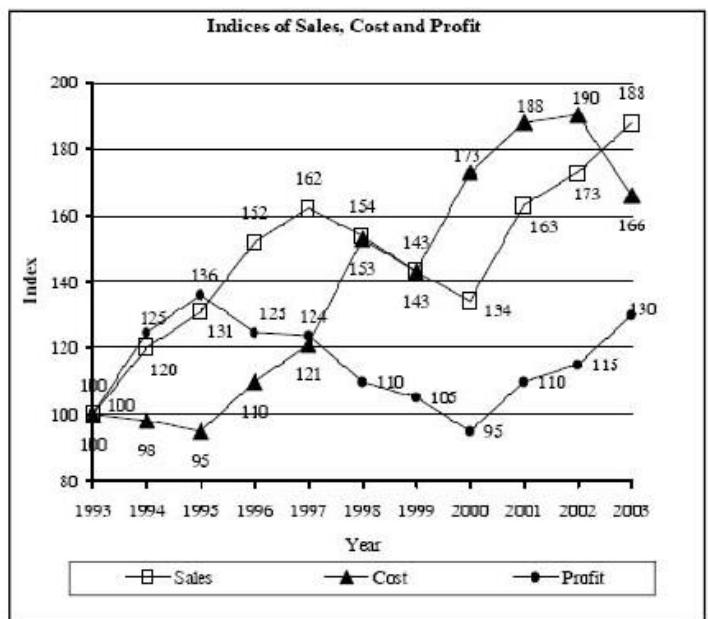
- a. 10% b. 20% c. 25%
- d. 33.33% e. Cannot be determined

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
15					

Practice exercise - A2

Direction for questions 1 to 15: Study the chart given below and answer the following questions.



Profit = Sales - Cost; Gross profit = Sales - Cost

Base year for all three indices is 1993.

1. What is the value of profit in 2001?

- a. Rs. 110 crore b. Rs. 210 crore c. Rs. 90 crore

- d. Rs. 10 crore e. Cannot be determined
2. If the value of sales in 1993 was Rs. 500 crore, what would be the value of sales in 1998?
 - a. Rs. 770 crore b. Rs. 870 crore c. Rs. 950 crore
 - d. Rs. 554 crore e. Cannot be determined
3. If the value of cost in 1996 is Rs. 550 crore, what would be the value of cost in 2002?
 - a. Rs. 910 crore b. Rs. 190 crore c. Rs. 950 crore
 - d. Rs. 590 crore e. Cannot be determined
4. If the value of sales in 1996 is Rs. 650 crore, what would be the value of cost in 2002?
 - a. Rs. 810 crore b. Rs. 890 crore c. Rs. 850 crore
 - d. Rs. 980 crore e. Cannot be determined
5. In which year will the gross profit be maximum?
 - a. 1995 b. 1996 c. 1997
 - d. 2003 e. Cannot be determined
6. If the profit in 2003 is Rs. 780 then what will be its value in 2001?
 - a. Rs. 710 crore b. Rs. 660 crore c. Rs. 650 crore
 - d. Rs. 600 crore e. Cannot be determined
7. If in 1993 the sales is Rs. 300 and cost is Rs. 120, what is the gross profit in 1998?
 - a. Rs. 278 crore b. Rs. 288 crore c. Rs. 268 crore

d. Rs. 298 crore e. Cannot be determined

8. Refer to the data in question 7, what would be the gross profit in 2003?

a. Rs.328.5 crore b. Rs.364.8 crore c. Rs.338.5 crore

d. Rs.345.8 e. Cannot be determined

9. If the sales in 1993 is Rs. 700 and the costs in 1996 is Rs. 600, then what is the gross profit in 1998?

a. Rs. 193 crore b. Rs. 344 crore c. Rs. 243 crore

d. Rs. 414 crore e. Rs. 160 crore

10. If base of sales index is changed to 1994 = 100 in place of 1993 = 100, what would be the index of sales for 1993?

a. 80 b. 83 c. 85 d. 20 e. Cannot be determined

11. If base of profit index is changed to 1996 then what would be the index of profit for 2003?

a. 104 b. 100 c. 109

d. 106 e. None of these

12. If the index of cost for 2003 is 100 then for how many years will the cost index be more than 100?

a. 2 b. 3 c. 4 d. 1 e. Cannot be determined

13. If sales was Rs. 1,200 crore in 1993, what was the total sales in the period 1993-98?

a. Rs. 8,628 crore b. Rs. 9,828 crore c. Rs. 9,156 crore

d. Rs. 8,136 crore e. Rs. 9,888 crore

14. Refer to question 13 for data. If the cost in 1993 was Rs. 800 crore, what would be the cumulative gross profit for the period 1993-98.

a. Rs. 4,412 crore b. Rs. 3,706 crore c. Rs. 4,102 crore

d. Rs. 4,532 crore e. Cannot be determined

15. What was the difference between the average sales index and the average cost index?

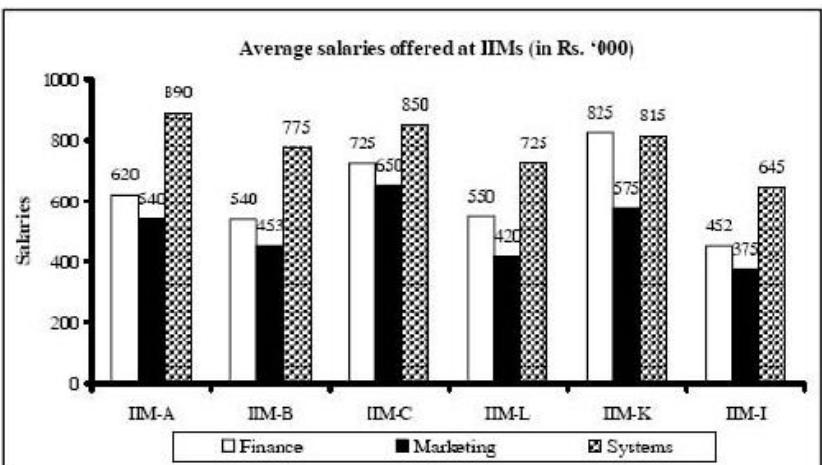
a. 7.3 b. 7.7 c. 7.5 d. 7.9 e. 7.4

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
15					

Practice exercise - A3

Direction for questions 1 to 10: At IIMs, students can specialise in one of the three streams viz. Finance, Marketing and Systems. The graph below gives the average salaries offered to the students of all the six IIMs in 2002. All the question the given below are based on the data for year 2002 only.



1. What is the average salary offered to a Finance graduate passing out of IIM-A, IIM-B, and IIM-L?

- a. Rs. 570000 b. Rs. 580000 c. Rs. 560000
- d. Rs. 590000 e. Cannot be determined

2. Given that out of a total 150 students at IIM-L, 60 opted for Finance and 40 opted for Marketing while the rest opted for Systems. What is the average salary offered to a student of IIM-L?

a. Rs. 747000 b. Rs. 553000 c. Rs. 574000

d. Rs. 675000 e. Cannot be determined

3. Refer to data in question 2, given that there are 60 students at IIM-K and the break-up for the different specialization are Finance-25, Marketing-15 and Systems-20. What is the difference in the average salaries offered to graduates of IIM-L and IIM-K?

a. Rs. 185000 b. Rs. 206000 c. Rs. 120000

d. Rs. 312000 e. Cannot be determined

4. Given that the number of students at the IIM-B for different courses are Finance-50, Marketing-45 and System-110. What is the average salary offered to an IIM-B graduate?

a. Rs. 540000 b. Rs. 647000 c. Rs. 778000
d. Rs. 605000 e. Rs. 575000

5. Refer to the data in question 4, if the number of students in Finance in IIM-B increases to 100 then what would be the average salary offered to an IIM-B graduate??

a. Rs. 650000 b. Rs. 647000 c. Rs. 678000
d. Rs. 626000 e. Rs. 665000

6. Refer to questions 4 for data, if the number of students in Systems increases to 150 then what would be the average salary offered to an IIM-B graduate?

a. Rs. 650000 b. Rs. 637000 c. Rs. 668000
d. Rs. 635000 e. Rs. 655000

7. The number of students opting for Finance are 90 in IIM-A, 50 in IIM-B and 45 in IIM-C. What is the average salary offered to a Finance specialists passing out from one of these three institutes?

a. Rs. 615000 b. Rs. 647000 c. Rs. 624000

d. Rs. 635000 e. Rs. 637000

8. If in IIM-C, 500 students opted for systems out of which 200 got jobs in dotcom companies with an average salary of Rs. 1000000, what will be the average salary of the remaining systems students? [Only students who opted for systems are allowed to apply for dot com companies]

a. Rs. 74000 b. Rs. 750000 c. Rs. 778000

d. Rs. 800000 e. None of these

9. At IIM-A, jobs offered by foreign companies accounted for 60% of all the jobs offered in Finance with an average salary of Rs. 800000. What is the average salary for Finance at IIM-A for students who accepted jobs offered by Indian companies?

a. Rs. 420000 b. Rs. 350000 c. Rs. 380000

d. Rs. 320000 e. Rs. 370000

10. Due to locational disadvantage of IIM-K, the placements of IIM-K took place at IIM-B only. For marketing IIM-B had 150 students while IIM-K had 50. What is the average salary offered to a student of IIM-B and IIM-K who specialized in marketing?

a. Rs. 440000 b. Rs. 468000 c. Rs. 478000

d. Rs. 483500 e. Rs. 495000

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
10					

Practice exercise - A4

Directions for questions 1 to 15: Study the table below and answer the following questions.

		1998-99	1999-2000	2000-01	2001-02	2002-03
Paddy	Area	14.36	12.36	13.04	12.71	11.75
	Production	11.68	8.1	12.81	11.41	9.2
	Yield	814	655	982	898	783
Wheat	Area	10.48	10.03	10.62	9.55	10.11
	Production	6.9	4.67	8.88	4.97	7.15
	Yield	658	465	836	521	707
Maize	Area	5.9	5.86	5.96	5	6.1
	Production	8.96	8.06	9.99	9.6	9.12
	Yield	1518	1376	1676	1602	1493
Ragi	Area	2.17	2.13	1.9	1.88	1.83
	Production	2.34	2.58	2.53	2.6	2.43
	Yield	1078	1212	1329	1378	1327
Barley	Area	0.96	0.95	0.79	0.79	0.84
	Production	1.63	1.7	1.31	1.31	1.58
	Yield	1697	1781	1653	1653	1884

Units: Area is given in million hectares (Mn Ha), Production is given in million tonnes (Mn T) and Yield is given in kg/Hectare (kg/Ha)

(Note: Assume that only these five crops are being cultivated)

1. What is the percentage of cultivated land under the cultivation of paddy, in 2001-02?

- a. 43.33% b. 45.35% c. 38.97% d. 47.38% e. None of these

2. By what percentage has the yield of ragi decreased, in 2002-03?

- a. 5.7% b. 4.7% c. 3.7% d. 6.7% e. None of these

3. Which crop has the highest average yield over the given time period?

- a. Paddy b. Barley c. Ragi d. Maize e. Wheat

4. What would be the production of ragi in 2003-04 if the yield increases by 10% over its previous year's value, the area under cultivation remaining the same?

- a. 2.54 Mn T b. 3.45 Mn T c. 2.67 Mn T d. 2.98 Mn T e. None of these

5. Because of crop rotation, if the area available for paddy is interchanged with that available for wheat then what would be the production of wheat in 2001-02? (Assume yield of wheat remains same)

- a. 6.89 Mn T b. 5.67 Mn T c. 8.65 Mn T d. 6.62 Mn T e. 6.78 Mn T

6. In the period 2002-2003, which crop has shown the best performance in terms of the minimum requirement of area for a 1 Mn T production?

- a. Barley b. Maize c. Ragi d. Paddy e. Wheat

7. If the production of maize for the period 2001-2003 increases at a compounded annual growth rate which is same as the growth rate as between 1999-2000 and 2000-01 then what would be the yield (in kg/hectare) of the crop in 2002-03, area under cultivation remaining same?

- a. 2476 b. 2518 c. 3124 d. 2550 e. 2780

8. In which year is the total production of crops the highest and what is the value of that production?

- a. 1998-99, 29.93 Mn T b. 1999-2000 , 43.23 Mn T c. 2000-01 , 35.52 Mn T d. 2002-03 , 30.78 Mn T e. 2002-03, 29.48 Mn T

9. If the entire ragi production is lost because of floods in 1999-2000, what should be the yield of ragi in the next year to make up for this loss?

- a. 2689 kg/Ha b. 2346 kg/Ha c. 2546 kg/Ha d. 2334 kg/Ha e. 2392 kg/Ha

10. If Government of India uses HYV (High Yielding Variety) seeds in 2001-02, which increases the yield of paddy equal to that of maize in that year then what is the growth rate in production of paddy, in 2001-02?

- a. 54%
- b. 49%
- c. 67%
- d. 59%
- e. 45%

11. Which crop(s) show alternately increasing and decreasing trend in production over the years, given?

- a. Wheat and Maize
- b. Maize and Ragi
- c. Wheat and Ragi
- d. Paddy and Maize
- e. Ragi and Paddy

12. If the price of paddy in 1998-99 is Rs 10 per kg and if the price increases by 5% per annum, over the years that followed then what is the turnover of paddy cultivating for 2000-01 (in Rs. million)?

- a. 140810
- b. 123420
- c. 231450
- d. 1234850
- e. Cannot be determined

13. If 10% of the produce of barley is lost due to rodents and transportation in 2002-03 and a profit of 25% is desired, at what price should barley be sold in the market to make-up for the loss. Given that the cost of production of barley in 2002-03 is Rs. 1250 per quintal (Assume all that is left is sold)?

- a. Rs. 1,200 per quintal
- b. Rs. 1,794 per quintal
- c. Rs. 1,736 per quintal
- d. Rs. 2,321 per quintal
- e. Cannot be determined

14. Of the total production of maize in 2002-03, some part is allocated for PDS (Public Distribution System) and to be sold at Rs. 15 per kg. The rest will be released in the open market to be sold at Rs. 22 per kg. If the average selling price of Maize is Rs. 20 per kg, then what percentage of maize has been allocated for PDS?

- a. 26.3%
- b. 28.5%
- c. 32.1%
- d. 17.6%
- e. 27.5%

15. What minimum area (in Mn Ha) of land should be used in 1999-2000 for maize production with a yield value same as that in the year 1998-99?

- a. 0.45
- b. 0.61
- c. 0.49
- d. 0.55
- e. 1.05

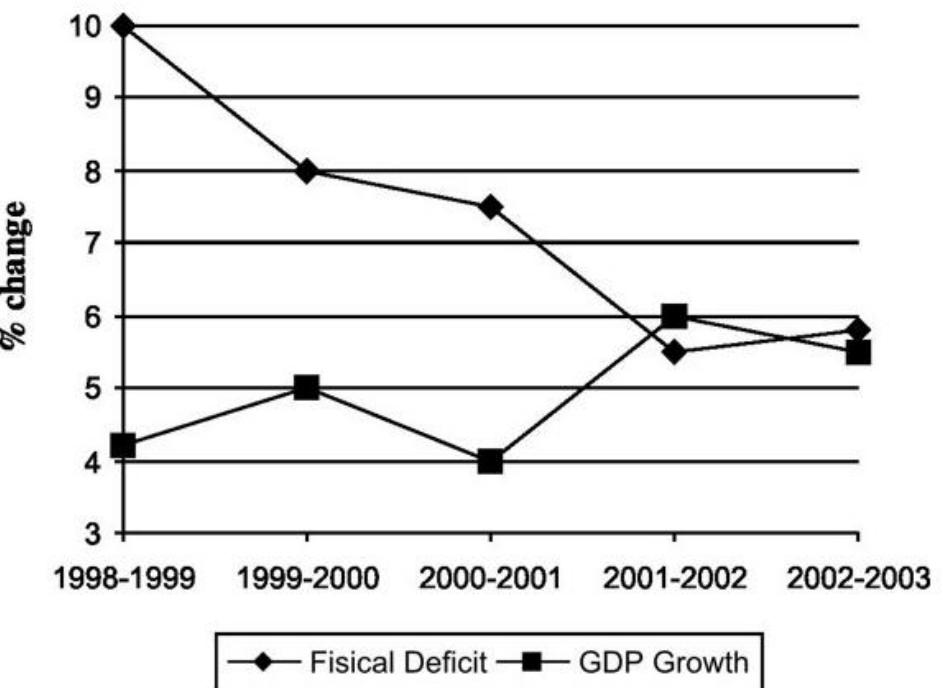
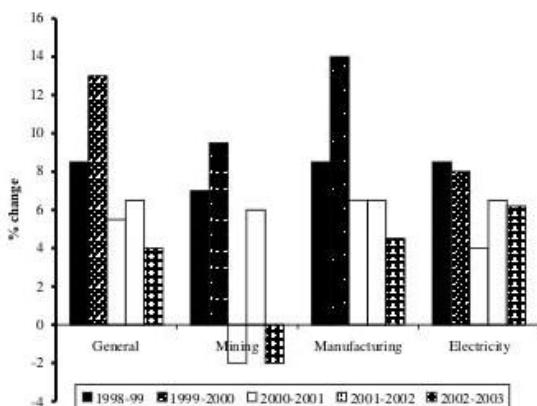
Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
15					

Practice exercise - A5

Direction for questions 1 to 10: Study the graph below and answer the questions that follow.

The following bar chart and the line graph give the percentage changes in the values of various parameters of industrial growth, over their respective values in the previous year.



1. In 2000-01 the total production in mining was 100 billion tonnes and that in manufacturing was 80 billion tones. If in 2001-02 the mining products grow to 106 billion tonnes, then by how much does the manufacturing grow?
 - a. 3.6 billion tonnes b. 5.2 billion tonnes c. 4.8 billion tonnes
 - d. 6.4 billion tonnes e. 6.0 billion tonnes
2. What is the average of GDP growth rate for the years mentioned in the graph?
 - a. 6% b. 3% c. 4.8% d. 5% e. 3.8%

3. In the period 1998-2003, the average growth rate of fiscal deficit was more than the average growth rate of which of the following parameters?

- a. General and manufacturing
- b. Mining and electricity
- c. Mining, electricity and general
- d. Mining only
- e. General and Electricity

4. Fiscal deficit is calculated as a percentage of GDP. What is the fiscal deficit if it is given that GDP for 2001-02 is Rs. 360000 crore?

- a. Rs. 19800 crore b. Rs. 19000 crore c. Rs. 20100 crore
- e. Rs. 21000 crore e. Cannot be determined

5. If general, mining, manufacturing and electricity all started with an initial value of 100 in the beginning of 1999-2000 then which of the following would have the highest figure in 2002-2003?

- a. General b. Mining c. Manufacturing
- d. Electricity e. FD

6. Which industrial sector witnessed the highest growth in values in 1999-2000?

- a. General b. Mining c. Electricity
- d. Manufacturing e. Cannot be determined

7. If the fiscal deficit in 1997-98 was Rs. 11,200 crore, find the fiscal deficit as a percentage of GDP in 1999-2000. The GDP in 1998-99 was Rs. 3,09,000 crore.

- a. 4.9% b. 4.1% c. 3.6% d. 4.8% e. 5.3%

8. If the growth rate of electricity in 2000-01 is interchanged with the growth rate in mining in 1999-2000, what will be the overall difference in growth rate for the period 1998-2003 in electricity?

- a. 11.5% b. 4.5% c. 7.3% d. 9.5% e. 8.3%

9. The figure for total production in mining would be the highest for which year?

- a. 2000-01 b. 1999-2000 c. 2002-2003
- d. 2001-02 e. Cannot be determined

10. If the highest percentage increases for each of the years are picked and taken together, what is the total overall growth rate from 1997 to 2003 for such a hypothetical graphs?

- a. 57.4% b. 48.5% c. 52.6%
- d. 41.60% e. Cannot be determined

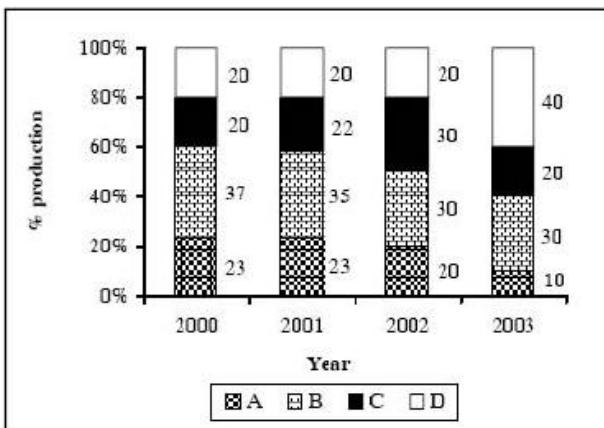
Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
10					

Practice exercise - A6

Direction for questions 1 to 10: Study the graph below and answer the questions that follow.

The 'percentage bar chart' gives the production of A, B, C and D in a firm for 4 years. It is given that the total production increases at the rate of 10% per annum over its value in the previous year in the period 2000-2003. It is also known that the amount of production of C in 2003 minus the amount of production of A in 2001 is equal to 1320 metric tonnes (MT).



1. The annual compounded percentage increase in the production of C for the period 2000-2002 is approximately
 a. 35% b. 40% c. 45% d. 31% e. 42%

2. The price of product D is Rs. 150 per unit in 2002. The sales revenue contributed by D in 2002 will be:

a. Rs. 3630000 b. Rs. 4356000 c. Rs. 2354600

d. Rs. 4536500 e. Cannot be determined

3. Which product has the largest cumulative production?

a. B b. C c. D d. A e. Cannot be determined

4. If the value of D's production in 2003 minus the value of A's production in 2001 is equal to 4,191 MT, what will be the answer to the previous question?

a. D b. C c. A d. B e. Cannot be determined

5. If the firm is able to sell all its production then what is the ratio of the sales revenues of A during this period?

a. 2300 : 2530 : 2420 : 1331 b. 240 : 255 : 342 : 313

c. 1230 : 3425 : 3241 : 2314 d. 23 : 26 : 32 : 42

e. Cannot be determined

6. If a profit of 20% is earned in 2002 from the product D (at a selling price of Rs. 120 per unit), at what loss percentage has B (at a selling price of Rs. 150 per unit) been sold, so that the overall profit on sale of B and D taken together is 5% in the year 2002? [Assume that the entire production of B and D is sold]

a. 4.31% b. 4.76% c. 1.53%

d. 5.3% e. Cannot be determined

7. If in the year 2002 and in the year 2003 the growth rate of total production would have been 25% instead of 10%, as given then what would have been the difference in the

production of C and B in 2003?

a. 1500 MT b. 2,500 MT c. 1800 MT

d. 2800 MT e. Cannot be determined

8. Due to labourers' strike in 2001, if the production drops by 5% over that in 2000 then what should be the growth rate of production in 2002 for maintaining a CAGR of 10% in the period 2000-2002?

a. 30.5% b. 25.7% c. 27.4%

d. 18.6% e. Cannot be determined

9. With reference to question 8, if the labour problem had continued in 2002 as well, thereby decreasing the production by 5% over the previous year then what would have been the production of C in 2003?

a. 19,855 MT b. 21,841 MT c. 22,990 MT

d. 27,320 MT e. Data inconsistent

10. If, in the first three years, all of B produced was sold in the market whereas the demand suddenly drops to half of what is produced in the last year, what is the profit due to B in four-year period, assuming zero value for the items which are not sold? (It is given that for the product B, sale price is Rs. 400 per unit, variable cost of production is Rs. 200 per unit and fixed production cost is Rs. 100 per unit.)

a. 21.3% b. 33.3% c. 51.7%

d. 24.64% e. 15.79%

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
10					

Practice exercise - A7

Direction for questions 1 to 14: Answer the questions based on the following information.

Following are the essential details of a new post-paid billing plan called 'Airtel One' which is introduced by Airtel (a GSM mobile service provider).

Pulse Rate	60 secs		
Price of Plan	Rs.99		
Free Airtime on Plan	Nil		
Incoming Calls (in Rs. / minute)	FREE		
Outgoing Calls (in Rs/minute)	Airtel	GSM / CDMA (10 Digit)	Landline / WLL
LOCAL RATES	Rs.1	Rs.1	Rs.2
STD RATES			
50 - 200 km	Rs. 1.50	Rs.1.50	Rs.2
200 - 500 km	Rs. 1.50	Rs.2.50	Rs.2.50
More than 500 km	Rs. 1.50	Rs.3.00	Rs.3.50
ISD RATES			
USA, Canada, Europe (Fix ed Line)	Rs.7		
Gulf, Europe (Mobile), SAARC	Rs10		
Rest of the world	Rs.40		
SMS RATES			
Local	Rs 1.50		
National	Rs.2		
International	Rs.5		
Value Added Services (Rs.)	Rs.3 & Rs.6 depending on the service		

Monthly Bill = Call charges + SMS charges + Price of Plan + Value Added Services

(Assume one call is less than or equal to 1 minute)

1. In a month, if Abhishek spent 150 min on local (GSM), 50 min (WLL) on national (above 700 km) and 25 min on international (USA) calls, and sent 14 international and 15 national SMSs, then what was the amount of his bill for that month?

- a. Rs. 500 b. Rs. 599 c. Rs. 600 d. Rs. 699 e. Rs. 799

2. If the government imposed 12% service tax only on all international calls, then in the previous question, what will be the bill amount Abhishek would have paid for the same month?

- a. Rs. 699 b. Rs. 720 c. Rs. 820 d. Rs. 790 e. None of these

3. If Mohan makes STD calls (within 100km) for 30 min and spent 100 min on local calls with 30% on landline, 40% on GSM and 30% on Airtel, and Rohan spent 18 min on STD (within 150 km) and spent 120 min on local calls with 30%, 40% and 30% on GSM, landline and Airtel respectively, then what can be the maximum possible difference in the amount spent by Rohan and Mohan?

- a. Rs. 29 b. Rs. 44 c. Rs. 20 d. Rs. 15 e. Cannot be determined

4. A new SMS scheme was introduced at a rate of 60 paise for one local SMS, with an additional monthly charge of Rs.35. Who will not benefit from the scheme? A person sending

- a. 38 local SMS a month b. 40 local SMS a month c. 60 local SMS a month d. 59 local SMS a month. e. 50 local SMS a month

5. A monthly bill of Rs. 199 is definitely not possible when you make only

- a. 30 calls to Airtel on STD (500+ km) and 55 local calls in a month

b. 16 calls to Airtel on STD (150 km) and 76 local calls in a month

- c. 10 STD calls (250 km) each to Airtel, GSM and landline respectively and 30 local calls in a month

d. 8, 4 and 7 calls to Airtel, GSM and landline respectively on STD (500 + km) and 55 local calls in a month

e. None of these

6. A bill of Rs 299/month is possible for Sunny if he makes only

a. 8 ISD calls in a month

b. 35 STD calls to GSM and 10 to WLL in a month

c. 40 STD calls to Airtel in a month

d. (b) and (c)

e. (a) and (b)

7. If all the calls from Delhi to Mathura (100 km distance) from any Airtel user is treated as a local call, with an additional charge of Rs 20/month, then the maximum benefit will be enjoyed by the person who makes (Assume that all calls were made to Mathura from Delhi)

a. 40 calls to GSM

b. 50 calls to Airtel

c. 35 calls to GSM and 10 to WLL

d. 20 calls to WLL

e. All will have the same benefit

8. If Airtel introduced a new scheme called "All India One", where they charge only Re1/minute for all STD calls made anywhere in India with an additional monthly charge of Rs. 250, then how many minimum STD calls should I make, so that I am definitely sure of having no loss from opting for to this plan?

a. 100 b. 250 c. 500 d. 350 e. 450

9. In an introductory offer, the Airtel to Airtel (all India) call charge was reduced to Rs 0.50/minute, the Airtel and Rs. 5 were deducted daily, then which of the following calling patterns will not gain from the offer?

a. On Airtel STD (150 km) and Local for 12 minutes and 8 minutes respectively in 3 days

b. On Airtel STD (250 km) and Local for 14 minutes and 18 minutes respectively in 5 days

c. 75 min of Local calls on Airtel for a week

d. 60 min of local calls on Airtel for 5 days

e. All of the above

10. In the previous question, if the offer was only meant for local calls, then what is the minimum number of local calls one should make in a day in order to gain from the offer?

a. 20 calls on Airtel b. 11 calls on Airtel c. 10 calls on Airtel

d. 21 calls on Airtel e. One will always gain from the offer

11. Due to fierce competition, a "Couple Offer" (for local calls only) was introduced, in which any two Airtel numbers can have a combined 100 minutes of free outgoing and 100 free SMS between them on an extra charge of Rs 200/month to be paid by any one of the two. The maximum benefit from the offer will be gained by the "Couple" who share

a. 200 calls and 150 SMS between them

b. 100 calls and 200 SMS between them

c. 250 calls and 100 SMS between them

d. 150 calls and 200 SMS between them

e. Same for all of the above "Jodi's"

12. A person made 12 ISD calls in a particular month. If 80% of his ISD bill come from calling "Rest of the world", then the ISD calls for the minimum duration were made to which of the following group of countries?

a. USA, Canada, Europe (Fixed line)

b. Gulf, Europe (Mobile), SAARC

c. Rest of the world

d. (a) or (c)

e. (b) or (c)

Questions 13 and 14 based on additional information:

In a new scheme called "Happy Hours", all outgoing call rates and SMS charges are reduced to half between 10 pm to 5:30 am.

13. After using Happy Hours scheme, a person's bill was reduced by 20%, what is the ratio of total calls and SMS during the day and during Happy Hours?

a. 2 : 1 b. 3 : 2 c. 4 : 1 d. 3 : 1 e. Cannot be determined

14. In the previous question, what percentage of the total calls were made during the day, apart from those during Happy Hours?

a. 60% b. 40% c. 50% d. 66.67% e. Cannot be determined

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
14					

Practice exercise - A8

Directions for questions 1 to 15: Study the caselet given below and answer the questions that follow.

In Lala Public School (LPS), only 80% of the students passed the class X board examination in 2003 and all of those, who passed moved on to Lala Junior College (LJC) for class XI. In 2003, 20% of the students of LPS, who passed class X, joined science stream in LJC; 30% joined arts stream, while the remaining joined commerce stream. Other than these students, a number of students equal to 20% of the number of LPS students who passed class X in 2003, also joined LJC for class XI from other schools. The break-up of number of students from other schools, across science, arts and commerce streams at LJC was in the ratio 2 : 3 : 5 respectively.

In 2003, the number of students in arts stream in LJC in class XI was 720.

1. How many students of LPS appeared for the class X board examination in 2003?
a. 2,000 b. 2,500 c. 2,800 d. 3200 e. Cannot be determined
2. What is the number of students who passed the class X board examination from LPS in 2003?
a. 2,000 b. 2,100 c. 2,200 d. 2,500 e. Cannot be determined
3. What was the number of students in class XI commerce stream in LJC, in 2003?
a. 1,000 b. 1,400 c. 1,200 d. 1,500 e. Cannot be determined
4. What percentage of all the students in class XI, at LJC, study in arts stream in 2003?
a. 20% b. 30% c. 50% d. 28% e. 25%

5. What is the total number of students in class XI in science stream, at LJC, in 2003?
a. 800 b. 640 c. 480 d. 400 e. Cannot be determined
6. In 2003, what percentage of science stream students in class XI, at LJC, were from LPS?
a. 83.33% b. 86.66% c. 91.11% d. 66.67% e. Cannot be determined
7. If 50% of LPS class X board examination passouts are girls then what is the number of girls, from LPS, in arts stream in class XI at LJC in 2003?
a. 300 b. 400 c. 600 d. 250 e. Cannot be determined
8. If after class XI, 10% of commerce stream students changed to arts stream and 5% of arts stream students got failed and dropped out then what would have been the number of students in class XII arts at LJC, in 2004? (Assume that no student outside LJC, was admitted to class XII, at LJC).
a. 570 b. 670 c. 804 d. 690 e. Cannot be determined
9. If after class XI, only 5% of arts stream students and only 6% of commerce stream students drop out at LJC then how many students there would have been in class XII at LJC in 2004? (Assume that no students outside LJC was admitted to class XII, at LJC and none of the science stream student got dropped)
a. 2292 b. 1910 c. 1890 d. 2182 e. Cannot be determined
10. If 8% of commerce stream students had joined arts stream after class XI in 2004 and 10% of science stream students had moved commerce stream in 2004 then by what percentage of the number of commerce stream students would have been changed from class XI to XII, in 2004?
a. 4% b. 4.167% c. -4% d. -4.167% e. Cannot be determined

5. What is the total number of students in class XI in science stream, at LJC, in 2003?

- a. 800 b. 640 c. 480 d. 400 e. Cannot be determined

6. In 2003, what percentage of science stream students in class XI, at LJC, were from LPS?

- a. 83.33% b. 86.66% c. 91.11% d. 66.67% e. Cannot be determined

7. If 50% of LPS class X board examination passouts are girls then what is the number of girls, from LPS, in arts stream in class XI at LJC in 2003?

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10. If 8% of commerce stream students had joined arts stream after class XI in 2004 and 10% of science stream students had moved commerce stream in 2004 then by what percentage of the number of commerce stream students would have been changed from class XI to XII, in 2004?

- a. 4% b. 4.167% c. -4% d. -4.167% e. Cannot be determined

11. If the number of girls in class XI at LJC in 2003 is distributed in the ratio 2 : 5 : 3 across science, commerce and arts streams respectively then what is the number of girls in class XI at LJC, in 2003?

- a. 720 b. 800 c. 1200 d. 1000 e. Cannot be determined

12. Referring to the data in question 11, if the number of girls in science stream is only 50% of the number of boys in science stream in class XI then what is the number of girls in arts stream in class XI, at LJC, in 2003?

- a. 360 b. 240 c. 200 d. 220 e. Cannot be determined

13. If 90% of all the students in class XI, in 2003, had passed then how many would have failed in class XI, in 2003?

- a. 250 b. 240 c. 200 d. 320 e. Cannot be determined

14. Using the data in questions 11 and 12, what is the ratio of the number of boys in science stream to that in arts stream, in 2003?

- a. 2 : 5 b. 2 : 3 c. 3 : 2 d. 1 : 2 e. Cannot be determined

15. If a new stream viz. home science is introduced in class XI at LJC, in 2003 and 300 new students join then what percentage of the total students at LJC in class XI in 2003, will be in home science stream?

- a. 9.09% b. 11.11% c. 12% d. 12.5% e. Cannot be determined

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
15					

Strategies to tackle DI sets

Apart from fast and accurate calculations, one should also be careful in attempting the DI section very strategically. This may obviate the need to calculate. Few strategies are explained below.

Choose the order of problem sets intelligently

As in Reading Comprehension in which, a lot depends on the choice of the order of passages in DI as well a wrong choice of problem sets can lead to long calculations, frustration and a sense of hopelessness, which is very detrimental to your score. So be very proactive in selecting in which order you will be attempting the problem sets. A few guidelines for choosing a correct order of the problem sets are:

1. How comfortable are you with the type of problem set given?

Each one of us is more comfortable with a particular type of graph. For some, line graphs may be easier and for some others pie charts may be more comfortable. Accordingly, one must choose a problem in which one is more comfortable.

2. What are the numbers associated with the graphs?

Obviously if numbers are like 86, 114, 320, they are definitely easier than 4 or 5 digit numbers like 34567, 127034.

Also, in pie charts if sectors read as 15%, 24%, 42%, 12%, then one can deduce that calculations will not be tougher, but if the readings are like 17.5%, 22.8% etc, it calculations will be difficult.

One must also have a look at the numbers used in the answer options. Answer options with numbers as 12.5%, 8.33%, 62.5% would definitely be easier to arrive at, as we are comfortable with these percentages.

3. Are the answer options wide or close?

Look how far apart are the answer choices. Wider the choices, easier is the elimination process and accordingly, lesser are the calculations.

Also keep a watch for answer choices such as 'Cannot be determined' and 'None of these'. 'Cannot be determined' makes it much easier because, first of all the question becomes a data sufficiency question. And if it can be answered, only four alternatives are left. Pick the alternative which is value-wise the middle one and just check if your answer will be less than this, equal to this or greater than this. Thus in one iteration of calculation one can find out the correct answer. 'None of these' on the other hand makes it much more difficult as one has to do calculation to know the exact value.

4. The amount of data

It might be a better idea to solve a line chart with two lines having 6 points each rather than solving a table with 5 columns and 6 rows. Though, depending upon other factors, this may not be the case always.

5. When to approach the Caselets?

One has to be very cautious about the order of attempting a problem set, which is a caselet. One should not start the LRDI section with a caselet first, because one may not know what the caselet will be all about. Hence there is a possibility that one may waste 3 to 5 minutes in reading the caselet only to conclude that it did not make too much of sense. This way, the initial three minutes go wasted and panic may set in. Also, a caselet should not be left for the very end, for the simple reason that it may be a very very easy one. So somewhere in the middle, caselets should definitely be given a reading.

Caselets can be categorized under two types. First category is the one in which a tabular data is given in the caselet form and in the second type, puzzles are given. It is very easy to identify which of these two types, the caselet belongs to after reading the first two lines. If the caselet reads as....on 1st Jan Ghosh Babu invested Rs. 10000 and by December got a

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Caselets can be categorized under two types. First category is the one in which a tabular data is given in the caselet form and in the second type, puzzles are given. It is very easy to identify which of these two types, the caselet belongs to after reading the first two lines. If the caselet reads as....on 1st Jan Ghosh Babu invested Rs. 10000 and by December got a

return of 20%....it is of the tabular data form. Whereas if it reads as ...in a game of lifting match sticks, the following rules apply.....or.....there are four friends, each of which wear different color shirts, reside in different corners of city....it will be a puzzle. After deducing the type of caselet, a student has to take a call as to should he attempt it or not. Puzzles can be riskier since either you may crack them in a short time or else you may spend 10 minutes without making any headway. Analyse your strengths. If you have been solving a lot of puzzles then pick it up or else it is best left unattempted.

Logical Reasoning³

Reasoning is the act of methodically using logic to derive a conclusion from certain premises.

In reasoning based questions, you are required to break down the given set of information into smaller components and organize the information provided in a systematic fashion. One must first get a sense of the overall shape of the problem, and then see how individual pieces of information fit into it; this often involves construction of a rudimentary chart or diagram or table to aid in answering the questions that follow.

Remember the good old jigsaw puzzles - putting pieces together to get the complete picture!



Reasoning

Broadly, reasoning based questions are categorized into **two types**:

Type 1:

Questions which are based solely upon the general problem and specific conditions that are initially provided, and which apply to all the questions in the set.

This can be further divided into three more subtypes:

A. Simple Logic/reasoning based: It contains certain conditions which act as guidelines. Accordingly, one has to decipher the logic/reasoning of the given set.

Example: In a family,

I. There are three fathers.

II. There are five children.

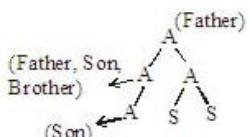
III. One pair of brothers and one pair of sisters.

Question:

1. Minimum number of members possible in the family is:

- a. 8 b. 7 c. 6 d. 5 e. 9

Explanation:



$A \rightarrow \text{Male}$, $S \rightarrow \text{Female}$

∴ Minimum number of member possible is six.

B. Missing data Type: In this type of reasoning, the data provided is generally incomplete. Therefore, reasoning is used to fill in the missing data, which is later used to answer the questions.

Example: The following table gives the final medal tally of the Commonwealth Nations Games

Rank	Country	Gold	Silver	Bronze
1	China	8	5	-
2	Russia	-	7	9
3	Germany	-	-	2
4	India	7	4	10

1. How many gold medals were won by Russia?

- a. 7 b. 6 c. 5 d. 8 e. None of these

2. Minimum number of silver medals Germany would have won:

- a. 7 b. 6 c. 5 d. 4 e. 8

Explanation: Russia and Germany will have same number of Gold medal as won by India, because the difference of gold medal between 1st and 4th is only 1. Therefore, the ranking is governed by Silver medals, and Germany should have won less silver medals than Russia, but higher than India, in order to rank between them.

Hence,

1. (a) 2nd, 3rd and 4th placed countries have won the same number of gold medals. The number is 7.

2. (c) Germany should have won more number of silver medals than won by India. Minimum number is 5.

C. DI based: Data is given in the form of charts and tables, and reasoning is applied to deduce the data according to which the questions are answered.

Example: The score card of Virender Sehwag in a One day match is shown in the table below

Runs	Balls	4s	6s	Strike rate
57	79	6	0	72.15%

All runs scored are in singles, doubles, threes, fours and sixes. No extras.

Strike rate = No. of runs score/No. of balls faced

1. The minimum strike rate Sehwag would have had after facing 70 balls or deliveries

- a. 40.00% b. 57.82% c. 34.28% d. 45.2% e. None of these

Explanation: Since minimum strike rate is to be calculated, worst case scenario is taken into account.

Maximum Runs he scored in the last 9 balls, $4 \times 6 + 3 \times 3 = 33$ runs.

Therefore, remaining 24 runs were scored in 70 balls. In other words, he has to score at least 24 runs in 70 balls in order to score 57 runs in 79 balls. Thus minimum strike rate = $\frac{24}{70} = 34.28\%$

Type 2:

Second category involves the addition of such conditions which are relevant only for answering individual questions in the set.

This again can be further divided into three more subtypes:

A. Derivative Type: The individual question specific reasoning is derived from the initial set of reasoning. It is just an extension of the logic asked in the main question.

B. Modifier Type: In this type, the reasoning of the question alters or modifies the given reasoning or parameters of the set in accordance with a particular question.

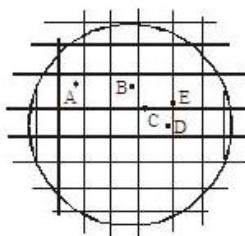
C. Contradictory Type: The reasoning in the individual question completely negates or overrides the existing initial reasoning of the set.

Example:

In the time zones 0° longitude (the reference) is considered to be in Greenwich in Britain and is called GMT (Greenwich Mean Time). It is taken as a reference for calculating the time around the globe. Following points are considered while calculating the time

- Time of the day increases on moving towards east from Greenwich
- 1° change in longitude = 4 minutes change in time

The table below shows the longitudes of some cities; here Naples is taken as the reference city, whose longitude is 5° E



	City	Longitude
A	Toronto	80° W
B	Copenhagen	5° W
C	Naples	0°
D	Jerusalem	37° E
E	Kabul	70° E

1. A rock Band U2 is performing in Greenwich at 10:00 pm Monday. At what time will the people in Toronto be watching its live telecast?

- a. 3:00 am, Tuesday b. 5:00 pm, Monday c. 6:00 pm Monday d. 4:00 am, Tuesday e. 6:00 am Monday

- Derivative Type

2. A UEFA cup match between Arsenal and A.S Roma was scheduled for 5:30 pm in Naples. If the match rescheduled to Milan (10° E of Greenwich) at 9:30 pm on the same day, then how early/late will the game be telecast live in Kabul?

- a. 5 hrs b. 4:20 hrs c. 3:40 hrs
d. 4:40 hrs e. None of these

- Contradictory Type

3. With reference to Greenwich, what is the longitude of a city which is four hours ahead of Naples?

- a. 55° E b. 65° W c. 55° W
d. 65° E e. 70° W

- Modifier Type

Explanation:

i. b Toronto is 80° W of Naples

∴ Toronto is (80 - 5)° W of Greenwich

$\Rightarrow 75 \times 4 = 300 \text{ min} = 5 \text{ hrs}$ and since it is in west, the time will decrease..

$\Rightarrow 10:00 - 5 = \text{At } 5:00 \text{ pm local time it will be telecast live in Toronto.}$

2. c Since, Milan, which is 5° E of Naples is taken in reference to Greenwich, we should now consider the former with reference to Naples.

∴ Milan is (10 - 5) = 5° E of Naples.

∴ Milan is $5 \times 4 = 20 \text{ min}$ ahead of Naples

So, when in Naples the time is 5:30 pm,

in Milan it is 5:50 pm

The difference in playing time is $9:30 - 5:30 = 4 \text{ hrs}$

\Rightarrow Actual time difference will be $4 - 20 \text{ min} = 3:40 \text{ hrs.}$

Hence, the match will be telecast 3:40 hrs late in Kabul.

Note: Data regarding Kabul is irrelevant

3. a Four hours = $\frac{4 \times 60}{4} = 60^\circ$

Since, the city is ahead of Naples $\Rightarrow 60^\circ$ East of Naples

Greenwich with reference to Naples is 5° E

∴ The city with reference to Greenwich $60 + 5 = 65^\circ$ E.

1. b Toronto is 80° W of Naples

\therefore Toronto is $(80 - 5)^\circ$ W of Greenwich

$\Rightarrow 75 \times 4 = 300$ min = 5 hrs and since it is in west, the time will decrease..

$\Rightarrow 10:00 - 5$ = At 5:00 pm local time it will be telecast live in Toronto.

2. c Since, Milan, which is 5° E of Naples is taken in reference to Greenwich, we should now consider the former with reference to Naples.

\therefore Milan is $(10 - 5) = 5^\circ$ E of Naples.

\therefore Milan is $5 \times 4 = 20$ min ahead of Naples

So, when in Naples the time is 5:30 pm,

in Milan it is 5:50 pm

The difference in playing time is $9:30 - 5:30 = 4$ hrs

\Rightarrow Actual time difference will be $4 - 20$ min = 3:40 hrs.

Hence, the match will be telecast 3:40 hrs late in Kabul.

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Since, the city is ahead of Naples $\Rightarrow 60^\circ$ East of Naples

Greenwich with reference to Naples is 5° E

\therefore The city with reference to Greenwich $60 + 5 = 65^\circ$ E.

Such reasoning questions, in particular, also require one to understand the distinction between logical possibility and logical necessity, or, to put it another way, the distinction between "can" and "must."

Various Themes

Themes:

Following is the list of various topics or themes on which reasoning based sets may be formed. Getting oneself acquainted with the methodology and key elements behind these topics will make it easier to decipher the given data.

It's advisable to have a fair idea about the following themes before answering such questions. Various business and general magazines, television, newspaper and the internet are a few good sources where these themes are discussed more often. One can easily understand the concept behind each of these themes, which may prove helpful in solving these theme based sets.

Following are the various types of reasoning data which have appeared in CAT.

The theme of the same is mentioned in the margins.

In CAT - 2004

The year was 2006. All six teams in Pool A of World Cup hockey play each other exactly once. Each win earns a team three points, a draw earns one point and a loss earns zero points. The two teams with the highest points qualify for the semifinals. In case of a tie, the team with the highest goal difference (Goals For - Goals Against) qualifies.

In the opening match, Spain lost to Germany. After the second round (after each team played two matches), the pool table looked as shown below:

Pool A

Teams	Games Played	Won	Drawn	Lost	Goals For	Goals Against	Points
Germany	2	2	0	0	3	1	6
Argentina	2	2	0	0	2	0	6
Spain	2	1	0	1	5	2	3
Pakistan	2	1	0	1	2	1	3
New Zealand	2	0	0	2	1	6	0
South Africa	2	0	0	2	1	4	0

In the third round, Spain played Pakistan, Argentina played Germany, and New Zealand played South Africa. All the third round matches were drawn. The following are some results from the fourth and fifth round matches

- (a) Spain won both the fourth and fifth round matches.
 - (b) Both Argentina and Germany won their fifth round matches by 3 goals to 0.
 - (c) Pakistan won both the fourth and fifth round matches by 1 goal to 0.
1. Which one of the following statements is true about matches played in the first two rounds?
1. Germany beat New Zealand by 1 goal to 0.
 2. Spain beat New Zealand by 4 goals to 0.
 3. Spain beat South Africa by 2 goals to 0.
 4. Germany beat South Africa by 2 goals to 1.
 5. Spain beat South Africa by 1 goals to 0.
2. Which one of the following statements is true about matches played in the first two rounds?
1. Pakistan beat South Africa by 2 goals to 1.

2. Argentina beat Pakistan by 1 goal to 0.
 3. Germany beat Pakistan by 2 goals to 1.
 4. Germany beat Spain by 2 goals to 1.
 5. Argentina beat Pakistan by 2 goals to 1.
3. If Pakistan qualified as one of the two teams from Pool A, which was the other team that qualified?
1. Argentina
 2. Germany
 3. Spain
 4. New Zealand
 5. None of these
4. Which team finished at the top of the pool after five rounds of matches?
1. Argentina
 2. Germany
 3. Spain
 4. Pakistan
 5. Cannot be determined

* **Errata:** In each round, there will be three matches played and hence, there will be three winners in each round. But if we see statement (a), (b) and (c) we find that Spain, Argentina, Germany, and Pakistan won their 5th round matches, which is not possible.

Following themes can be used under these categories.



1. SPORTS

• Cricket

i. Career graph

ii. Tournament Points Tally

iii. Match analysis

iv. World Cup schedule

v. Super Selector

• Olympics

i. Medals Tally

ii. Voting

• Tennis

i. Knock-Out

ii. Seeding

iii. Scheduling

• Soccer

i. Champions League

ii. Points tally



2. Stock Market

a. Portfolio can be of three different types:

I: well-balanced and safe

II: geared for short term profit and volatile

III: dormant but potentially rewarding in future

b. Share Prices over the week

c. Moving average of share prices.



3. HR

a. Training schedule given for groups of Operator level, Floor Level, manager level and Senior mgmt Level staff. Which all training sessions can be scheduled?

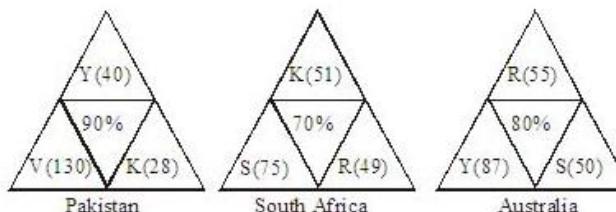
b. Workshops

c. Job applicants

d. Hierarchy

In CAT - 2004

Coach John sat with the score cards of Indian players from the 3 games in a one-day cricket tournament, where the same set of players played for India, and all the major batsmen got out. John summarized the batting performance through three diagrams, one for each game. In each diagram, the three outer triangles communicate the number of runs scored by the three top scorers from India, where K, R, S, V, and Y represent Kaif, Rahul, Saurav, Virender, and Yuvraj respectively. The middle triangle in each diagram denotes the percentage of the total score that was scored by the top three Indian scorers in that game. No two players score the same number of runs in the same game. John also calculated two batting indices for each player based on his scores in the tournaments; the R-index of a batsman is the difference between his highest and lowest scores in the 3 games while the M-index is the middle number, if his scores are arranged in a non-increasing order.



1. For how many Indian players is it possible to calculate the exact M-index?

1. 0 2. 1 3. 2 4. 3 5. 4

2. Among the players mentioned, who can have the lowest R-index from the tournament?

1. Only Kaif, Rahul or Yuvraj

2. Only Kaif or Rahul

3. Only Kaif or Yuvraj

4. Only Kaif

5. Only Rahul or Yuvraj

3. How many players among those listed definitely scored less than Yuvraj in the tournament?

1. 0 2. 1 3. 2

4. More than 2 5. Cannot be determined

4. Which of the players had the best M-index from the tournament?

1. Rahul 2. Saurav 3. Virender

4. Yuvraj 5. Either Rahul or Saurav

In CAT - 2005

The year is 2089. Beijing, London, New York, and Paris are in contention to host the 2096 Olympics. The eventual winner is determined through several rounds of voting by members of the IOC, with each member representing a different city. All the four cities in contention are also represented in IOC.

- In any round of voting, the city receiving the lowest number of votes in that round gets eliminated. The survivor after the last round of voting gets to host the event.
- A member is allowed to cast votes for a maximum two different cities, in all rounds of voting combined. (Hence, a member becomes ineligible to cast a vote in a given round if both the cities (s)he voted for in earlier rounds are out of contention in that round of voting.)
- A member is also ineligible to cast a vote in a round if the city (s)he represents is in contention in that round of voting.
- As long as the member is eligible, (s)he must vote and vote for only one candidate city in any round of voting.

The following incomplete table shows the information on cities that received the maximum and minimum votes in different rounds, the number of votes cast in their favour, and the total votes that were cast in those rounds.

Round	Total votes cast	Maximum votes cast		Eliminated	
		City	No. of votes	City	No. of votes
1		London	30	New York	12
2	83	Paris	32	Beijing	21
3	75				

It is also known that:

- All those who voted for London and Paris in round 1, continued to vote for the same cities in subsequent rounds, as long as these cities were in contention. 75% of those who voted for Beijing in round 1, voted for Beijing in round 2 as well.

- Those who voted for New York in round 1, voted either for Beijing or Paris in round 2.
 - The difference in votes cast for the two contending cities in the last round was 1.
 - 50% of those who voted for Beijing in round 1, voted for Paris in round 3.
1. What percentage of members from among those who voted for New York in round 1, voted for Beijing in round 2?
 - a. 33.33
 - b. 50
 - c. 66.67
 - d. 75
 - e. 60.0
 2. What is the number of votes cast for Paris in round 1?
 - a. 16
 - b. 18
 - c. 22
 - d. 24
 - e. 20
 3. What percentage of members from among those who voted for Beijing in round 2 and were eligible to vote in round 3, voted for London?
 - a. 33.33
 - b. 38.10
 - c. 50
 - d. 66.67
 - e. 45.33
 4. Which of the following statements must be true?
 - I. IOC member from New York must have voted for Paris in round 2.
 - II. IOC member from Beijing voted for London in round 3.
 - a. Only I
 - b. Only II
 - c. Both I and II
 - d. Either I or II
 - e. Can't say

In CAT 2005

Venkat, a stockbroker, invested a part of his money in the stock of four companies – A, B, C and D. Each of these companies belonged to different industries, viz., Cement, Information Technology (IT), Auto, and Steel, in no particular order. At the time of investment, the price of each stock was Rs. 100. Venkat purchased only one stock of each of these companies. He was expecting returns of 20%, 10%, 30% and 40% from the stock of companies A, B, C and D, respectively. Returns are defined as the change in the value of the stock after one year, expressed as a percentage of the initial value. During the year, two of these companies announced extraordinarily good results. One of these two companies belonged to the Cement or the IT industry, while the other one belonged to either the Steel or the Auto industry. As a result, the returns on the stocks of these two companies were higher than the initially expected returns. For the company belonging to the Cement or the IT industry with extraordinarily good results, the returns were twice that of the initially expected returns. For the company belonging to the Steel or the Auto industry, the returns on announcement of extraordinarily good results were only one and a half times that of the initially expected returns. For the remaining two companies which did not announce extraordinarily good results, the returns realized during the year were the same as initially expected.

1. What is the minimum average return Venkat would have earned during the year?

- a. 30%
- b. $31\frac{1}{4}\%$
- c. $32\frac{1}{2}\%$
- d. Cannot be determined
- e. $33\frac{1}{2}\%$

2. If Venkat earned a 35% return on average during the year, then which of these statements would necessarily be true?

- I. Company A belonged either to Auto or to Steel Industry.
- II. Company B did not announce extraordinarily good results.
- III. Company A announced extraordinarily good results.
- IV. Company D did not announce extraordinarily good results.
- a. I and II only
- b. II and III only
- c. III and IV only

d. II and IV only

3. If Venkat earned a 38.75% return on average during the year, then which of these statement(s) would necessarily be true?

- I. Company C belonged either to Auto or to Steel Industry.
- II. Company D belonged either to Auto or to Steel Industry.
- III. Company A announced extraordinarily good results.
- IV. Company B did not announce extraordinarily good results.
- a. I and II only
- b. II and III only
- c. I and IV only
- d. II and IV only
- e. I only

4. If Company C belonged to the Cement or the IT industry, and did announce extraordinarily good results, then which of these statement(s) would necessarily be true?

- I. Venkat earned not more than 36.25% return on average.
- II. Venkat earned not less than 33.75% return on average.
- III. If Venkat earned 33.75% return on average, Company A announced extraordinarily good results.
- IV. If Venkat earned 33.75% return on average, Company B belonged either to Auto or to Steel Industry.
- a. I and II only
- b. II and IV only
- c. II and III only
- d. III and IV only
- e. IV only

In CAT 2005: The table below reports the gender, designation and age-group of the employees in an organization. It also provides information on their commitment to projects coming up in the months of January (Jan), February (Feb), March (Mar) and

April (Apr), as well as their interest in attending workshops on: Business Opportunities (BO), Communication Skills (CS), and E- Governance (EG).

SL No.	Name	Gender	Designation	Age group	Committed to projects during	Interested in workshop on
1	Anshul	M	Mgr	Y	Jan, Mar	CS, EG
2	Bushkant	M	Dir	I	Feb, Mar	BO, EG
3	Charu	F	Mgr	I	Jan, Feb	BO, CS
4	Dinesh	M	Exe	O	Jan, Apr	BO, CS, EG
5	Eashwaran	N	Dir	O	Feb, Apr	BO
6	Fatima	F	Mgr	Y	Jan, Mar	BO, CS
7	Gayatri	F	Exe	Y	Feb, Mar	EG
8	Hari	M	Mgr	I	Feb, Mar	BO, CS, EG
9	Indira	F	Dir	O	Feb, Apr	BO, EG
10	John	M	Dir	Y	Jan, Mar	BO
11	Kalindi	F	Exe	I	Jan, Apr	BO, CS, EG
12	Lavanya	F	Mgr	O	Feb, Apr	CS, EG
13	Mandeep	M	Mgr	O	Mar, Apr	BO, EG
14	Nandal	M	Dir	I	Jan, Feb	BO, EG
15	Parul	F	Exe	Y	Feb, Apr	CS, EG
16	Rahul	M	Mgr	Y	Mar, Apr	CS, EG
17	Sunita	F	Dir	Y	Jan, Feb	BO, EG
18	Urvashi	F	Exe	I	Feb, Mar	EG
19	Yamini	F	Mgr	O	Mar, Apr	CS, EG
20	Zeena	F	Exe	Y	Jan, Mar	BO, CS, EG

M = Male, F = Female; Exe = Executive, Mgr = Manager,

Dir = Director; Y = Young, I = In between, O = Old

For each workshop, exactly four employees are to be sent, of which at least two should be Females and at least one should be Young. No employee can be sent to a workshop in which he / she is not interested in. An employee cannot attend the workshop on

- Communication Skills, if he/she is committed to internal projects in the month of January.

- Business Opportunities, if he/she is committed to internal projects in the month of February.

- E-governance, if he/she is committed to internal projects in the month of March.

1. Assuming that Parul and Hari are attending the workshop on Communication Skills (CS), then which of the following employees can possibly attend the CS workshop?

- a. Rahul and Yamini b. Dinesh and Lavanya c. Anshul and Yamini d. Fatima and Zeena e. Anshul and Fatima

2. How many Executives (Exe) cannot attend more than one workshop?

- a. 2 b. 3 c. 15 d. 16 e. 18

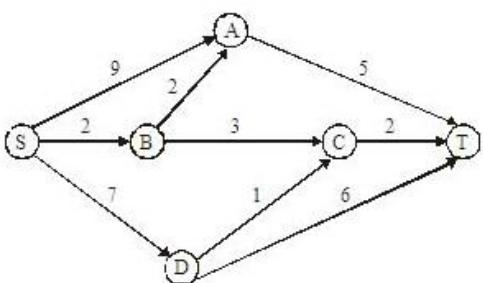
3. Which set of employees cannot attend any of the workshops?

- a. Anshul, Charu, Eashwaran and Lavanya
 b. Anshul, Bushkant, Gayatri, and Urvashi
 c. Charu, Urvashi, Bushkant and Mandeep
 d. Anshul, Gayatri, Eashwaran and Mandeep
 e. Charu, Mandeep, Gayatri and Anshul

In CAT 2006

A significant amount of traffic flows from point S to point T in the one-way street network shown below.

Points A, B, C, and D are junctions in the network, and the arrows mark the direction of traffic flow. The fuel cost in rupees for travelling along a street is indicated by the number adjacent to the arrow representing the street.



Motorists travelling from point S to point T would obviously take the route for which the total cost of travelling is the minimum. If two or more routes have the same least travel cost, then motorists are indifferent between them. Hence, the traffic gets evenly distributed among all the least cost routes.

The government can control the flow of traffic only by levying appropriate toll at each junction. For example, if a motorist takes the route S-A-T (using junction A alone), then the total cost of travel would be Rs 14 (i.e., Rs 9 + Rs 5) plus the toll charged at junction A.

1. If the government wants to ensure that no traffic flows on the street from D to T, while equal amount of traffic flows through junctions A and C, then a feasible set of toll charged (in rupees) at junctions A, B, C, and D respectively to achieve this goal is:

1. 1,5,3,3 2. 1,4,4,3 3. 1,5,4,2 4. 0,5,2,3 5. 0,5,2,2

2. If the government wants to ensure that all motorists travelling from S to T pay the same amount (fuel costs and toll combined) regardless of the route they choose and the street from B to C is under repairs (and hence unusable), then a feasible set of toll charged (in rupees) at junctions A, B, C, and D respectively to achieve this goal is:

1. 2,5,3,2 2. 0,5,3,1 3. 1,5,3,2 4. 2,3,5,1 5. 1,3,5,1

3. If the government wants to ensure that the traffic at S gets evenly distributed along streets from S to A, from S to B, and from S to D, then a feasible set of toll charged (in

rupees) at junctions A, B, C, and D respectively to achieve this goal is:

1. 0,5,4,1 2. 0,5,2,2 3. 1,5,3,3 4. 1,5,3,2 5. 0,4,3,2

4. If the government wants to ensure that all routes from S to T get the same amount of traffic, then a feasible set of toll charged (in rupees) at junctions A, B, C, and D respectively to achieve this goal is:

1. 0,5,2,2 2. 0,5,4,1 3. 1,5,3,3 4. 1,5,3,2 5. 1,5,4,2

5. The government wants to devise a toll policy such that the total cost to the commuters per trip is minimized. The policy should also ensure that not more than 70 per cent of the total traffic passes through junction B. The cost incurred by the commuter travelling from point S to point T under this policy will be:

1. Rs. 7 2. Rs. 9 3. Rs. 10 4. Rs. 13 5. Rs. 14

In CAT 2007

A low-cost airline company connects ten Indian cities, A to J. The table below gives the distance between a pair of airports and the corresponding price charged by the company. Travel is permitted only from a departure airport to an arrival airport. The customers do not travel by a route where they have to stop at more than two intermediate airports

Sector No	Airport of Departure	Airport of Arrival	Distance between the Airports (km)	Price (Rs)
1	A	B	560	670
2	A	C	790	1350
3	A	D	850	1250
4	A	E	1245	1600
5	A	F	1345	1700
6	A	G	1350	2450
7	A	H	1950	1850
8	B	C	1650	2000
9	B	H	1750	1900
10	B	I	2100	2450
11	B	J	2300	2275
12	C	D	460	450
13	C	F	410	430
14	C	G	910	1100
15	D	E	540	590
16	D	F	625	700
17	D	G	640	750
18	D	H	950	1250
19	D	J	1650	2450
20	E	F	1250	1700
21	E	G	970	1150
22	E	H	850	875
23	F	G	900	1050
24	F	I	875	950
25	F	J	970	1150
26	G	I	510	550
27	G	J	830	890
28	H	I	790	970
29	H	J	400	425
30	I	J	460	540

1. What is the lowest price, in rupees, a passenger has to pay for travelling by the shortest route from A to J?

(1) 2275 (2) 2850 (3) 2890 (4) 2930 (5) 3340

2. The company plans to introduce a direct flight between A and J. The market research results indicate that all its existing passengers travelling between A and J will use this direct flight if it is priced 5% below the minimum price that they pay at present. What should the company charge approximately, in rupees, for this direct flight?

(1) 1991 (2) 2161 (3) 2707 (4) 2745 (5) 2783

3. If the airports C, D and H are closed down owing to security reasons, what would be the minimum price, in rupees, to be paid by a passenger travelling from A to J?

(1) 2275 (2) 2615 (3) 2850 (4) 2945 (5) 3190

4. If the prices include a margin of 10% over the total cost that the company incurs, what is the minimum cost per kilometer that the company incurs in flying from A to J?

(1) 0.77 (2) 0.88 (3) 0.99 (4) 1.06 (5) 1.08

5. If the prices include a margin of 15% over the total cost that the company incurs, which among the following is the distance to be covered in flying from A to J that minimizes the total cost per kilometer for the company?

(1) 2170 (2) 2180 (3) 2315 (4) 2350 (5) 2390

Analytical Reasoning Fundas

There are two ways of solving analytical reasoning questions. The first way is the one which consists of the general method for solving any type of analytical reasoning questions. This method consists of a standard approach which must be followed by all the analytical reasoning questions (based on the need). The other approach is based on the specific type of the questions.

A. Important tips for solving analytical reasoning questions

1. As they aptly say that 'the question itself consists of the answer', this statement is equally true in case of analytical reasoning questions.

In order to solve any analytical reasoning question, **you must read the statements very thoroughly and repeatedly to clearly understand the meaning (known or unknown) which they carry**, with a very cool and patient mind. After reading the statements and analysing them, you will find that every statement which is there will definitely have some meaning (that is why it is there). Read the statements closely as there will be statements, for sure, which will have complementary meanings. You must read the statements carefully enough, so that you are able to dig out that hidden complementary meaning which is there.

Example:

In the statement, 'Kandarp immediately precedes Devesh', the statement has two meanings: one, that Kandarp is immediately before Devesh. This meaning is a direct and an obvious one. **The other meaning (which is the complementary meaning) is that, nobody else is there between Kandarp and Devesh.** Therefore, it is necessary that you must read the statement so thoroughly that you are able to come up with the hidden meanings also, if it is there.

2. Do not jump from one statement to the other before completely understanding the statements. This is very important, as it has been found that because of this very habit, questions take longer time to crack than what is required.

3. Use notations, symbols and abbreviations wherever required, preferably.

For example, you can use the following symbols given in the table below.

(+) → Male

(-) → Female

= → Equal to

≠ → Not equal to

> → Greater than

< → Smaller than

a straight line, for linking two informations.

Initial letters of names, places, or things as a representative of them.

Example:

Ram is taller than Shyam who is equal in age to Sita. Sita is shorter than Kanwal who is shorter than Shyam.

Now to reduce this complicated set of information into a simpler and useful one, we use the following notation and get

R > S = Sita (height)

Sh = Si (age)

Here by using this method, we save lot of precious time, and simplify the existing information which helps in solving the question faster.

4. Mark the keywords which are present in the statements and they really hold **THE KEY** for unlocking the problems. These words are really important as they help in giving clear guidelines within which the question has to be cracked. Here is a list of few important keywords that are generally used in analytical reasoning questions.

- a. At least b. At most c. All
- d. Consecutive e. Each f. Except
- g. If h. Only i. None j. Same

Example:

Santy and Kandy were having at least two two-rupee coins each with each of them.

The meaning of this statement is that Santy and Kandy were both having two-rupee coins which were minimally two in number, with each of them. The other hidden/complementary meaning of this statement is that Santy and Kandy may have more than two coins each individually or only two coins each.

5. Organize the information given in the question in the form of suitable tables, maps, or tree (whatever the case may be).

Example:

There are eight students — Harish, Gita, Girish, Rita, Manish, Shirish, Sita and Sanjay — coming from four cities — A, B, C and D. They appeared for five subjects, viz. English, history, mathematics, geography and science in an examination. Following additional information is also given.

I. Harish and Sita passed in both English and science.

II. Sanjay and Shirish failed in both history and geography.

III. Harish and Sita are from A.

IV. A boy from city A failed in history.

V. Two boys from C failed in history, geography and mathematics.

VI. Gita from B failed only in science.

VII. Shirish from D passed in three subjects.

VIII. Only two boys failed in science.

IX. Girish passed in only two subjects.

X. Rita and Sanjay failed in science.

XI. Students from A passed both in geography and mathematics.

XII. Rita is from Gita's place but she failed in mathematics.

XIII. Manish from B passed in three subjects and failed in mathematics.

XIV. Rita passed in three subjects.

XV. All girls passed in history.

Note: Harish, Girish, Manish Shirish and Sanjay are boys and Gita, Rita and Sita are girls.

Now looking at the homogeneity of the data which is there in the question, it is very difficult to organize the given data other than using table, as done below.

By tabulating the given information, we can easily arrange the given data in a very effective and efficient manner which helps a lot in solving the question.

Name	Place	English	History	Geography	Mathematics	Science
Harish	A	✓	✗	✓	✓	✓
Gita	B	✓	✓	✓	✓	✗
Girish	C	✓	✗	✗	✗	✓
Rita	B	✓	✓	✓	✗	✗
Manish	B	✓	✓	✓	✗	✗
Shirish	D	✓	✗	✗	✓	✓
Sita	A	✓	✓	✓	✓	✓
Sanjay	C		✗	✗	✗	✗

6. Do not make unnecessary assumptions.

This is an area where many problems are created just because of lack of clear understanding of what the statements imply. So be very careful while reading and comprehending the meaning of the statements.

Example:

In the statement, 'if Sanjay Veer is selected for a team, Sanjay Rawat must also be selected for that team', the meaning of this statement is that if and only if Sanjay Veer is selected in a team, then only Sanjay Rawat must be selected in that team and **not vice versa**, i.e. it certainly does not mean that if Sanjay Rawat is selected in a team, then Sanjay Veer will also be selected in that team. This is because of the fact that we know about Sanjay Veer completely, as it is the distributed term here, and not about Sanjay Rawat, as it is not the completely distributed term here.

B. Important tips for solving specific type of analytical reasoning questions

Here are few important tips regarding solving specific type of problems in analytical reasoning, i.e. blood relation based, sitting arrangement based, puzzles based (carrying lots of information) and condition based problems. These are very important tips which one must follow to crack these problems.

I. Blood relations based problems: The key to solving blood relation based problems is by identifying the 'married couples'. One must find out the married couples (whose number must be given in the question) for cracking these problems.

Key points to remember

- i. Key factors in these types of problems are 'gender' and 'generations'.
- ii. Preferably, write the subjects vertically and the characteristics horizontally.
- iii. Mark out all the connections on the chart.
- iv. For showing relationships and depicting generations, make tree diagrams.
- v. Notice words 'his' or 'her' always in the statements as they are crucial in solving the questions.

II. Sitting arrangement based problems: These types of problems can again be of two types: one, in which people are sitting in rows, and the other in which they are sitting in circles.

Key points to remember

- i. In rows based problems, we take directions according to our left and right.
- ii. In circle based problems, we move by imagining the face of the person who is sitting in the circle and then take left and right accordingly.

iii. Few important words must be paid adequate attention, i.e. 'between' means 'sandwiched', 'immediate left' is different from 'to the left' or 'towards left', (here 'immediately left' can be a specific case of 'towards left' but 'towards left' cannot be similar to 'immediately left').

iv. Key of solving row based problems is that 'part groups are made which can be fitted in a single way without violating any condition'.

III. Puzzles (based on large information) based problems: Few important tips for solving these problems are as follows.

Key points to remember

- i. Preferably, write the subjects vertically and the characteristics horizontally.
- ii. Use both the sides of the table or diagram (this is very useful in case of those questions where large number of characteristics are required to be dealt with).
- iii. While reading the conditions, understand the complementary meaning and it is very important to put crosses side by side in the table.
- iv. Do not fill in data unnecessarily.
- v. Sometimes data from questions is the key, and sometimes what should be taken as subject is decided by the conditions.
- vi. Whenever relationship between two things is given, connect them on the top of the chart as it is very important.
- v. It is understood that unless specified otherwise, each row and each column has one data.

IV. Condition based problems: Few important tips for solving these types of problems are as follows.

Key points to remember

- i. Order, group, flow and schedule based problems are few of the examples of this type of condition based problems.
- ii. In these types of questions, there is no unique solution possible, so one must work through choices and eliminate them to solve the questions.
- iii. For solving these types of questions, we make little flow diagrams and deduce conclusions and go by options. Generally, in these problems it is easy to spot an option which has violated condition or conditions given in the question, which helps in solving the problems.
- iv. Two specific words, 'must' and 'never' must be taken care of appropriately, as they are very frequently used words in these types of problems.

We believe and hope that if these fundamentally important concepts and tips are mastered thoroughly, then they will prove themselves to be of immense help in cracking analytical reasoning based questions.

Happy cracking analytical reasoning based problems!

Solved Examples

A group of 6 students, living in a Hostel - Chandra, Natasha, Ankush, Vaibhav, Neha and Satya — decide to sit together in one of their rooms, to conduct a GD. Here is a complete account of their movement between 11 pm and 5:30 am.

1. Three students started the GD at 11:00 pm in one of their rooms.
2. Chandra, who overheard their discussion joined them immediately.
3. Vaibhav left that room and went to his room to have a nap at 1:45 am.
4. Ankush, who came to the canteen, met Vaibhav on his way. He immediately joined the GD group.
5. Satya went out from that room at 2:15 am to have a coffee.
6. Neha went out from that room at 2:30 am to get Vaibhav.
7. On his way back, Satya woke up Natasha, and brought her along at 2:35 am. He didn't find the owner of the room when he again entered the GD room.
8. Neha and Vaibhav went to the library at 2:45 am, sat there together, and returned at 4:30 am.
9. The group finally dispersed at 5:30 am.

Note: Immediately means at the same time

The problem can be understood as

The question describes various events which take place one after the other.

So, visualizing the flow of events on the account of various time-windows will make it easier to deduce the logic.

But just before ordering the data, take a glimpse at the questions which will give you an idea what information is relevant, and which key points are required

In this case:

- Number of students present in GD
- Sorting of names and their presence
- Time Flow
- Change of events

GD Scene

At 11:00 pm

Students present in GD: 3

Event: One joined later

New Total : 4

Names we know: Chandra

At 1:45 am

Event: Vaibhav went to his room

Students present in GD: $4 - 1 = 3$

Names we know: Chandra, Vaibhav

At 1:45 am

Event: Ankush joined.

Students present in GD: $3 + 1 = 4$

Names we know: Ankush, Chandra (Still in GD),

Vaibhav (out)

At 2:15 am

Event: Satya went for coffee

Students present in GD: $4 - 1 = 3$

Names we know: Ankush, Chandra(Still in GD)

Vaibhav, Satya (out)

Check1: Since Chandra and Ankush joined later, Satya, Vaibhav and a third person(which is still in the GD) were present in the beginning.

Reasoning deciphered: Satya and Vaibhav were two of the three starters of the GD

At 2:30 am

Event: Neha went out

Students present in GD: $3 - 1 = 2$

Names we know: Ankush, Chandra(Still in GD),

Vaibhav, Satya, Neha (out)

Check2: Previously, there were three people in the GD of which, two we know (Chandra and Ankush). Therefore, the third person (who has been there since the beginning of the GD) is Neha.

Reasoning deciphered: Neha, Vaibhav and Satya were the GD starters.

At 2:35

Event: Satya and Natasha returned

Students present in GD: $2 + 2 = 4$

Names we know: Ankush, Chandra, Satya, Natasha (Now in GD),

Vaibhav, Neha (out)

At 4:30

Event:Neha and Vaibhav returned

Students present in GD: $4 + 2 = 6$

Names we know: Vaibhav, Neha, Ankush, Chandra, Satya, Natasha (All six of them)

At 5:30 am

GD ended

Time frame account

Time	Event	Names	Students present
11:00	GD began, one joined later	Chandra	4
1:45	Vaibhav went to his room	Chandra(in GD), Vaibhav(out)	3
1:45	Ankush joined	Chandra, Ankush(in GD); Vaibhav(out)	4
2:15	Satya went for coffee	Chandra, Ankush(in GD); Satya, Vaibhav(Out)	3
2:30	Neha went out	Ankush, Chandra(in GD); Vaibhav, Satya, Neha (Out)	2
2:35	Satya returned with Natasha	Ankush, Chandra, Satya, Natasha (in GD); Vaibhav, Neha (out)	4
4:30	Neha and Vaibhav returned	Vaibhav, Neha, Ankush, Chandra, Satya, Natasha (All six of them)	6

Example 1: What is the highest number of students in the room at a given point of time between 11 pm and 5:30 am?

- a. 3 b. 4 c. 5
- d. 6 e. None of these

Solution: (d) Checking *students present in GD*, between 4:30 am 5:30am, all Six were present.

Example 2: Between what times were only two students present in the GD?

- a. 1:45 am to 2:15 am
- b. 2:30 am to 2:35 am
- c. 2:35 am to 2:45 am
- d. Never were only two students present in the GD.

e. 2:45 am to 2:55 am

Solution (b) Between 2:30 to 2:35, only two were present Chandra and Ankush

Example 3: Who was the owner of the room where GD was conducted?

- a. Chandra b. Neha c. Satya
- d. Vaibhav e. None of these

Solution (b) Now according to point-1,

Owner of the room was one of the three initial starters, i.e Vaibhav, Neha or Satya

Now,

At 1:45 - Event : Vaibhav went to his room (He's obviously not the owner).

At 2:35 (point-7) - Satya didn't find the owner. Therefore, he's also not the owner.

Hence, in Neha's room the GD was being conducted.

Example 4: Who was there for the maximum duration in the GD?

- a. Satya b. Neha c. Chandra
- d. Satya and Neha e. None of these

Solution (c) Firstly, don't straightaway go on solving the reasoning. Use your presence of mind

Why do you want to calculate the duration of all the 6 people? Look at the options;

Check only for the three names mentioned.

3 is always less than 6, so save crucial time!

Satya:- 11:00 - 2:15 ~ 3 hrs

2:35 - 5:30 ~ 3 hrs

Neha :- 11:00 - 2:30 ~ 3:30 hrs

4:30 - 5:30 ~ 1 hr

Chandra:- He was always present

Example 5: Who was there in the GD for the minimum duration?

- a. Vaibhav b. Satya c. Neha
- d. Natasha e. Vaibhav and Satya

Solution (d) Checking for the names mentioned in the options.

Vaibhav:

11:00 pm - 1:45 am ~ 2:45 hrs

4:30 am - 5:30 am ~ 1:00 hrs = 3:45 hrs

Satya:

11:00 pm - 2:15 am ~ 3:15 hrs

2:35 am - 5:30 am ~ 2:55 hrs = 6: 10 hrs

Neha:

11:00 pm - 2:30 am ~ 3:30 hrs

4:30 am - 5:30 am ~ 1:00 hrs = 4:30 hrs

Natasha:

2:35 am - 5:30 am ~ **2:55 hrs**

Example 6: Who all were already there when Natasha entered the GD room?

- a. Chandra and Vaibhav
- b. Vaibhav and Neha
- c. Chandra and Ankush
- d. Ankush and Neha
- e. Chandra and Neha

Solution (c) Chandra and Ankush

Example 7: Which two students spent equal amount of time in the GD during the whole schedule?

- a. Satya and Chandra
- b. Natasha an Ankush
- c. Ankush and Vaibhav
- d. Neha and Ankush
- e. Natasha and Neha

Solution (c) Both Vaibhav and Ankush stayed in the GD for 3:45 hrs

Example 8: If, instead of Satya, Vaibhav work up Natasha when he went for his nap, and she immediately went to the GD room after that and stayed there till the end, then who stayed for the same duration as Natasha?

- a. Satya b. Chandra c. Neha

d. Ankush e. Cannot be determined

Solution (d) Vaibhav went for his nap at 1:45 am

Therefore, according to the question. Natasha entered the GD at 1:45 am and stayed till 5:30 am ~ 3:45 hrs.

Hence, from the options, Ankush also stayed in the GD for the same duration.

Example 9: If between 2:00 am to 4:00 am nobody was allowed to either enter or leave the GD room, then who would have definitely missed the GD?

a. Vaibhav b. Satya c. Natasha

d. Neha e. Cannot be determined

Solution (d) Cannot be determined because we don't have any clear idea about what events occurred after 4:00 am.

Example 10: Minimum number of students present in the GD at any given time?

a. 4 b. 3 c. 2

d. 5 e. Cannot be determined

Solution (c) Interesting observation: Look closely at Q-2. You will notice that it is somewhat related to the answer to this question. Now, look at the options. No choice is less than **two**.

Observational Note:

Sometimes, this technique helps. How? Apart from one example above, it can help in deciphering the reasoning of the set, and one can go through the questions, along with the guide lines, for clues. It might help you. After all, questions were made from the same set only. Right!

Example 11: Maximum number of students who went out of the GD room in a 45 min time window during the whole event were/was

a. 4 b. 3 c. 2

d. 1 e. 5

Solution (b) Looking at the time window between 1:45 am and 2:30 am, it was 3 students — Vaibhav, Satya and Neha.

Example 12: If Vipin, staying next door, overheard their conversation at 3:15 am, and requested to join them and was there till 4:35 am before going back, then when did the GD have maximum attendance, and how many were present?

a. 4:30 to 5:30 am , 6 b. 3:15 to 4:30 am, 6

c. 4:30 to 4:35 am, 7 d. 4:40 to 4:50 am, 6

e. None of these

Solution (c) A twist, this is called additional information based reasoning, which is provided specifically for the particular question. Here, the reasoning is just the derivative of the whole set. Maximum attendance of 6 was present between 4:30 and 5:30

(Remember Q- 1, don't go back the whole way, use your presence of mind!)

Was Vipin there in between that time? Yes.

So, maximum students were seven (including Vipin)

Time: 4:30 to 4:35

Example 13: If due to the heated discussion in the room, the warden woke up at 3:00 am and went to that room and asked them to continue the discussion in the library, then

how many missed out on the warden's instruction? (Combine data from the previous questions as well).

- a. Four b. Three c. Two d. One e. Five

Solution (b) According to question whatever change occurred, happened only after 3:00 am

So, we will shift our focus only to the events at 4:00 am

(i.e time slot between 2:35 an 4:30)

People present: Ankush, Chandra, Satya, Natasha

Not present: Vaibhav, Neha

Therefore, those who missed were Vaibhav and Neha. So, the answer is Two.

No, this is wrong! Read the last line in the bracket.

Vipin came at 3:15, therefore he also missed out on the instructions.

Hence, the correct choice is option (b)

Example 14: If Chandra started feeling sleepy, and went back to his room at 3:00 am and stayed there till 9:00 am, then at 4:20am, how many people were there which were not present in the beginning of the GD?

- a. 3 b. 2 c. 1
- d. 4 e. Cannot be determined

Solution (b) At 4:20, the students in the room were: Ankush, Satya and Natasha. Among these three, only Satya was present in the beginning of the GD.

Example 15: It was decided that next GD will be held in the room of a male person who stayed for the shortest duration. In whose room will it be held the next time?

- a. Chandra b. Ankush c. Vaibhav
- d. Either b or c e. Either a or b

Solution (d) Both Ankush and Vaibhav stayed in the GD for 3:45 hrs (question No.7, remember!).

Hence, option (d) is the correct choice.

Note: Explanations for a number of questions appear to be quite lengthy. However, this is not something that you need to write to solve these questions. Rather, this explains the mental thinking that you undertake to solve such questions.

Practice Exercises

Introduction

This section contains total of 6 Practice Exercises. These exercises are specifically designed keeping in the mind the requirement and trends of Logical Reasoning in CAT and other management entrance examination.

At the end of each practice exercise, there is a scoring table to assess your performance in 'concept building', instantly. Since practice exercises are concept-oriented, you are advised not to worry too much regarding time spent.

Any rough work, if required, should be done on a separate sheet of paper. Force yourself to do mental calculations and use the pen only when it is absolutely necessary.

How to score: The process of scoring is very simple. For every right answer add one mark, and for every wrong answer deduct one-fourth mark.

All the best !

Practice exercise - B1

Directions for questions 1 to 5: Read the given information carefully and answer the questions that follow.

Three brothers are married to three sisters. The brothers are Bhimsingh, Ramsingh and Mansingh. The sisters are Aparna, Bharti and Chandra.

- I. Chandra is the only sister having short hair.
- II. One of the sisters, who is a dancer, lives in Kolkata.
- III. Bhimsingh's wife is not a dancer.
- IV. The sister with short hair does not like to write letters.
- V. Aparna rings her dancer sister every Saturday.
- VI. The only sister who does not like to write letters lives in New Delhi.
- VII. Chandra receives a letter from Kolkata once a week.
- VIII. Ramsingh is married to the dancer.
- IX. The sister in Mumbai is married to Mansingh.

- 1. Who is the dancer?
 - a. Aparna b. Bharti c. Chandra
 - d. Ramsingh e. Cannot be determined
- 2. Which sister lives in Mumbai?

- a. Aparna b. Bharti c. Chandra
- d. Either (a) or (b) e. None of these
- 3. Who is Chandra's husband?
 - a. Bhimsingh b. Ramsingh c. Mansingh
 - d. Either (b) or (c) e. None of these
- 4. Who lives in Kolkata?
 - a. Bhimsingh b. Aparna c. Ramsingh
 - d. Chandra e. Cannot be determined
- 5. Which couple lives in New Delhi?
 - a. Bhimsingh and Chandra
 - b. Ramsingh and Bharti
 - c. Mansingh and Aparna
 - d. Bhimsingh and Bharti
 - e. Ramsingh and Aparna

Directions for questions 6 to 10: Read the given information carefully and answer the questions that follow.

- I. There are five pieces of lost luggage lined up in a row for customs inspection. They weigh 5, 10, 15, 20 and 25 pounds (not necessarily in that order). The items to be identified are a trunk, a box, a crate, a suitcase and a carton not necessarily in that order; and the nationalities of the owners are American, Belgian, German, Swedish, and Indian, not necessarily in that order.

- II. The fifth item (i.e. fifth in the row) weighs 10 pounds.
- III. The Swedish traveller's luggage has another piece of luggage on both sides of it.
- IV. The Indian traveller owns the items weighing 15 pounds.
- V. The traveller who owns the item weighing 5 pounds (which happens to be the second item in the row) has lost a box.
- VI. The American owns the item in the middle, which weighs 20 pounds.
- VII. The German does not own the carton, which weighs less than all but one of the other items.
- VIII. The item on the extreme left is the heaviest and is a trunk.
6. Which of the following can be derived from statements I, III and VI?
- The Swede owns the first or second item.
 - The Swede owns the first or fourth item.
 - The Swede owns the second or fourth item.
 - The Swede owns the third or fourth item.
 - The Swede owns the first or third item.
7. What does the Belgian own?
- A 25-pound trunk
 - A 25-pound box
 - A 25-pound crate
 - A 10-pound carton
 - None of these
8. Which of the following is false?
- The Indian's missing luggage is lighter than the German's.
- b. The combined weight of the 5 pounds item and the American's item is equal to the weight of the German's item.
- c. The Indian's missing luggage weighs more than the Swede's.
- d. The American's luggage weighs more than the Belgian's.
- e. None of these
9. Which of the following is true?
- The first item (first in the row) is owned by the Swede.
 - The 10-pound item is owned by the Belgian.
 - The trunk is owned by the Indian.
 - The box is owned by the German.
 - None of these
10. Which of the following additional pieces of information would, if true, facilitate the identification of the pieces of luggage that weigh 15 and 20 pounds respectively?
- The crate weighs more than the suitcase.
 - The crate is twice as heavy as the carton.
 - The combined weight of the box and the carton equals the weight of the suitcase.
- I only
 - I and II only
 - I and III only
 - II and III only

e. All of them individually only

Directions for questions 11 to 16: Read the given information carefully and answer the questions that follow.

Four persons A, B, C and D are camping at four campsites E, F, G and H, not necessarily in that order. The campsites are located on four different lakes I, J, K and L (not necessarily in that order) which are in four different states M, N, O and P (not necessarily in that order).

I. B is camping on K.

II. H is on J, which is in N.

III. The person at I, a native of P, camps only in that state.

IV. D is at F.

V. A is camping in O.

11. Where is B camping?

a. At E b. In M c. On L d. At F e. In P

12. I is where

a. F is located

b. A is camping

c. the campsite in which O is located

d. the campsite G is located

e. None of these

13. On the basis of the information given, it is possible to deduce that

I. A is not at H

II. C is in P

III. D is not at E

a. I only b. II only c. III only

d. I and III only e. II and III only

14. O is where

I. L is located

II. F is located

a. I only b. II only c. I and II both

d. I or II but not both e. None of these

15. Which of the following is true of L?

a. C is camping there b. D is camping there c. It is in M

d. A is camping there e. None of these

16. Which of the following cannot be determined on the basis of the information given?

a. Which state is K in? b. Who is camping at E? c. Which campsite is in P?

d. Who is camping in N? e. None of these

Directions for questions 17 and 18: Read the given information carefully and answer the questions that follow.

Ratan, Anil, Pinku and Gaurav are brothers of Rakhi, Sangeeta, Pooja and Saroj, not necessarily in that order. Each boy has one sister and the names of brothers and sisters do not begin with the same letter. Pinku and Gaurav are not Saroj's or Sangeeta's brothers. Saroj is not Ratan's sister.

17. Pooja's brother is

- a. Ratan b. Anil c. Pinku
- d. Gaurav e. Cannot be determined

18. Which of the following are brother and sister?

- a. Ratan and Pooja b. Anil and Saroj c. Pinku and Sangeeta d. Gaurav and Rakhi e. Anil and Pooja

19. Two cyclists approach each other on a straight road, each cycling at 15 miles per hour. When they are 30 miles apart, a housefly alights on one bicycle, then dashes off to the other. It shuttles back and forth between the two at 20 miles per hour until the riders meet. What is the distance has it travelled?

- a. 20 miles b. 10 miles c. 5 miles d. 15 miles e. 25 miles

20. A vagabond runs out of cigarettes. He searches for the stubs, having learnt that 7 stubs can make a new cigarette, good enough to be smoked. He gathers 49 stubs. If he smokes 1 cigarette every three-quarters of an hour, how long will his supply last?

- a. 5.25 hr b. 6 hr c. 4.5 hr d. 3 hr e. 5 hr

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
20					

Practice exercise - B2

Directions for questions 1 and 2: Answer the questions based on the following information.

N is a natural number and it has only four distinct factors: 1, x, y and N itself.

(Assume that x is always less than y.)

1. Integer x is a

- a. Prime number b. Odd but not prime number c. Even number
- d. Composite number e. Cannot be determined

2. $x \cdot x \cdot y =$

- a. N b. N^2 c. \sqrt{N} d. x. N e. $x\sqrt{N}$

Directions for questions 3 to 5: Answer the questions based on the following information.

A circular table is pushed in one of the corners of a room. The corner is making an angle 90° . There is a spot on the edge of the table that is 9 m away from one of the walls and 8 m away from another. (Both these walls are the ones which form the corner in question.)

3. How many such tables are possible?

- a. 1 b. 2 c. 4 d. 3 e. Data insufficient

4. What is the diameter of the table?

- a. 10 m b. 58 m c. 10 or 58 m d. 48 m e. No such table is possible

5. If the spot is on the edge which is in between the points of contact of the table and the walls, then the radius of the table is

- a. 5 m b. 29 m c. 58 m d. 14 m e. None of these

Directions for questions 6 and 7: Answer the questions based on the following information.

In solid rectangle, 10,00,009 folders are arranged. Total number of columns is more than total number of rows. (Assume that the folders are arranged in a grid of rows and columns. The number of rows multiplied by the number of columns gives the total number of folders.)

6. How many columns are there?

- a. 193 b. 293 c. 183 d. 173 e. None of these

7. How many rows are there?

- a. 293 b. 183 c. 381 d. 341 e. None of these

Directions for questions 8 to 11: Answer the questions based on the following information.

At the end of the soccer season, every player had scored a prime number of goals and the average of the 11 players was also a prime number. No player's individual tally was the same as anyone else's or as the average. Nobody had scored more than 45 goals.

8. What was the average of their goal scores?

- a. 27 b. 23 c. 29 d. 31 e. 25

9. What was the maximum number of goals scored by a single player?

- a. 43 b. 41 c. 37 d. 29 e. 34

10. What was the minimum number of goals scored by a single player?

- a. 5 b. 7 c. 11 d. 13 e. 9

11. How many players had scored above 20 goals individually?

- a. 6 b. 5 c. 7 d. 8 e. None of these

Directions for questions 12 and 13: Answer the questions based on the following information.

From Kargil War, 2,22,221 soldiers are returning to their homes. They have to board a special train with a superpower engine. An equal number of soldiers board in each compartment.

12. How many compartments are filled with soldiers?

- a. 619 b. 359 c. 721 d. 1281 e. Data insufficient

13. If the total number of compartments is less than the number of soldiers in each compartment, then how many compartments are there in the train?

- a. 358 b. 359 c. At least 359 d. 619 e. None of these

Directions for questions 14 and 15: Answer the questions based on the following information.

There are at least 3 points. Distance between any 2 points is same.

14. How many such points are possible if all the points are in a plane?

- a. 4 b. 6 c. 5 d. 3 e. 7

15. How many such points are possible, if the points do not necessarily have to be in a plane?

- a. 3 b. 4 c. 5 d. 6 e. 7

Directions for questions 16 to 18: Answer the questions based on the following information.

A rectangle has integral dimensions. The perimeter and area of this rectangle are equal in numerical value.

16. How many such rectangles are possible? (Assume that a square is also a rectangle.)

- a. 1 b. 2 c. 3 d. 4 e. Infinitely many

17. How many such squares are possible?

- a. 1 b. 2 c. 3 d. 4 e. Infinitely many

18. If it is a rectangle (i.e. not a square), what are the dimensions of the rectangle?

- a. 6×4 b. 6×3 c. 4×3 d. 6×2 e. No such rectangle is possible

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
18					

Practice exercise - B3

Directions for questions 1 and 2: Read the following information and answer the questions that follow.

The difference between two, two-digit numbers is 36. They are composed of the same two digits reversed.

1. How many such pairs are possible?

- a. 0 b. 1 c. 4 d. 3 e. 5

2. How many pairs are of prime numbers only?

- a. 0 b. 1 c. 5 d. 4 e. None of these

Directions for questions 3 and 4: Read the following information and answer the questions that follow.

x and y are two different two-digit numbers. They are numerical reversals of each other and so are the squares of these numbers.

3. How many such pairs are possible?

- a. 1 b. 2 c. 3 d. 0 e. 4

4. We take smaller numbers from all the pairs. Sum of such smaller numbers is

- a. 23 b. 25 c. 38 d. 36 e. None of these

Directions for questions 5 and 6: Read the given information carefully and answer the questions that follow.

A monkey distributed ladoos to two cats, black and white cheating them of some and eating those ladoos himself. At the end of the distribution, if the black cat were to give some ladoos to the white cat, the white cat would have five times as many ladoos as the black cat. If the white cat were to give the same number of ladoos to the black cat, the white cat would have three times the number of ladoos as that of the black cat.

5. What is the ratio of ladoos initially distributed to the white cat and black cat respectively?

- a. 10 : 3 b. 19 : 5 c. 5 : 21 d. 17 : 5 e. Cannot be determined

6. If the total number of ladoos was 30, what was the number of ladoos eaten by the monkey?

- a. 19 b. 5 c. 6 d. 13 e. Cannot be determined

Directions for questions 7 and 8: Read the following information and answer the questions that follow.

There are 70 clerks working with M/s. Jha Lal Khanna & Co. chartered accountants, of which 30 are female.

I. 30 clerks are married.

II. 24 clerks are above 25 years of age.

III. 19 married clerks are above 25 years of age; among them, 7 are males.

IV. 12 males are above 25 years of age.

V. 15 males are married.

7. How many unmarried girls are there?

- a. 12 b. 15 c. 18 d. 12 e. 16

8. How many of these unmarried girls are above 25?

- a. 12
- b. 15
- c. 4
- d. 0
- e. 10

Directions for questions 9 and 10: Read the following information and answer the questions that follow.

At a Railway station, P family is saying goodbye to R family. We do not know who is leaving and who is seeing the other family off. Each member of P family says farewell to each member of R family. To say goodbye, two men shake hands. A man and woman or two women kiss once on the cheek. An eyewitness to the event counted 21 handshakes and 34 kisses.

9. How many men were there?

- a. 10
- b. 6
- c. 22
- d. 18
- e. Either (a) or (c)

10. How many women were there?

- a. 13
- b. 6
- c. 34
- d. 22
- e. Either (b) or (c)

Directions for questions 11 and 12: Read the following information and answer the questions that follow.

There are two consecutive natural numbers whose product is equal to the product of three consecutive natural numbers.

11. How many such pairs of natural numbers are possible?

- a. 1
- b. 2
- c. 3

- d. More than 3
- e. 0

12. What is the product?

- a. 6
- b. 210
- c. Either (a) or (b)

- d. 110
- e. None of these

Directions for questions 13 and 14: Read the following information and answer the questions that follow.

ABCABC is a six-digit number. (Therefore, both the As, both the Bs and both the Cs are the same.) C is an even digit.

13. Is ABCABC divisible by 14?

- a. Yes
- b. No
- c. divisible if A is even
- d. divisible if B is even
- e. None of these

14. Is ABCABC divisible by 13?

- a. Yes
- b. No
- c. divisible if A = 2
- d. divisible if B = 5
- e. None of these

Directions for questions 15 and 16: Read the following information and answer the questions that follow.

It is February 26, 2006 today. Today is my birthday anniversary and two of my great-grandsons share it with me. The product of our ages is 1001. One of my grandsons is more than 95.5 years younger to me. I was born after AD 1857.

15. What is my age?

- a. 148 years
- b. 91 years
- c. 143 years

- d. 134 years
- e. Data insufficient

16. One of my great-grandsons was born in

- a. AD 2005
- b. AD 1999
- c. Either (a) or (b)

- d. AD 2001
- e. Data insufficient

- d. 110 e. None of these

Directions for questions 13 and 14: Read the following information and answer the questions that follow.

ABCABC is a six-digit number. (Therefore, both the As, both the Bs and both the Cs are the same.) C is an even digit.

13. Is ABCABC divisible by 14?

- a. Yes b. No c. divisible if A is even d. divisible if B is even e. None of these

14. Is ABCABC divisible by 13?

- a. Yes b. No c. divisible if $A = 2$

- d. divisible if $B = 5$ e. None of these

Directions for questions 15 and 16: Read the following information and answer the questions that follow.

It is February 26, 2006 today. Today is my birthday anniversary and two of my great-grandsons share it with me. The product of our ages is 1001. One of my grandsons is more than 95.5 years younger to me. I was born after AD 1857.

15. What is my age?

- a. 148 years b. 91 years c. 143 years

- d. 134 years e. Data insufficient

16. One of my great-grandsons was born in

- a. AD 2005 b. AD 1999 c. Either (a) or (b)

- d. AD 2001 e. Data insufficient

Directions for questions 17 and 18: Read the following information and answer the questions that follow.

I went on a holiday with a group of friends. It rained for 13 days. But when it rained in the morning, the afternoon was absolutely dry. And when it rained in the afternoon, it followed a clear morning. During our holiday, we had 11 very nice mornings and 12 very nice afternoons.

17. How many days did our holiday last?

- a. 18 b. 20 c. 24

- d. 22 e. 26

18. On how many days did it rain in the morning as well as in the afternoon?

- a. 6 b. 5 c. 7

- d. 8 e. None of these

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
18					

Practice exercise - B4

1. Four girls are sitting on a bench to be photographed. All four girls are facing north. Shikha is to the left of Reena. Manju is to the right of Reena. Rita is between Reena and Manju. Who would be the second from the left in the photograph?

- a. Reena b. Shikha c. Manju d. Rita e. Either Rita or Reena

2. There are five different houses facing north, A to E, in a row. A is to the right of B; E is to the left of C and right of A; B is to the right of D. Which of the houses is in the middle?

- a. A b. B c. D d. E e. C

3. In a march past, seven persons are standing in a row facing north. Q is standing to the left of R and to the right of P. O is standing to the right of N and to the left of P. Similarly, S is standing to the right of R and to the left of T. Who is standing in the middle?

- a. P b. Q c. R d. O e. S

4. Five children are sitting in a row facing north. S is sitting next to P but not next to T. K is sitting next to R who is sitting to the extreme left, and T is not sitting next to K. Who is/are sitting adjacent to S?

- a. K and P b. R and P c. Only P d. P and T e. R and T

5. Five girls are sitting in a row facing north. Rashi is not adjacent to Sulekha or Abha. Anuradha is not adjacent to Sulekha. Rashi is adjacent to Monika. Monika is seated in the middle of the row. Then to whom is Anuradha adjacent in the given choices?

- a. Rashi b. Sulekha c. Abha d. Monika e. Anuradha

Directions for questions 6 to 8: Study the given information carefully and answer the questions that follow.

In a swimming race, five participants — A, B, C, D and E take part. Lane 1 is extreme left and lane 5 is extreme right. The following conditions exist.

I. B and E are not swimming adjacent to each other.

II. D is not in one of the extreme (outermost) lanes.

III. A is to the left of C.

6. If B is in lane 3, A in lane 1, then C could be in

- a. lane 4

- b. lane 2

- c. lane 2 or 4

- d. lane 5

e. Situation violates the conditions

7. If B is in lane 4 and C is in lane 3, then E could be in

- a. lane 1

- b. lane 2

- c. lane 1 or 2

- d. lane 5

e. Situation violates the conditions

8. If D is to the left of A, then D can be in

- a. lane 2 b. lane 3 only c. lane 2 or 3

d. lane 1 or lane 2 e. None of these

9. Five persons A, B, C, D and E are sitting in a row facing you such that D is on the left of C; B is on the right of E. A is on the right of C; B is on the left of D. Who is sitting in the centre?

a. A b. B c. C

d. D e. A or B

Directions for questions 10 to 14: Study the given information carefully and answer the questions that follow.

There are four people sitting in a row: one each from India, Japan, USA and Germany, but not in that order.

I. They are wearing caps of different colours — green, yellow, red and white, not necessarily in that order.

II. One is wearing a kurta and one a T-shirt.

III. The Indian is wearing a green cap and a jacket.

IV. The American is not seated at either end.

V. The persons with kurta and T-shirt are sitting next to each other.

VI. The person with kurta wears a red cap and sits next to the Japanese.

VII. The Japanese wears a shirt and is not seated at either end.

VIII. The man with white cap wears T-shirt and is seated at one end.

10. Who wears the T-shirt?

a. Indian b. Japanese c. American

d. German e. Either (a) or (b)

11. Who is wearing a kurta?

a. Indian b. Japanese c. American

d. German e. Cannot be determined

12. What is the colour of the cap worn by the Japanese?

a. Red b. Green c. Yellow

d. White e. None of these

13. Who is sitting to the right of man wearing T-shirt?

a. Indian b. Japanese c. American

d. German e. Either (b) or (c)

14. Who is sitting to the left of man wearing jacket?

a. Indian b. German c. Japanese

d. American e. Either (a) or (b)

15. In Sydney Olympic 2000, the flags of six nations were flown facing north on masts in the following ways.

The flag of America was to the left of the Indian Tricolour and to the right of the flag of France. The flag of Australia was to the right of the Indian flag but was to the left of the flag of Japan, which was to the left of the flag of China. Which two flags are in the centre?

a. India and Australia b. America and India c. Japan and Australia d. America and Australia e. India and Japan

Directions for questions 16 to 20: Read the following information carefully and answer the questions given below it.

In a car exhibition, seven cars of seven different brands, viz. Cadillac, Ambassador, Fiat, Maruti, Mercedes, Bedford and Fargo were displayed in a row, facing east direction such that:

- I. Cadillac was to the immediate right of Fargo.
- II. Fargo was fourth to the right of Fiat.
- III. Maruti was between the Ambassador and Bedford.
- IV. Fiat, which was third to the left of Ambassador, was at one of the extreme ends.

16. Which of the following was the correct position of the Mercedes?

- a. To the Immediate right of Fargo
- b. To the Immediate left of Bedford
- c. Between Bedford and Fargo
- d. Fourth to the right of Maruti
- e. None of these

17. Which of the following is definitely true?

- a. Fargo is between Ambassador and the Fiat
- b. Cadillac is to the immediate left of Mercedes
- c. Fargo is to the immediate right of Cadillac
- d. Maruti is fourth to the right of Mercedes

e. Both (a) and (b)

18. Which cars are neighbours of Cadillac?

- a. Ambassador and Maruti
- b. Maruti and Fiat
- c. Fiat and Mercedes
- d. Mercedes and Fargo
- e. Maruti and Fargo

19. Which of the following is definitely true?

- a. Maruti is to the immediate left of Ambassador
- b. Bedford is to the immediate left of Fiat
- c. Bedford is at one of the ends
- d. Fiat is second to the right of Maruti
- e. Both (b) and (c)

20. Which of the following groups of cars is to the right of the Ambassador?

- a. Cadillac, Fargo and Maruti
- b. Maruti, Bedford and Fiat
- c. Mercedes, Cadillac and Fargo
- d. Bedford, Cadillac and Fargo
- e. Maruti, Cadillac and Fargo

e. Both (a) and (b)

18. Which cars are neighbours of Cadillac?

a. Ambassador and Maruti

b. Maruti and Fiat

c. Fiat and Mercedes

d. Mercedes and Fargo

e. Maruti and Fargo

19. Which of the following is definitely true?

a. Maruti is to the immediate left of Ambassador

b. Bedford is to the immediate left of Fiat

c. Bedford is at one of the ends

d. Fiat is second to the right of Maruti

e. Both (b) and (c)

20. Which of the following groups of cars is to the right of the Ambassador?

a. Cadillac, Fargo and Maruti

b. Maruti, Bedford and Fiat

c. Mercedes, Cadillac and Fargo

d. Bedford, Cadillac and Fargo

e. Maruti, Cadillac and Fargo

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
20					

Practice exercise - B5

Directions for questions 1 to 5: Answer the questions based on the following information.

All the roads of a city are either perpendicular or parallel to one another. The roads are all straight. Roads A, B, C, D and E are parallel to one another. Roads G, H, I, J, K, L and M are parallel to one another.

I. A is 1 km east of road B.

II. B is $\frac{1}{2}$ km west of C.

III. D is 1 km west of E.

IV. G is $\frac{1}{2}$ km south of H.

V. I is 1 km north of J.

VI. K is $\frac{1}{2}$ km north of L.

VII. M is 1 km south of N.

1. Which among the following is necessarily true?

a. E and B intersect. b. D is 2 km west of B. c. D is at least 2 km west of A.

d. M is 1.5 km north of L. e. Both (a) and (b)

2. If E is between B and C, then which of the following is false?

a. D is 2 km west of A.

b. C is less than 1.5 km from D.

c. Distance from E to B added to distance from E to C is $\frac{1}{2}$ km.

d. E is less than 1 km from A.

e. Both (b) and (c)

3. If E is between B and C, then distance between A and D is

a. $\frac{1}{2}$ km b. 1 km c. 1.5 km d. 1.5 to 2 km e. 2.5 km

4. Which of the following possibilities would make two roads coincide?

a. L is $\frac{1}{2}$ km north of I. b. C is 1 km west of D c. I is $\frac{1}{2}$ km north of K.

d. E and B are $\frac{1}{2}$ km apart. e. None of these

5. If K is $\frac{1}{2}$ km south of J and 1 km north of G, which two roads would be $\frac{1}{2}$ km apart?

a. I and K b. J and G c. I and G d. K and J e. J and I

6. A seminar was scheduled to be held at 12 noon in an auditorium with seating capacity 200. 10% of the seats were found vacant at 12 noon. There were 40% ladies among the audience. After 15 min an announcement was made saying that the seminar will start at 12.50 p.m. due to certain unavoidable reasons. After this announcement 40% of the people who were waiting left out of which 50% were males. 25% of those left, came back again at 12.50 p.m. They were all men. What is the percentage of males attending the seminar finally with respect to the initial number of males at 12 noon?

a. 83.3% b. 33.3% c. 71.4% d. 75% e. 64%

7. A survey showed that among 10,000 Americans, some like apples, 20% like mangoes and some like pineapples. It was also observed that 5% liked both apples and mangoes and 3% liked both mangoes and pineapples. Also, 2% liked all the three fruits. How many among them liked only mangoes?

- a. 3,900 b. 3,300 c. 1,400 d. 3,600 e. Data insufficient

8. Seven friends A, B, C, D, E, F and G were sitting in a row facing north such that

I. A was to the immediate left of G.

II. G was fourth to the left of C.

III. D was between B and F.

IV. C, who was third to the right of B, was at one of the ends.

Which of the following is the correct position of E?

a. Immediate right of A b. Immediate left of F c. Between F and G

d. Fourth to the left of D e. Either (a) or (b)

9. There are three boys: Amit, Dhruv and Harsh. They want to go out with three girls – Nidhi, Parul and Kriti, not necessarily in the same order. The pairs want to go to different places. They want to visit movie, beach and circus, again not necessarily in the same order. They were having different choices: pavbhaji, chaat and panni-puri.

Following information is also given.

I. Nidhi does not eat pavbhaji.

II. Dhruv goes with Kriti.

III. Parul does not go for a movie.

IV. The pair which goes to the beach eats paani-puri.

V. The boy that goes to the beach did not go with Nidhi.

V. The pair which went to the circus did not eat pavbhaji.

VI. Harsh did not go with Parul.

Which of the following statements is true?

a. Dhruv - Kriti - Pavbhaji, Amit - Parul - Chaat, Harsh - Nidhi - Panni- puri

b. Amit - Parul - Pavbhaji, Dhruv - Kriti - Chaat, Harsh - Nidhi - Panni- puri

c. Dhruv - Kriti - Pavbhaji, Harsh - Nidhi - Chaat, Amit - Parul - Panni- puri

d. Amit - Parul - Pavbhaji, Harsh - Nidhi - Chaat, Dhruv - Kriti - Panni - puri

e. Both (b) and (d)

10. Amrita lost her datesheet for the coming examinations but she remembers certain points using which she tries to put all the pieces, i.e. the scattered information into its right place and makes the datesheet again. She remembers the following.

I. Examinations are scheduled from March 2 to March 9.

II. There is no other holiday except March 3 which is a Sunday.

III. There are a total of seven papers.

IV. Her last examination is of physical education.

V. Chemistry is on the previous day of mathematics.

VI. Physics is immediately after the holiday.

VII. There is a gap of exactly one day between biology and mathematics.

VIII. There is a gap of exactly two days between computers and biology, with computers taking place before biology.

IX. One of the subject is engineering drawing.

Answer the following question using the above information.

Which subject's examination will be on Friday?

a. Biology b. Mathematics c. Engineering drawing

d. Either (b) or (c) e. Data inadequate

11. In a group of five persons X, Y, Z, A and B.

I. Y and Z are intelligent in mathematics and physics.

II. X and Z are intelligent in mathematics and computers.

III. Y and A are intelligent in chemistry and physics

IV. A and B are intelligent in chemistry and biology

V. B is intelligent in biology, computers and chemistry.

Who among the following is intelligent in chemistry, physics and mathematics?

a. X b. Y c. Z d. A e. B

12. XYZ country wants to export two spices and four other non-eatable products. The country wants to export any two of the following spices, ginger, cardamom, garlic, clove. The following non-eatables are highest on the priority list for export — watches, timber, rubber, cotton, woollens, glass products. But there is some problem in selecting the items which are as follows:

I. The country doesn't want to export woollens and cardamom together.

II. The country is a very good producer of both timber and garlic and will export both.

III. Watches are on the highest demand outside the country and XYZ is the largest producer of ginger.

IV. The country wants to export cotton with two other non-eatables that are in highest demand.

V. Watches and timber are in highest demand.

VI. Rubber and watches cannot be exported together.

Which of these combinations is possible?

a. Watches, woollens, cotton, ginger, garlic, timber.

b. Cardamom, ginger, woollens, glass product, rubber, timber

c. Clove, garlic, watches, woollens, cotton, glass products

d. Cardamon, watches, garlic, rubber, timber, woollens

13. The movies A, B, C, D were nominated for Oscar Awards. One movie got Oscar Awards for best costume, best direction, best actor. Another got awards for best actress and best make-up. Third movie bagged only the best cinematography award. The fourth was unable to get any award. Below are given few important facts about the movies.

I. The one which is a movie for kids was unable to bag as many awards as A did.

II. D is not the movie to get exactly two awards.

III. Action movie is not the one to get exactly two awards.

III. C is a horror movie.

IV. D is not a movie for kids and received more awards than A.

V. The movie on the plot of a love story got the maximum number of awards.

Which of the following is necessarily true?

- a. A is an action movie and got the best costume award.
- b. D is a romantic movie and got the best cinematography award.
- c. C is a horror movie and got the best make-up award
- d. B, which is the movie for kids, got best cinematography award.
- e. None of these

Directions for questions 14 and 15: A, B, C, D are four boys and E, F, G, H are four girls. They form four couples. The boys found different ideas to propose their girlfriends.

I. A's girlfriend neither like movies nor roses.

II. E is not fond of chocolates and roses.

III. H avoids going to movies and beaches.

IV. D's girlfriend loves to go to beaches.

V. F is not attached to A as well as D.

VI. Boyfriend of F neither gave her chocolates nor took to beach to propose her.

VII. For B, rose worked out to be lucky.

VIII. B and G are nice couple.

14. Whose girlfriend is H?

- a. B b. C c. A d. D e. E

15. Who took his girlfriend to movies to propose her?

- a. A b. B c. C d. D e. None of these

16. A shopkeeper has three different cloth products — bedsheets, shirts, sarees. The shop is giving three different kinds of items, one free with each purchase. Those three items are cap, T-shirt, wrist-watch. On purchasing three pieces of a particular product, a special discount is given. Each of the following statements consists a pair of statements in which one is true while the other is false.

I. The discount offer is not with the saree. Discount is with that product with which wristwatch is given as a free item.

II. Discount is not with the product with which the T-shirt is free. Discount is with the shirts.

III. Discount is with bedsheets. With every purchase of bedsheet, a cap is free.

If wristwatch is free with every purchase of saree, what is free with shirts?

- a. Cap b. T-shirt c. Wristwatch d. Cannot say e. Either (b) or (c)

Directions for questions 17 and 18: In a sports club, there are 1,200 members. The club has facilities for only three types of sports — tennis, swimming and billiards. 880 members play tennis, 690 have joined swimming, 675 play billiards, 430 play both tennis and swimming. 345 do both swimming and play billiards, 460 play both billiards and tennis. 190 play all the three games. On the basis of the given information answer the following questions.

17. How many play two or more games?

- a. 200 b. 455 c. 300 d. 855 e. 550

18. How many play only one game — either tennis or billiards?

15. Who took his girlfriend to movies to propose her?

- a. A b. B c. C d. D e. None of these

16. A shopkeeper has three different cloth products — bedsheets, shirts, sarees. The shop is giving three different kinds of items, one free with each purchase. Those three items are cap, T-shirt, wrist-watch. On purchasing three pieces of a particular product, a special discount is given. Each of the following statements consists of a pair of statements in which one is true while the other is false.

I. The discount offer is not with the saree. Discount is with that product with which wristwatch is given as a free item.

II. Discount is not with the product with which the T-shirt is free. Discount is with the shirts.

III. Discount is with bedsheets. With every purchase of bedsheets, a cap is free.

If wristwatch is free with every purchase of saree, what is free with shirts?

- a. Cap b. T-shirt c. Wristwatch d. Cannot say e. Either (b) or (c)

Directions for questions 17 and 18: In a sports club, there are 1,200 members. The club has facilities for only three types of sports — tennis, swimming and billiards. 880 members play tennis, 690 have joined swimming, 675 play billiards, 430 play both tennis and swimming. 345 do both swimming and play billiards, 460 play both billiards and tennis. 190 play all the three games. On the basis of the given information answer the following questions.

17. How many play two or more games?

- a. 200 b. 455 c. 300 d. 855 e. 550

18. How many play only one game — either tennis or billiards?

- a. 240 b. 345 c. 800 d. 450 e. None of these

Directions for questions 19 and 20: A family wants to paint the doors and windows with two different types of paints out of A, B, C and want to select three wall paints out of D, E, F, G, H. But there are a few problems in selecting the colours which are as follows.

I. No one in the family wants to have both colours dark for doors and windows.

II. Both B and C are dark colours.

III. Combination of C and E is horrible.

IV. The housewife doesn't like the combination of D and G.

V. Both D and F are blue shades.

VI. No two colours of same shade is allowed.

VII. At the end, everyone in the family was happy with the combinations.

19. If A is selected, which of the combinations is not possible?

- a. ABDGH b. ABDEH c. ABEGH d. ABEFH e. ACFGH

20. Which of the following colours must be selected?

- a. A b. B c. C d. D e. F

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
20					

Practice exercise - B6

1. There are five employees — A, B, C, D, E in a company. Each have five children studying in three different colleges — X, Y, Z. Following are the few facts about them.

I. All children of E are in college X.

II. 2nd and 3rd child of A are in college X while 5th one is in college Z.

III. Eldest child (1st child) of C and his youngest child are in college Z while rest are in college Y.

IV. All children of D are in college Z.

V. 4th and 5th children of B are in college Z and rest are in college X.

On the basis of the given information can you tell who is the only employee whose 2nd and 3rd child goes to Z?

a. A b. B c. C d. D e. E

2. Refer to the data below and answer the question that follows.

There are nine chairs in a row, each numbered 1 to 9 from left to right. Six friends are sitting on these chairs. Megha, Sapna and Riya are neither sitting at chair 1 nor at chair numbered 9. Beena and Megha does not have anybody sitting adjacent to them. There is only one empty chair between Megha and Riya. Charu is adjacent to both Jiya and Riya. Sapna is sitting at the seat numbered 2.

Megha is sitting on which of the following chairs?

a. 4 b. 5 c. 7 d. 8 e. 6

3. Six friends Anil, Shehul, Rajesh, Kiran, Milind and Vinay are sitting around a circular table. Following information about their seating arrangement is given.

I. Rajesh is to the immediate left of Kiran.

II. Neither Milind nor Kiran is the immediate neighbour of Shehul.

III. Anil is sitting between Milind and Shehul.

IV. Anil is not sitting exactly opposite to Rajesh.

Which of the following seating arrangements is definitely true according to the above information (taken in anticlockwise direction)?

a. Vinay, Shehul, Anil, Milind, Rajesh, Kiran

b. Vinay, Anil, Milind, Shehul, Rajesh, Kiran

c. Vinay, Milind, Anil, Shehul, Rajesh, Kiran

d. Vinay, Anil, Shehul, Kiran, Rajesh

4. Six friends are sitting around a circular table at equal distances from each other. Ramola is sitting two places right of Komolika who is exactly opposite to Anu. Anu is sitting on the immediate left of Pallavi, who is exactly opposite to Mandira. Natasha is also sitting at the table.

Which of the following statements is not correct?

a. Natasha and Ramola are exactly opposite to each other.

b. Mandira and Natasha are at equal distance from Komolika.

c. Angle subtended by Mandira and Natasha is same as the angle subtended by Ramola and Pallavi at the centre of the table.

d. Natasha is on the immediate left of Pallavi.

e. None of these

5. A, B, C want to play football or cricket. If A plays football, then B and C play the same sport. If B plays football, then A and C does not play the same sport. If C plays cricket, then A and B play same sport. Who among the following always play cricket?

a. B b. A c. C

d. Either (a) or (b) e. None of these

6. A company has to send six representatives to attend an important meeting. There should be two females and four males in the team. There are four female candidates namely, Asha, Anuradha, Kavita and Alka and six male candidates namely, Sanjay, Vineet, Saurabh, Kapil, Manoj and Akshay in option. But there is some problem in coordination of these candidates which are as follows.

I. Manoj will not go with Anuradha.

II. Vineet and Kavita will go if and only if both of them are selected.

III. Sanjay will go with Asha.

IV. Kapil wants to go with his seniors.

V. Sanjay and Vineet are the only seniors of Kapil.

VI. Saurabh does not want to go with Sanjay.

VII. Akshay does not have any problem in going with anyone.

Which of the following is a feasible group?

a. Kapil, Manoj, Asha, Anuradha, Vineet, Sanjay

b. Sanjay, Kapil, Vineet, Asha, Kavita, Manoj

c. Manoj, Sanjay, Vineet, Saurabh, Alka, Kavita

d. Saurabh, Manoj, Vineet, Kapil, Alka, Anuradha

e. None of these

7. Four girls stay in the same building but on different floors. They are Priya, Poonam, Poornima and Priyanka. Following information is given.

I. Priya is not living on first floor.

II. Poonam stays on a floor exactly above Priya's.

III. Poornima stays on a floor exactly above Priyanka's.

Which of the following is correct?

a. Priya (4th), Poonam (2nd), Poornima (1st) Priyanka (3rd)

b. Priya (2nd), Poonam (3rd), Poornima (1st), Priyanka (4nd)

c. Priya (3rd), Poonam (4th), Poornima (2nd), Priyanka (1st)

d. Priya (2nd), Poonam (3rd), Poornima (4th), Priyanka (1st)

e. Both (a) and (b)

8. Three friends Sunil, Rohit and Sandeep go out for shopping and buy a gift each for their wives — Dhwani, Himani and Vidhi on Valentine's Day.

I. Dhwani is not Mr Sharma's wife

II. Rohit's full name is Rohit Sehwag.

III. Mr. Sachdeva bought a purse for his wife.

IV. Himani got a saree as a present.

V. Mr Sharma did not buy a saree for his wife.

VI. Dhwani did not get cosmetics.

VII. Sandeep is not Mr Sachdeva.

VIII. One of the lady's name is Vidhi.

Which of the following statements is true?

- a. Sunil Sachdeva - Dhwani - Purse, Rohit Sehwag - Saree - Himani
- b. Sunil Sharma - Cosmetic - Dhwani, Sandeep Sharma - Purse - Vidhi
- c. Rohit Sehwag - Saree - Himani, Sandeep Sharma - Purse - Dhwani
- d. Sunil Sachdeva - Saree - Dhwani, Sandeep Sharma - Cosmetics - Vidhi
- e. None of these

9. A company has a total employee strength of 320. On a particular day, 10% of them were on leave. Out of the remaining employees, 30% were females. The company has two branches – A and B. On that very day, only 20% of the employees at branch A were absent and $\frac{9}{13}$ % of the employees at branch B were absent. Number of females in branches A and B are equal. What is the total number of males working at branch B?

- a. 43 b. 17 c. 217 d. 54 e. Cannot be determined

10. Three friends take few chapattis with them and leave for an overnight journey. After some travelling, they get tired and decide to sleep. After an hour one of them wakes up and feels hungry. He divides the chapattis into three parts and gives one remaining chapatti to a dog. He eats his share and again sleeps. Again after sometime, the second

friend gets up, divides chapattis into three parts but one chapatti is again extra and that he gives to a dog. He then eats his share and sleeps. Now, after sometime, the third friend gets up and do the same as the other two. In the morning, all three of them woke up together and divide the left over chapattis into three parts and give the one remaining chapatti to a dog standing nearby. They all eat their share then.

What is the minimum possible number of chapattis that they carried from their home?

- a. 82 b. 55 c. 61 d. 79 e. 74

11. From a group of six boys Anand, Biswas, Sameer, Vineet, John and Fred, and five girls Shikha, Priyanka, Aastha, Gunjan and Piya, a basketball team of six members is to be chosen. Following conditions have to be followed.

- I. Gunjan and Piya have to be together.
- II. Sameer cannot be with Gunjan.
- III. Anand and Vineet have to be together.
- IV. Vineet cannot be with Shikha.
- V. Sameer and Priyanka have to be together.
- VI. Biswas and Aastha have to be together.
- VII. Biswas and John cannot be teamed together.

If the team consists of four girls, the members of the team are

- a. Biswas, John, Shikha, Aastha, Gunjan, Piya
- b. John, Fred, Shikha, Aastha, Gunjan, Piya
- c. Biswas, Fred, Shikha, Aastha, Gunjan, Piya

d. Biswas, Sameer, Aastha, Gunjan, Piya

e. None of these

12. Five friends, including Ram, are working in five different call centres as customer care specialists each of them gets different salary. Below are some of the facts about them.

I. The five companies offer Rs. 6,000, 7,500, 10,000, 12,000 and 15,000 as a salary to customer care specialists.

II. One of the call centre is Global Vantedge.

III. Kishan is not working in GE Capital and his salary is of the salary of one of his four friends.

IV. Ganesh is working in EXCEL.

V. The person earning Rs. 10,000 works for Convergys.

VI. Shiv's salary is twice the salary of Shyam.

VII. Person working in Daksha gets the maximum salary.

Which of the following combination is necessarily true?

a. Shyam, Global Vantedge, Rs. 6,000

b. Shiv, Daksha, Rs. 12,000

c. Shyam, GE Capital, Rs. 7,500

d. Kishan, GE Capital, Rs. 6,000

e. None of these

13. There are five friends — Amrita, Ankit, Reena, Aman and Ankur. Two of them are good at mathematics while the others are good in three different subjects, viz. botany, zoology and physics. One of them, a mathematician and the one good at physics stay on the same second floor, while the other three stay on different floors, viz. 1, 3, and 4. Two of these five friends are architects while the other three belong to different occupations, viz. scientist, teacher and businessman. One of the mathematician is good at geometry while the other is more comfortable with algebra. Aman is good at algebra and stays on the second floor while Ankur is a scientist and stays on fourth floor. The botany expert is a teacher and stays on first floor 1, Ankit is a businessman while Amrita is the architect and is also good at geometry.

Based on the above information, answer the following question.

What is the occupation of the person expert in physics and on which floor he/she stays?

a. Teacher b. Scientist c. Businessman

d. Architect e. Cannot be determined

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
13					

4 Data Sufficiency

Introduction

Data sufficiency (DS) form of questions is associated more with Quantitative Ability. But, CAT 2005 showed that the same format can be used in DI section also. So, in LRDI section, this format is relatively new, and most of you are unfamiliar with this form in DI section. After a gap of few years Data Sufficiency reappeared in CAT - 2007 both in quantitative and Data Interpretation Sections.

These questions require maximum clarity of understanding. The techniques introduced in this chapter provide you the guideline to approach DS questions of various types, most effectively.

In this Chapter most of the questions are of five option type, but it is not necessary that this could be the only structure of options. It is strongly advised to go through options and instructions carefully before attempting any Data Sufficiency questions.

Learning Objectives

This chapter

- introduces you to the data sufficiency flowchart.
- exposes you to various kinds of logic involved, like Data Sufficiency / Data Consistency / Data Redundancy / Data Dependency etc.
- illustrates the application of each of these types in various domains like quantitative fundamentals, data nuances, numerical reasoning, analytical reasoning, verbal reasoning etc, with examples of each.

- tests you on the understanding of these unexplored aspects by small exercises followed by exhaustive and comprehensible explanations.

The Data Sufficiency Format

A data sufficiency (DS) question consists of three parts. The actual question is called the question stem. e.g. Is $p > 1$?

That's all you will be given. Sometimes the question is literally a question, like the preceding example. Sometimes the 'question' is actually a statement, telling you to do something. e.g.

Mr Prasad drives at 80 mph in 5 hr. Find the distance that Mr Prasad drives.

Or, like this: Find the rate at which oil flows into a container.

While the question form is far more common, do not be surprised if you get a statement form. We at **Career Launcher** have included both in the practice questions at the end of the book to be sure that **Career Launcher** students are able to tackle both types with considerable ease.

The second part of the DS question is statement 1. It may be like this:

1. $q > 1$ or

1. Mr Prasad drives thrice as far as his sister, but at half her speed.

or

1. The container has a capacity of 15,000 gallons.

The third part of the question is statement 2. It may be like this:

2. $p + q > 1$

or

2. Mr Prasad starts 300 miles east of the point at which his sister started.

or

2. The container is $\frac{3}{8}$ full by evening.

You need to decide whether the data (the information) is sufficient to answer the question and hence the title, Data Sufficiency. No answer choices are given at the end of the DS questions. Instead, instructions are given at the beginning of the section as illustrated below.

Key point to remember

Direction: Each of the following problems consist of a question followed by two statements, I and II. You must determine whether the information given by the statements is sufficient to answer the question asked. In addition to the information provided in the statements, you should rely on your knowledge of mathematics and ordinary facts (such as the number of seconds in a minute). On your answer sheet fill in the oval with

Mark (a) if the question can be answered by using the statement I alone but not by using the statement II alone.

Mark (b) if the question can be answered by using the statement II alone but not by using the statement I alone.

Mark (c) if the question can be answered by using either of the statements alone.

Mark (d) if the question can be answered by using both the statements together but not by either of the statements alone.

Mark (e) if the question cannot be answered on the basis of the two statements.

The five answer choices in detail

The following problems illustrate the meanings of the four answer categories.

1. Choice (a)

Concept

In any problem, the answer choice is (a) if

statement I ALONE is sufficient to answer the question asked, but statement II alone is not sufficient to answer the question asked

Example:

(A) Is Raja older than Ramu?

I. Sita is 4 years younger than Raja and 2 years younger than Ramu.

II. The average age Raja and Ramu is 21 years.

Statement I is by itself sufficient to answer the question asked. If Sita is 4 years younger, then Raja is 2 years younger than Ramu, then Raja must be 2 years older than Ramu. Statement II, however, is not by itself sufficient to answer the question. From the statement about the average of their ages in years, you cannot draw any conclusion about their respective ages. Since statement I alone is sufficient, but statement II is not, the correct answer choice is (a).

(B) If x, y and z are consecutive integers, is y even?

I. xz is odd integer.

II. $x < y < z$

Statement II is not sufficient to answer the question asked. Although statement II describes the order of the integers, it provides no information about which elements of the sequence are even and which are odd. Statement I, however, is by itself sufficient to determine whether y is even or not. If xz is odd, then both x and z must be odd integers. In the series of 3 consecutive integers, at least one of the integers must be even. Therefore, y must be even. Since statement I alone is sufficient to answer the question asked, but statement II alone is not, the correct answer choice is (a).

2. Choice (b)

Concept

In any problem the answer choice is (b) if statement II alone is sufficient to answer the problem but statement I alone is not.

Example:

Rahul writes three prime numbers in his note book. All three numbers are single digit numbers. What are they?

I. Two of the number are 3, 5.

II. The three numbers are in Arithmetic progression.

Statement I alone is not sufficient, as the third number could be 2 or 7. Statement II alone is sufficient as 3, 5, 7 are the only three prime numbers in Arithmetic Progression. Since statement II alone is sufficient but statement I alone is not, the correct answer choice is (b)

3. Choice (c)

Concept

In any problem the answer choice is (c) if each statement by itself is capable of answering the question asked.

Example:

What is the area of the circle?

I. The circle has a circumference of 4π .

II. The circle has a diameter of 4.

Statement I alone is sufficient to answer the question asked. Since the circumference of a circle is equal to 2π times its radius, a circle with a circumference of 4π has a radius of 2. And a circle with a radius of 2 has an area of 4π . Statement II is also by itself sufficient to answer the question. A circle with a diameter of 4 has a radius of 2 and an area of 4π . Since each statement is by itself sufficient to answer the question, the correct answer choice is (c).

4. Choice (d)**Concept**

In any problem the answer choice is (d) if each statement alone is not sufficient to answer the question but the two statements taken together answer the question.

Example:

How many students are enrolled in Madam Vidya's English class?

I. If 3 more students sign up for the class and no one drops out, more than 35 students will have enrolled in the class.

II. If 4 students drop out of the class and no more sign-up, fewer than 30 students will have enrolled in the class.

Statement I alone is not sufficient to answer the question asked, but I does imply that at least 33 students are enrolled in the class. Statement II alone is not sufficient to answer the question asked, but II does imply that no more than 33 students are enrolled in the

class. Although neither statement alone is sufficient to answer the question, the two statements taken together are sufficient to answer the question that the number of students enrolled in the class is 33. Since neither statement alone is sufficient to answer the question but both together are sufficient, the correct answer choice is (d).

5. Choice (e)**Concept**

In any problem the answer choice is (e) if the two statements are not capable of answering the question asked, either alone or when taken together.

Example:

Is $u < v$?

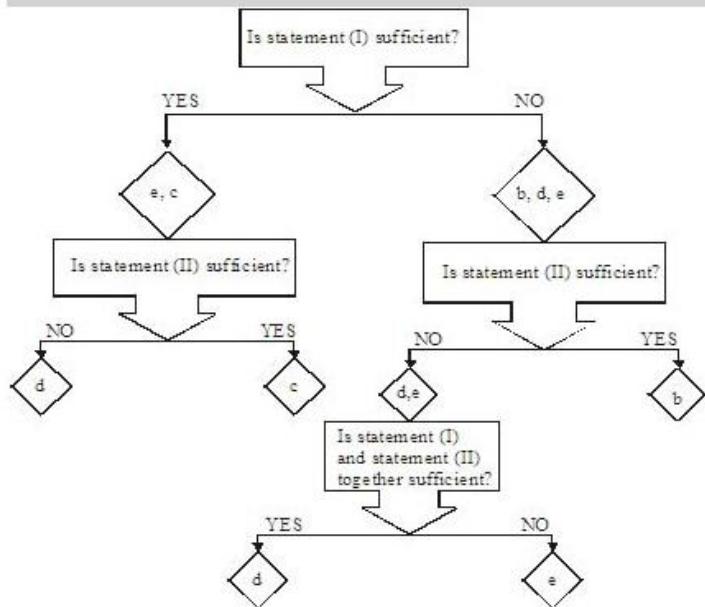
I. $-0.25 < u < 0.4$

II. $0.10 < v < 0.38$

Statement I alone is not sufficient to answer the question asked. Although statement I defines a range for u , the statement provides no information about v . Similarly, statement II alone is not sufficient to answer the question asked. Statement II defines a range for v but provides no information about u . Since the two statements, even when taken together, do not provide enough information to answer the question asked, the correct answer choice is (e).

Flow chart for solving DS questions

Concept



Stop work as soon as you know whether the data is sufficient even before solving the problem. In the heat of battle, it is easy to forget that you do not have to answer the question asked in a data sufficiency item. 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.

Knowing the Traps

Data sufficiency questions have many tricks and traps. Here are some examples on how easily you can fall for the traps.

Key point to remember

1. A unique answer: The data statements (alone or together) should be able to provide you with a unique answer to the question asked. Only then they will be considered as valid.

Example:

What is the value of x ?

I. $x^2 = 16$

II. $x > -10$

From statement I we can see that $x = +4$ or $x = -4$. Now you may be tempted to consider this as a valid answer, as we have determined the value of x . But since this is not a unique answer, such an answer is not valid. So statement II alone is not sufficient to answer the question. Statement II does not give a definite answer either as both $+4$ and -4 are greater than -10 . Hence, the correct answer choice to this question is (d), as neither of the statements (either alone or taken together) helps us get a unique value of x .

Key point to remember

2. A unique answer does not mean we cannot have two different answers from the two statements separately.

Consider this example:

Is $x > 0$?

I. $3x + 2 > 11$

II. $4x + 3 < -9$

From statement I we get that $x > 3$. This means that $x > o$. So we have a unique answer for the question asked. From statement II we get $x < -3$. This means $x < o$ and hence, not greater than o . Again we have a unique answer to the question asked. Hence, the correct answer is (b) as each statement by itself is capable of answering the question uniquely. Just because the two answers are contradicting each other does not mean that it is not valid.

Key point to remember

3. A statement that merely states a mathematics formula is not sufficient to answer the question.

Sometimes a statement gives you a mathematics rule, which does not actually help you to acquire relevant data to answer the question.

Example:

(A) Angles 'a' and 'b' are interior opposite angles. What is the measure of angle a?

$$\text{I. } a + b = 180^\circ$$

You already know that

$a + b = 180^\circ$ because from the basic geometric rule, sum of interior opposite angles is 180° . When a statement repeats a mathematical formula, it does not give you any new information and thus is not sufficient to answer the question.

(B) What is the area of the trapezoid ABCD?

$$\text{I. The area of the trapezoid is } \frac{1}{2} (\text{Base}_1 + \text{Base}_2) \times \text{Height.}$$

Again statement I just gives a mathematical formula. While you may be delighted with the information because you personally do not have a clue what the formula for the area of a

trapezoid is, statement I alone does not give you anything you can use to answer the question, in terms of the values of the bases and the height.

Key point to remember

4. A statement that only repeats information given in the question stem is not sufficient to answer the question.

Sometimes you are given information in a statement that you already know from the question stem.

Example:

When a glass is half full, it contains 5 L of water. What is the weight of the glass when it is full?

(i) The capacity of the glass is 10 L.

It is obvious that if the half-full glass is 5 L, naturally the full glass is 10 L. No new information is given.

Did you notice the trap built into this question? The question stem asked for the weight of the glass, not the capacity. If you thought you had to find the capacity, you probably thought statement I did the job. Always keep in mind carefully what you are being asked.

Key point to remember

5. Treat each statement separately, do not transfer information from one statement to the other.

A problem may give you something useful in statement I and then give you a variation of that same information in statement II. Many people choose (a), thinking that statement I alone is sufficient. They dump statement II, thinking they do not need it because they already have the information. True, you do not need statement II. However, keep in mind that one of the answer choices, choice (b) to be exact, states that either statement I or

statement II alone is sufficient. Do not rush off just because you have already answered the question. If statement II works as well, you have to choose (b) as the correct answer choice.

Example:

What is the area of square PQRS?

- I. The side of the square is 12.
- II. The perimeter of the square is 48.

You know that the area of a square is found by multiplying the length of the side with itself. Because statement I gives you the length of the side, do not immediately choose A, thinking your job is done. You must continue reading statement II. If the perimeter of a square is 48, each side is 12. Again, you have enough information. Because either statement alone is sufficient, the answer to the question is (b).

Key point to remember

6. Choice (c) means that both statements must be used. This is one of the favourite traps. Do not choose (c) just because one statement is helpful.

In order to choose (c) you must absolutely, positively need both the statements.

Example:

What is the perimeter of a rectangle with area 50?

- I. The ratio of the length to the width is 2 : 1.
- II. The sum of the interior angles of the rectangle is 360.

If you choose (c), you fell for the trap. The correct answer is (a) because statement I alone is sufficient to answer the question. To find a perimeter, you add the lengths of the sides.

You already have information that the area is 50. The area of a rectangle is equal to the product of length and breadth. You do not have to come up with the actual number, just determine whether the data is sufficient to do so. Statement II gives you the sum of the interior angles. First decide whether that alone is sufficient information to answer the question. It is not. How about using both statements together? Statement II is nice to know, but it certainly is not necessary to know. (Besides, you already know that the interior angles of a rectangle sum up to 360° .) Do not fall for the trap of choosing (c) just because both statements are true. You choose (c) only when one statement alone is not sufficient and it takes the combined information of both statements to get you to the right answer.

Key point to remember

- 7. Do not forget to try both statements I and II together.

Students in a big rush often eliminate choice (a) because statement I does not work. Then they eliminate choice (b) because statement II does not work. They immediately head to choice (d), thinking that there is no way to answer the question. They forget that there is one more possibility: maybe combining the two pieces of information will do the job.

Example:

(A) Is $u > v$?

I. $u^2 = v^2$

II. $u, v > 0$

Look at statement I alone. You may be tempted to say that if the squares of 2 numbers are identical, those 2 numbers are identical. Wrong, one of those numbers could be positive while the other could be negative. Say that $u = -2$ and $v = 2$. Then $u^2 = v^2$, but u is not equal to v (and you do not know whether $u > v$ because u could be negative and v positive, or v could be negative and u positive). Statement I alone is not sufficient to answer the question. Eliminate choice (b), (a).

Look at statement II alone. Certainly, knowing that u and v are greater than zero does not tell you which is greater, u or v . Eliminate choice (e). At this point many students make the mistake of choosing (D), saying there is not enough information to answer the question. Wrong again. Combine the two statements. If both u and v are greater than zero, then they must be the same numbers for their squares to be equal. In other words, they would no longer be 2 and -2; they would be 2 and 2 (or any other number). Both statements together are necessary to answer the question. Choose (c). You might argue that the answer must be (d) because the answer to the question 'Is $u > v$ ' is 'No, u is not greater than v '. Keep in mind that the answer to the question can be yes or no, as long as an answer is possible.

If you have a few minutes left at the end of a data sufficiency section, go back and double-check all those questions you answered with (d). You may be able to gain a few points by extracting yourself from the trap you had fallen into earlier.

(B) Is ' c ' a prime number?

I. $c > 10$

II. c divided by 2 has a remainder 0.

Statement I alone is not sufficient. Some numbers greater than 10 are prime, like 11. Some numbers greater than 10 are composite, like 12. Eliminate choice (b), (a).

Statement II alone is not sufficient. When a number divided by 2 has no remainder, that number is even. You may be thinking that there are no even prime numbers and statement II alone is sufficient. But there is one even prime number, i.e. 2. Therefore, statement II alone is not sufficient because the answer could be yes or no. Eliminate choice (e).

At this point most students get lazy and choose (d). Put the two statements together. You know from statement II that the number must be even. You know from statement I that the number must be greater than 10. Because the only even prime number is 2, any even

number greater than 2 must be composite, not prime. The answer to the question is 'no', 'c' is not prime. Because you can answer the question based on both statements. The answer is (c).

Key point to remember

8. If you can answer the question stem as 'no', you have sufficient data to answer the problem.

All you need to know about the problem is whether the data is sufficient to answer the question or solve the problem. If the answer to the question is 'yes' or if the answer is 'no', you have enough data.

Example:

(A) Is ' r ' even?

I. $(r + s)$ is odd.

II. s is even.

The answer is (c). Statement I alone is not sufficient to answer the question. Knowing that $(r + s)$ is odd will not tell you whether ' r ' is even. If ' s ' is even, then ' r ' is odd, because an even number and an odd number sum up to an odd number. If ' s ' is odd, then ' r ' is even, for the same reason. Put the two statements together. If ' s ' is even, and $(r + s)$ is odd, then ' r ' must be odd. The answer to the question is no, but there is an answer to the problem. The answer to the question 'Is ' r ' even?' is 'No, ' r ' is not even'. But because you can give an answer, even though that answer is negative, you do have enough data to answer the problem.

(B) Is Baban older than Raghu?

I. The ratio of Raghu's age to Baban's age is 7 : 4.

II. In 6 years Raghu will be half as old as he is now.

Statement I alone is sufficient to answer the question. If the ratio of their ages is $7 : 4$, then Raghu, the 7 part, is older than Baban, the 4 part. It makes no difference that the answer to the question is no; you are able to solve the problem. A 'no' is as good as a 'yes'. Statement II alone is not sufficient. You can use it to find out how old Raghu is now, but you have no information about his age relative to Baban's age.

Did you choose (c)? If so, you thought you actually had to find the exact ages of the two. True, you would need the information in statement II to get the age of Raghu, then the information in statement I to find the age of Baban. But you do not have to find the exact ages. You are not asked about the ages; only whether Raghu is older than Baban. Just answer the question and proceed instead of trying to add more to it.

Key point to remember

9. As soon as you know the data is sufficient to answer the question, stop.

Do not work out these DS problems right through till the end. You should not care what the final answer is. The name of the game here is not problem-solving, in which you — logically enough — actually solve the problem. The section is called data sufficiency. You need only a simple yes or no: to say whether the data is sufficient or not. You do not have to actually solve the problem.

(A) What is the volume of a right circular cylinder?

I. The area of the base of the cylinder is 96.

II. The height of the cylinder is 16.

Be smart enough not to actually work out the volume. The volume of a cylinder is the product of the area of the base and its height. You know the area of the base from statement I and the height from statement II. You do not want to multiply 96 times 16, do you? You know that statement I alone is not sufficient, and statement II alone is not sufficient. But both statements together give you required answer.

(B) How old is Subhash?

I. In 16 more years Subhash will be twice as old as he is today.

II. Four years ago Subhash was $\frac{3}{4}$ times of his present age.

Once again you could go ahead and solve for Subhash's age, but you do not have to and should not take the time to do so. Statement I alone is sufficient. Set up the equation $x + 16 = 2x$, where x stands for Subhash's current age. On solving, we get $x = 16$. While it does not take long to set up the equation and prove the answer, why do so if you do not have to? Every second counts, and besides, you might set up the wrong equation, get a weird answer, and get frustrated. You waste even more time 'trying to get it right'.

The same is true for statement II. You can set up the equation $x - 4 = \frac{3}{4}x$. On solving, $x = 16$.

As soon as you know you could solve the problem, you are through. The correct answer to this example is (b) because either statement I alone or statement II alone is sufficient.

Different Types of Data Sufficiency Problems

1. Signs of numbers

Examples:

(A) Is pq a positive number?

I. p^2q is a positive number.

II. $p \div q$ is a positive number.

Statement I alone is not sufficient to answer the question asked. The square of any number (except 0) is positive. So statement I implies that q is positive, but implies nothing about the sign of p . Statement II alone, however, is sufficient to answer the question. Since p divided by q is positive, p and q must have the same sign. Therefore, p times q must also be positive. Since statement II alone is sufficient to answer the question asked, but statement I alone is not, the correct answer is choice (e).

(B) Is $g - h > 0$?

I. $g > h$

II. $g^2 > h^2$

Statement I alone is sufficient to answer the question asked, for I can be rewritten as $g - h > 0$. Statement II, however, is not sufficient. Although g^2 is greater than h^2 , g may or may not be greater than h . (For example, g might be -5 and h might be 4). Since statement I alone is sufficient to answer the question asked, but statement II is not, the correct answer is choice (a).

2. Consecutive integers

Examples:

(A) If i, j and k are consecutive integers, in that order, what is the value of j ?

I. $j = i + k$

II. $ik = -1$

You will recall from earlier lessons that consecutive integers can be represented in the following way: if i is the least of the consecutive integers, then $i + 1$ is the next integer in the sequence, $i + 2$ is the third integer in the sequence, and so on. Thus, statement I can be rewritten as:

$$i + 1 = i + (i + 2) \dots \text{substituting in equation } j = i + k$$

$$i + 1 = 2i + 2$$

$$\therefore i = -1$$

And j is zero. Therefore, statement I is sufficient to answer the question.

Statement II is also sufficient to answer the question.

$$i(i + 2) = -1$$

$$i^2 + 2i = -1$$

$$i^2 + 2i + 1 = 0$$

$$(i + 1)(i + 1) = 0$$

So $i = -1$, and $j = 0$. Since each statement is by itself sufficient to answer the question, the correct answer is (b).

(B) What is the average of 3 consecutive odd integers?

I. One of the integers is -1 .

II. The sum of 2 of the integers is 4 .

Statement I alone is not sufficient to answer the question asked, since -1 could be the first, second or third odd integer in the series. Nor is statement II alone sufficient to answer the question. Let n represent the smaller of the 2 integers whose sum is 4 . They may be consecutive integers, in which case $n + (n + 2) = 4$, or they may be the first and third integers in the series, in which case

$$n + (n + 4) = 4$$

$$n + (n + 2) = 4$$

$$2n = 2$$

$$n = 1$$

or

$$n + (n + 4) = 4$$

$$2n = 0$$

$$n = 0$$

But, since n is odd, n is 1 and the other integer is 3. This alone, however, is not sufficient to answer the question, for the series might contain -1, 1 and 3, or 1, 3, and 5. The two statements taken together, however, do answer the question, for statement I selects one of the two possible series implied by statement II. The integers are -1, 1 and 3. Since neither statement alone is sufficient to answer the question, but both statements together are sufficient, the correct answer is choice (c).

3. Even and odd integers

Examples:

(A) If e is an integer, is e an odd number?

I. When $e + 1$ is divided by 3, the remainder is 1.

II. $3e$ is an odd integer.

Statement I alone is not sufficient to answer the question. If $e + 1$, when divided by 3, generates a remainder of 1, then e is divisible by 3. Some multiples of 3 are odd (example 3, 9, 15), but others are even (e.g. 6, 12, 18). Statement II alone is sufficient to answer the question. Since the question stem specifies that e is an integer, if $3e$ is an odd integer, then e must be odd. Thus, the correct answer is choice (e).

(B) If z is an integer, is z an even number?

I. $3z$ is an even number.

II. $z + 2$ is an even number.

Statement I alone is sufficient to answer the question. Since $3z$ is an even number, if $3z$ is even, then z must be an even number. Statement II is also sufficient. If $z + 2$ is an even number, then z must be an even number. Since each statement is by itself sufficient, the correct answer is choice (b).

4. Unique integer solutions

Examples:

(A) Shyam paid a total of Rs. 180 for tickets to a series of concerts. How many of the tickets cost Rs. 20?

I. Each ticket costs either Rs. 15 or Rs. 20.

II. More than 3 of the tickets cost Rs. 20.

Solution:

From statement I, we get

$$15x + 20y = 180$$

$$3x + 4y = 36$$

$$\text{Therefore, } x = 12 - \frac{4}{3}y$$

Therefore, y can take values 0, 3, 6, 9.

Therefore, statement I itself is not sufficient.

From statement II, y can take the values 6 or 9. Thus, using both statements we cannot determine how many tickets cost Rs. 20. Thus, the choice is (d).

(B) How many chocolates are contained in a certain box?

I. The chocolates can be evenly divided into groups, each group having a dozen chocolates.

II. There are more than 140 but fewer than 150 chocolates in the box.

Statement I alone is not sufficient to answer the question asked; the total could be any multiple of 12. Nor is statement II alone sufficient to answer the question asked, for II

just defines a range for the total. But both statements taken together are sufficient to answer the question, for there is only one multiple of 12 between 140 and 150, and that is 144. Since neither statement alone is sufficient to answer the question, but both statements taken together are sufficient, this answer should be classified as (c).

5. Multiples and divisibility

Examples:

(A) What is the remainder when y is divided by 15?

I. y is a multiple of 3.

II. y is a multiple of 5.

Statement I alone is not sufficient to answer the question asked. Some multiples of 3, such as 30, are divisible by 15, but others, such as 27, are not. Similarly, II alone is not sufficient to answer the question asked. Some multiples of 5, such as 45, are divisible by 15, but others, such as 35, are not. The two statements taken together are sufficient to answer the question, for together they imply that y is a multiple of $3 \times 5 = 15$. Since neither statement alone is sufficient to answer the question asked, but both statements taken together are sufficient, the correct answer choice is (c).

(B) Is $\frac{r}{9}$ an integer?

I. $\frac{r}{909909}$ is an integer.

II. $\frac{r}{567}$ is an integer.

Statement I alone is sufficient to answer the question asked. Since 909909 is divisible by 9 ($909909 = 9 \times 101101$), r is divisible by 9.

Statement II alone is sufficient to answer the question asked. Since 567 is divisible by 9 ($567 = 9 \times 63$), r is also divisible by 9. Since each statement is by itself sufficient to answer the question asked, the correct answer is choice (b).

6. Average

Examples:

(A) Amar made 8 deposits in his savings account. What was the total of the deposits?

I. The average of the deposits was Rs. 3,000.

II. The largest deposit was Rs. 6,500 and the smallest deposit was Rs. 1,900.

Statement I alone is sufficient to answer the question asked. Since Amar made 8 deposits, the total deposited was $3000 \times 8 = \text{Rs. } 24000$.

Statement II, however, is not sufficient to answer the question asked.

Since I alone is sufficient but II is not, the correct answer choice is (a).

(B) 15 children are sitting at a table. What is the average age, in years, of the 15 children?

I. The average age of the 8 youngest children is 10 years.

II. The average age of the 7 oldest children is 18 years.

Neither statement alone is sufficient to answer the question asked, but both taken together are. It is possible to set up a weighted average:

$$\frac{8(10) + 7(18)}{15} = 13.7.$$

Thus, the correct answer choice is (c).

7. Fraction, ratio and percentage

Examples:

(a) In a garden there are apple, mango and orange trees. Which type of trees is the most in number?

I. There are $\frac{4}{5}$ as many orange trees as there are mango trees.

II. There are $\frac{2}{3}$ as many mango trees as there are apple trees.

Neither statement alone is sufficient to answer the question asked, for each statement provides information about only two of the three types of trees. But both statements taken together are sufficient to answer the question asked. Statement I implies that there are fewer orange trees than mango trees, and statement II implies that there are fewer mango trees than apple trees. Therefore, the most numerous type of trees must be the apple trees. Since neither statement alone is sufficient to answer the question asked, but both statements together are, the correct answer choice is (c).

8. Distance, speed and time**Examples:**

(A) Rajesh drove from city A to city B, a total of 1,000 miles. What was his average speed for the trip?

I. Rajesh drove the first 400 miles at an average speed of 60 mph.

II. Rajesh drove the last 700 miles at an average speed of 80 mph.

Neither statement alone is sufficient to answer the question asked, for each provides information about only a portion of the trip. And even when the two statements are taken together, they are not sufficient, for there is an overlap of 100 miles between the two statements. The correct answer choice is (d).

(B) Sagarika drove from Pune to Mumbai and back again. What was her average speed for the entire trip?

I. She drove from Pune to Mumbai in 5 hr, and the return trip took 4 hr.

II. The distance between Pune and Mumbai is 600 miles.

Statement I is not sufficient to answer the question, because we have no information regarding the distance travelled. Statement II gives us the distance only, and not the time. However, statements I and II together give us the total distance and total time, using which, average speed can be found. Thus, the correct answer choice is (c).

9. Algebraic expressions**Examples:**

(A) What is the value of $\frac{(2xy+xy^2)}{xy}$, where $x, y \neq 0$?

I. $x = 2$

II. $y = 2$

The correct classification of this item is (e), a conclusion more easily seen once the expression in the stem is factorized and simplified.

$$\frac{(2xy+xy^2)}{xy} = \frac{xy(2+y)}{xy} = 2 + y$$

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

(B) What is the value of $\frac{p^3q^2r^4}{r^3p^4q^2}$, $p, q, r \neq 0$?

I. $p = 2$

II. $\frac{r}{p} = 2$

The correct answer choice is (e), a conclusion more easily seen once the expression in the stem is simplified.

$$\frac{p^3 q^2 r^4}{r^3 p^4 q^2} = \frac{r}{p}$$

So statement II alone is sufficient to answer the question, but not statement I alone. You should also be alert to the possibility of factorizing an expression.

(C) What is the value of

$$a^2 + 2ab + b^2 ?$$

I. $a + b = 0$

II. $a = -b$

The correct answer choice is (b), a conclusion more easily seen once the expression has been factorized.

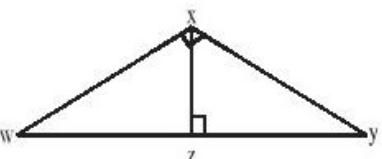
$$a^2 + 2ab + b^2 = (a + b)(a + b)$$

Statement I is sufficient because it implies that the value of the entire expression is zero.

Statement II is also sufficient, for it implies that $a + b = 0$

10. Geometry

(A) In the figure above, if $WX = XY$, then what is the area of the $\triangle WXY$?



I. $XZ = 1$

II. $WX = \sqrt{2}$

Using statement I, $XZ = 1$.

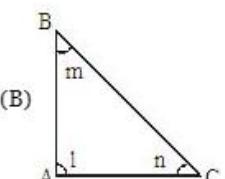
$$\text{In } \triangle XZY, XZ = ZY = 1 \quad \therefore WY = 2$$

$$\therefore \text{Area of } \triangle WXY = \frac{1}{2} \times 2 \times 1 = 1$$

$$\text{From statement II, } WX = XY = \sqrt{2}, \therefore WZ = \frac{\sqrt{2}}{\sqrt{2}} = 1 \therefore WY = 2$$

$$\therefore \text{Area of } \triangle WXY = \frac{1}{2} \times 2 \times 1 = 1$$

Hence, we can get the answer by using each statement independently. Hence (b).



What is the area of $\triangle ABC$?

I. The degree measures of l , m and n are in the ratio $3 : 2 : 1$ respectively.

II. $BA = 3\sqrt{3}$

Each statement alone is not sufficient to answer the question.

Let the angles be a , $2a$ and $3a$.

Therefore, $a + 2a + 3a = 180^\circ$

$6a = 180^\circ$

$a = 30^\circ$

So it is a 30° - 60° - 90° triangle.

With the use of statement II, we get the measure of BA .

$\therefore BC$ and AC can be obtained using properties of 30° - 60° - 90° triangle.

The answer, hence, is (c).

(C) What is the area of a circle with centre O?

I. The circumference of the circle is 6π .

II. The diameter of the circle is 6.

Each statement alone is sufficient to answer the question asked. Obviously, statement II is sufficient to determine that the radius of the circle is 3 and the area is 9π . But statement I is also sufficient:

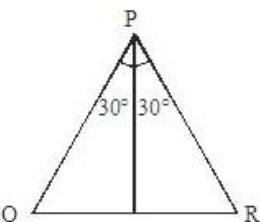
Circumference = $2\pi r$

$$6\pi = 2\pi r$$

$$r = 3$$

\therefore Answer is (b).

(D)



What is the area of $\triangle PQR$?

I. PQR is an equilateral triangle.

II. The length of PQ is 2.

The correct answer choice is (c). Neither statement alone is sufficient to answer the question asked, but both taken together are sufficient. Given information about the length of the sides, the length of the altitude, or the area of an equilateral triangle, you can deduce the magnitude of the other quantities. Therefore, given that PQR is an equilateral triangle with a side measuring 2, you can deduce that the area is $\sqrt{3}$.

Note:

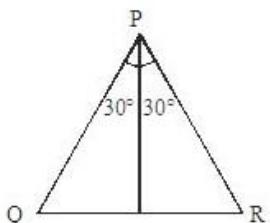
The most important warning:

When plugging in numbers, do not forget negatives, fractions, zero and 1.

Many data sufficiency items include one or more unknown quantities like x , n , a , and so forth. Just as with multiple choice problems, there may be times when the easiest and quickest way to tackle such an item is by plugging a possible value into the equation or statement given and then working backwards.

When you do this, do not forget to take into account the kind of 'odd-ball' values often overlooked: negative numbers, fractions, zero and 1. Unless these are explicitly ruled out,

(D)



they are possible values for the unknown, and the variations they introduce can turn an 'answerable' question into an 'unanswerable' one.

What is the area of $\triangle PQR$?

- I. PQR is an equilateral triangle.
- II. The length of PQ is 2.

The correct answer choice is (c). Neither statement alone is sufficient to answer the question asked, but both taken together are sufficient. Given information about the length of the sides, the length of the altitude, or the area of an equilateral triangle, you can deduce the magnitude of the other quantities. Therefore, given that PQR is an equilateral triangle with a side measuring 2, you can deduce that the area is $\sqrt{3}$.

Note:

The most important warning:

When plugging in numbers, do not forget negatives, fractions, zero and 1.

Many data sufficiency items include one or more unknown quantities like x , n , a , and so forth. Just as with multiple choice problems, there may be times when the easiest and quickest way to tackle such an item is by plugging a possible value into the equation or statement given and then working backwards.

When you do this, do not forget to take into account the kind of 'odd-ball' values often overlooked: negative numbers, fractions, zero and 1. Unless these are explicitly ruled out,

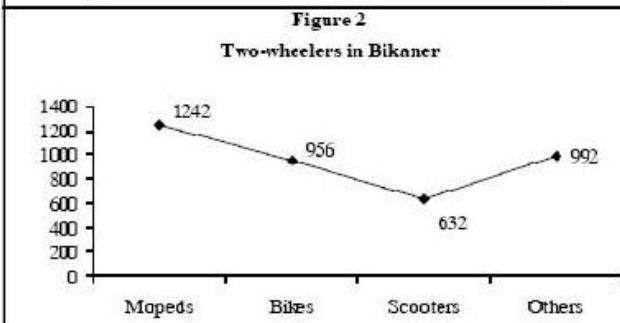
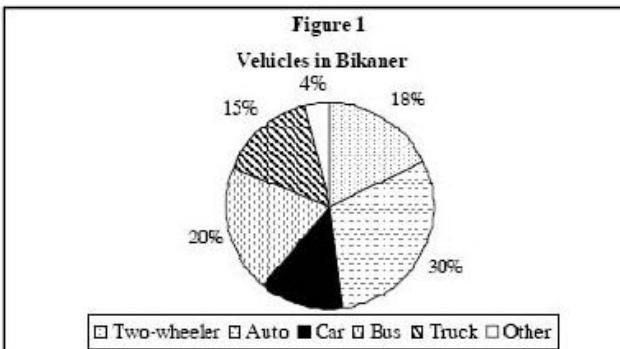
Visual Data Sufficiency

Data Sufficiency format can also be used in LRDI module without using the concepts of Quantitative Ability. Here, the sufficiency of the data is to be tested on the basis of two figures. Without further discussions, it would be a good learning if you straightway move on to the real thing.

Solved Examples

Answer the questions based on the following information.

Bikaner is experiencing very heavy traffic these days. The following figures give the information regarding vehicles running on the roads of Bikaner as of now.



In the following questions, mark

- Choice (a) if the question can be answered by figure 1 alone and figure 2 is not required
- Choice (b) if the question can be answered by figure 2 alone and figure 1 is not required
- Choice (c) if the question can be answered by both the figures (figure 1 and figure 2) taken together and not by any one of these figures alone
- Choice (d) if the question cannot be answered even by using both the figures together
- Choice (e) if the question can be answered by figure 1 alone and figure 2 alone.

Example 1: What percentage of the two-wheelers in Bikaner are scooters?

Solution (b) As we are interested only in two-wheelers, only the second figure would give us the percentage.

$$\text{The answer would be } \frac{632}{1242 + 956 + 632 + 992} \times 100\%$$

Choice (b).

Example 2: What is the ratio of the number of trucks to the number of mopeds in Bikaner?

Solution (c) Total two-wheelers = 3822 = 18% of all vehicles. Hence, number of trucks, which is equal to 15% of all vehicles, can be computed. So the ratio can be determined.

Alternately, trucks = 15% of all vehicles.

$$\text{Mopeds} = \frac{1242}{1242 + 956 + 632 + 992} \times 100\% \text{ of all two-wheelers}$$

$$= \frac{18}{100} \times \frac{1242}{1242 + 956 + 632 + 992} \times 100\% \text{ of all vehicles. Therefore, the ratio would be}$$

$$15 : \frac{18}{100} \times \frac{1242}{1242 + 956 + 632 + 992} \times 100\%. \text{ Hence, data from both the figures is required. Choice (c).}$$

Example 3: How many buses per auto are there in Bikaner?

Solution (a) For number of buses per auto, we do not need the absolute figures.

Buses = 20% of all the vehicles

Auto = 30% of all the vehicles

Hence, ratio = 20% : 30% = 2 : 3

Hence, figure 1 is sufficient to get the answer.

Example 4: If 25% of the "Other" vehicles in Bikaner are transported to some other city and an equal number of scooters came in Bikaner, what would be the ratio of the number of cars to the number of two-wheelers in Bikaner?

Solution (a) 25% of the "Other" vehicles in Bikaner = 1% of all the vehicles. Since the total number of vehicles remained same, this 1% would get displaced from "Other" to two-wheeler. Hence, the ratio

$$\frac{\text{Cars}}{\text{Two-wheeler}} = \frac{13}{18+1} = 13 : 19$$

Note: You need not carry out any calculations in any of the questions. Only thing required to be found out was whether the question can be answered by data from a single figure only, or both the figures were required. Here, calculations are shown only to illustrate the answer.

Data Sufficiency and Consistency

This exercise goes one step beyond 2-statement type data sufficiency. It asks you not only to reject the options where the data is not sufficient, but also to single out the option which actually leads you to your answer. This area is unexplored as far as any MBA entrance examination till date goes, but the trend has attested the fact that surprises are here to stay and the logical minds of the aspirants would be probed deeper.

In the following questions, a statement is given and a conclusion is drawn from that statement combined with some other information. The statement along with that additional information is sufficient to infer the stated conclusion correctly. You have to find that additional information from the given options:

Example 1: Statement: Aplu ate 4 mangoes more than Paplu.

Conclusion: Paplu ate 9 mangoes

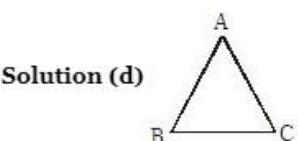
- a. Aplu ate 15 strawberries and 10 mangoes.
- b. Aplu ate 40 bananas.
- c. Aplu ate 13 strawberries and an equal number of mangoes.
- d. Aplu ate 10 strawberries and a total of 23 fruits.
- e. Aplu ate 28 bananas and 10 mangoes

Solution (c) Given that Aplu's mangoes = Paplu's mangoes + 4, if we come to know that Aplu's mangoes = 13, Paplu's mangoes would be $13 - 4 = 9$ (our conclusion). Hence, option (c).

Example 2: Statement: $\triangle ABC$ is an isosceles triangle with $AB = AC$.

Conclusion: Area of $\triangle ABC = 81\sqrt{3}$ square units.

- a. $AD = 9\sqrt{3}$ units, where AD is the bisector of $\angle A$ meeting BC in D
- b. $\angle BAC = 60^\circ$ and $r = 6\sqrt{3}$ units, where r is the inradius of $\triangle ABC$
- c. $\triangle ABC$ is a right angled triangle having $BC = 18\sqrt{3}$ units
- d. Area of $\triangle AOB = 30\sqrt{3}$ square units and area of $\triangle BOC = 21\sqrt{3}$ square units, where O is the circumcentre of $\triangle ABC$
- e. Area of $\triangle AOB = 20\sqrt{3}$ square units and area of $\triangle BOC = 21\sqrt{3}$ square units, where O is the circum centre of $\triangle ABC$.



In option (a), we have the length of the height (which is nothing but the angle bisector AD) only. The length of base BC is also required to confirm the area. Hence, this information is not sufficient.

In option (b), $\angle BAC = 60^\circ$ and $\angle ABC = \angle ACB$ (because $AB = AC$). So $\triangle ABC$ is equilateral. If $r = 6\sqrt{3}$ units, height = $3r = 18\sqrt{3}$ units.

Therefore, area = $\frac{\text{height}^2}{\sqrt{3}} = \frac{(18\sqrt{3})^2}{\sqrt{3}} = 324\sqrt{3}$ square units and not $81\sqrt{3}$ square units. So this information is misleading.

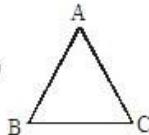
In option (c), $\triangle ABC$ can be right angled only at angle A.

If $BC = 18\sqrt{3}$ units, $AB = AC = 18\sqrt{\frac{3}{2}}$ units.

Conclusion: Area of $\triangle ABC = 81\sqrt{3}$ square units.

- a. $AD = 9\sqrt{3}$ units, where AD is the bisector of $\angle A$ meeting BC in D
- b. $\angle BAC = 60^\circ$ and $r = 6\sqrt{3}$ units, where r is the inradius of $\triangle ABC$
- c. $\triangle ABC$ is a right angled triangle having $BC = 18\sqrt{3}$ units
- d. Area of $\triangle AOB = 30\sqrt{3}$ square units and area of $\triangle BOC = 21\sqrt{3}$ square units, where O is the circumcentre of $\triangle ABC$
- e. Area of $\triangle AOB = 20\sqrt{3}$ square units and area of $\triangle BOC = 21\sqrt{3}$ square units, where O is the circum centre of $\triangle ABC$.

Solution (d)



In option (a), we have the length of the height (which is nothing but the angle bisector AD) only. The length of base BC is also required to confirm the area. Hence, this information is not sufficient.

In option (b), $\angle BAC = 60^\circ$ and $\angle ABC = \angle ACB$ (because AB = AC). So $\triangle ABC$ is equilateral. If $r = 6\sqrt{3}$ units, height = $3r = 18\sqrt{3}$ units.

Therefore, area = $\frac{\text{height}^2}{\sqrt{3}} = 324\sqrt{3}$ square units and not $81\sqrt{3}$ square units. So this information is misleading.

In option (c), $\triangle ABC$ can be right angled only at angle A.

If $BC = 18\sqrt{3}$ units, $AB = AC = 18\sqrt{\frac{3}{2}}$ units.

Hence, area of $\triangle ABC = \frac{1}{2} \times 18\sqrt{\frac{3}{2}}^2 = 243$ square units.

So this information doesn't direct us to the required conclusion.

In option (d), $\triangle AOB$ is congruent to $\triangle AOC$ (O is the circumcentre and AB = AC). Therefore, area of both = $30\sqrt{3}$ square units.

Combining it with area of $\triangle BOC = 21\sqrt{3}$ square units, total area of $\triangle ABC = 81\sqrt{3}$ square units. Hence, this option is our valid information.

Practice exercises

Introduction

This chapter contains a total of 2 practice exercises and each practice exercise consists of various kinds of questions that can be asked from a set of given information. The motive of these practice sets is just to make you comfortable with the different types of concepts used in Data Interpretation.

At the end of each practice exercise, there is a scoring table to assess your performance in 'concept building', instantly. Since practice exercises are concept-oriented, you are advised not to worry too much regarding time spent.

Any rough work, if required, should be done on a separate sheet of paper. Force yourself to do mental calculations and use the pen only when absolute necessary.

How to score: The process of scoring is very simple. For every right answer add one mark, and for every wrong answer deduct one-fourth mark.

DI is an application of the concepts of Arithmetic, especially percentages, simple and compound interest, profit, loss and discount and ratio, along with your ability to calculate. In case you get a net score of less than 80% in any practice exercise, do not forget to revise the above mentioned concepts.

All the best !

Practice exercise - C1

Directions for questions 1 to 5: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Mark (a) if the question can be answered by using only one of the statement alone but not by using other statement alone.

Mark (b) if the question can be answered by using either of the statements alone.

Mark (c) if the question can be answered by using both the statements together but not by either of the statements alone.

Mark (d) if the question cannot be answered on the basis of the two statements.

1. What are the distinct integers A and B where $A > B$?

I. The product of A and B is 4.

II. A and B are both positive.

2. If $x < y < z$ are odd integers, are they consecutive odd integers?

I. $z - x = 4$

II. y is the average of x and z .

3. If a , b and c are consecutive integers, in that order, what is the value of a ?

I. $b = a + c$

II. $ac = -1$

4. What is the average of 3 consecutive odd integers?

I. One of the integers is -1 .

II. The sum of 2 of the integers is 4.

5. What is the remainder when x is divided by 20?

I. x is a multiple of 2.

II. x is a multiple of 5.

Directions for questions 6 to 10: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Mark (a) if the question can be answered by using the statement I alone but not by using the statement II alone.

Mark (b) if the question can be answered by using the statement II alone but not by using the statement I alone.

Mark (c) if the question can be answered by using both the statements together but not by either of the statements alone.

Mark (d) if the question cannot be answered on the basis of the two statements.

6. Sheena bought a new music album for which she had to pay entertainment tax as well as sales tax. She liked it so much that she bought 7 more copies so that she could present it to her friends. If she paid Rs. 12.5 as entertainment tax, what is the percentage of sales tax per copy?

I. The album she purchased was Rs. 15 less than the best album in the shop.

II. She paid Rs. 89 for the whole transaction.

7. What was the cost, before tax or delivery charge, on an item for which the total bill with tax and delivery charge was Rs. 92.35? (Assume that there is no tax on delivery charges.)

- I. The sales tax rate is 12.5%.
- II. The delivery charge was Rs. 2.35.
8. What is A's salary, if he saves 30% of his income after tax?
- I. Rs. 50,000 is tax exempt.
- II. Tax incurred by A is 10% of his income.
9. p varies inversely as the cube root of q. Find the value of pr?
- I. q varies directly as the cube of r.
- II. When $q = 1000$, $p = 40$.



On the number line above, if $BC : AD = 1 : 3$ and $AC : AD = 1 : 2$, what is the value of B?

- I. $A = 8$
- II. $D = 10$

Directions for questions 11 to 15: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Mark (a) if the question can be answered by using the statement I alone but not by using the statement II alone.

Mark (b) if the question can be answered by using the statement II alone but not by using the statement I alone.

Mark (c) if the question can be answered by using either of the statements alone.

Mark (d) if the question can be answered by using both the statements together but not by either of the statements alone.

11. How many students appeared for the examination?
- I. Only 50% of students passed the examination.
- II. If 10 more students passed, the pass percentage would have been 51%.
12. Which is costlier — a can of corn or a can of beer?
- I. Canned corn are sold at 4 cans for a dollar.
- II. Two cans of beer can be exchanged for 4 cans of corn.
13. What is the profit percentage made by the shopkeeper?
- I. Selling price of 100 eggs is Rs. 120.
- II. Cost price is two-thirds of the selling price.
14. Sandip buys a colour TV at a discount price of Rs. 15,500. How much discount did he get?
- I. His other option was to buy at 0% finance on the list price.
- II. EMI for 12 months at 0% works out to Rs. 1,485.
15. What is the total profit on sales of 7 dozen washers?
- I. Washers are bought at Rs. 15 per dozen and sold at 4 for Rs. 6.
- II. The mark-up on washers is 20%.

Directions for questions 16 to 20: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Mark (a) if the question can be answered by using only one of the statement alone but not by using other statement alone.

Mark (b) if the question can be answered by using both the statements together but not by either of the statements alone.

Mark (c) if the question can be answered by using either of the statements alone.

Mark (d) if the question cannot be answered on the basis of the two statements.

16. Is 2000 the average score in the GRE?

I. The highest GRE score is 2390 and the lowest score is 880.

II. Half of those who take the GRE score above 2000 and the other half scores below 2000.

17. Maryanne has Rs. 4 in 50-paisa and one-rupee coins. How many 50-paisa coins does she have?

I. She has less 50-paisa coins than one-rupee coins.

II. She has a total of 5 coins.

18. What is the value of the ratio $(a + c) : c$?

I. The ratio of $a : b = 1 : 5$

II. The ratio of $b : c = 3 : 2$

19. Samal made 5 deposits to his savings account. What was the total of the deposits?

I. The average of the deposits was \$75.

II. The largest deposit was \$110 and the smallest deposit was \$35.

20. When a body falls from rest, its distance from the starting point varies as the square of the time taken for the fall. How much does it fall in the 10th second?

I. If falls through 120.5 m in 5 s.

II. If falls through 490.4 m in 10 s.

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
20					

Practice exercise - C2

Directions for questions 1 to 5: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Mark (a) if the question can be answered by using only one of the statement alone but not by using other statement alone.

Mark (b) if the question can be answered by using either of the statements alone.

Mark (c) if the question can be answered by using both the statements together but not by either of the statements alone.

Mark (d) if the question cannot be answered on the basis of the two statements.

1. John received a \$140 fine for speeding. What was the greatest speed he could have been driving at?

I. The fine was \$65 for the first 5 miles per hour by which he exceeded the limit plus an additional \$25 for each additional 5 miles per hour or part.

II. John drove from Baltimore to New York, a distance of 180 miles in less than 3 hr.

2. How long will the tank take to fill up completely?

I. Two taps can fill up the tank in 6 hr.

II. One tap can empty the tank in 14 hr.

3. How many hours will it take for some students and teachers to put up a tent?

I. There are 4 teachers and 7 boys.

II. A teacher alone can put it up in 5 hr while one boy alone can do so in 3 hr.

4. In how many days does B finish a certain job?

I. B is twice as efficient as A.

II. A is half-efficient as B and can finish the job in 10 days.

5. Working together, how many hours will John and Armando take to vacuum all the rooms on one floor of a hotel?

I. John can vacuum a room in 20 min.

II. Armando can vacuum a room in 15 min.

Directions for questions 6 to 10: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Mark (a) if the question can be answered by using the statement I alone but not by using the statement II alone.

Mark (b) if the question can be answered by using the statement II alone but not by using the statement I alone.

Mark (c) if the question can be answered by using both the statements together but not by either of the statements alone.

Mark (d) if the question cannot be answered on the basis of the two statements.

6. What is the ratio of $(a + b)$ to $(a - b)$?

I. $a + 4b = 11$

II. $\frac{a}{b} = \frac{3}{2}$

7. What is the value of $a + b$?

I. $\frac{a-6}{b-6} = \frac{2}{7}$

II. Seven times a is 30 more than 2b.

8. What is the average weight of the class of 40 students?

I. The total weight of 30 students is 1,800 kg.

II. The total weight of 10 students is 650 kg.

9. What is the value of $x^2 + 2xy + y^2$?

I. $x + y = 0$

II. $x - y = 0$

10. What is the value of y?

I. $\frac{3x}{9-6y} = 2$

II. $x = 6 - 4y$

Directions for questions 11 to 15: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Mark (a) if the question can be answered by using the statement I alone but not by using the statement II alone.

Mark (b) if the question can be answered by using the statement II alone but not by using the statement I alone.

Mark (c) if the question can be answered by using either of the statements alone.

Mark (d) if the question can be answered by using both the statements together but not by either of the statements alone.

11. If $x \neq y$, then what is the value of x?

I. $\frac{7y}{3x+67} = 5$

II. $\frac{x+y}{y-x} = 1$

12. What is the value of $\frac{2pq+pq^2}{pq}$, ($p, q \neq 0$) ?

I. $p = 2$

II. $q = 1$

13. Is g greater than h?

I. $(g+3)$ is greater than $(h+2)$.

II. The cube of g is greater than the cube of h.

14. If $a^6 - b^6 = 0$, what is the value of $a^3 - b^3$?

I. a is a positive integer.

II. b is greater than 1.

15. Is r equal to 3?

I. r is a solution of $r^2 - 3r = 0$

II. r is a solution of $r^2 - 2r - 3 = 0$

Directions for questions 16 to 20: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Mark (a) if the question can be answered by using only one of the statement alone but not by using other statement alone.

Mark (b) if the question can be answered by using both the statements together but not by either of the statements alone.

Mark (c) if the question can be answered by using either of the statements alone.

Mark (d) if the question cannot be answered on the basis of the two statements.

16. Monty came back home from the mall with one-third of the amount of money he took to the mall. How much money did he take to the mall?

I. He bought a shirt with half of his money and spent Rs. 18 on food.

II. He spent three times as much to buy a shirt as he spent on food.

17. The average weight of students in a class is 50 kg. What is the number of students in the class?

I. The heaviest and the lightest members of the class weigh 60 kg and 40 kg respectively.

II. Exclusion of the heaviest and the lightest members from the class does not change the average weight of the students.

18. What are the values of a and b?

I. The ratio of a and b is 3 : 5, and b is positive.

II. The ratio of 2a and b is 12 : 10, and a is positive.

19. How much money does Prem have?

I. Prem has at least Rs. 100 more than Jagdish.

II. The total money both Prem and Jagdish have is not more than Rs. 500.

20. How many books are there on the shelf?

I. If 4 more books are placed on the shelf, the total number of books on the shelf will be more than 28.

II. If 5 books are removed, the shelf will contain less than 21 books.

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
20					

LRDI Practice Test

Introduction

This Test contains total 30 questions on Data Interpretation, Logical Reasoning and Data Sufficiency. The motive of this test is just to check your learnings in Data Interpretation, Logical Reasoning and Data Sufficiency.

At the end of the test , there is a scoring table to assess your performance in 'concept building', instantly. Since the test is concept-oriented, you are advised not to worry too much regarding time spent.

Any rough work, if required, should be done on a separate sheet of paper. Force yourself to do mental calculations and use the pen only when absolute necessary.

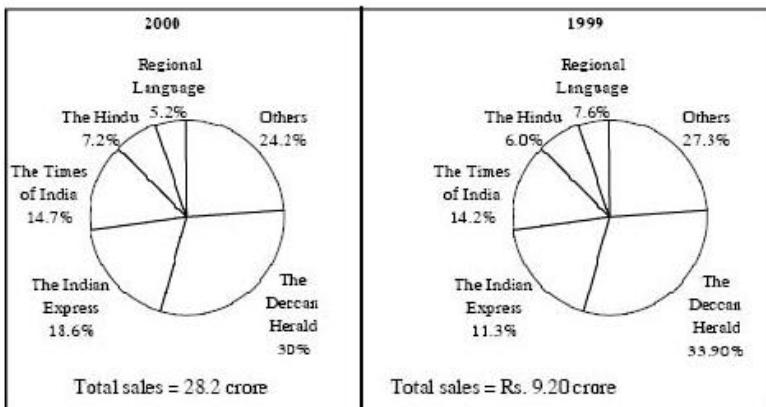
How to score: The process of scoring is very simple. For every right answer add one mark, and for every wrong answer deduct one-fourth mark.

DI is an application of the concepts of Arithmetic, especially percentages, simple and compound interest, profit, loss and discount and ratio, along with your ability to calculate. In case you get a net score of less than 80% in any practice exercise, do not forget to revise the above mentioned concepts.

All the best !

Directions for questions 1 to 4: Answer the questions based on the given data.

Percentages of sales of different newspapers in Bangalore in 1999 and 2000



1. Which of the following is the best approximation of the ratio of sales of *The Times of India* in 1999 to that in 2000?

- a. 3 : 1 b. 1 : 2 c. 1 : 1 d. 2 : 1 e. 1 : 3

2. If the total sales in 1999 is not Rs. 9.2 crore and the sales of regional language newspapers is Rs. 1.32 crore, what is the total sales?

- a. Rs. 34.2 crore b. Rs. 25.4 crore c. Rs. 17.4 crore
d. Rs. 15.9 crore e. Rs. 20.5 crore

3. Of all the newspapers shown in pie charts, for 1999 and 2000, which news paper has the fourth largest sales value?

- a. *The Times of India* in 2000

b. *The Deccan Herald* in 1999

c. *The Hindu* in 2000

d. Regional language newspapers in 2000

e. Others

4. Which newspaper experienced the maximum growth (in terms of circulation) in 2000 over 1999?

- a. *The Times of India*

- b. *The Deccan Herald*

- c. Regional language newspapers

- d. *The Hindu*

- e. Others

Directions for questions 5 to 8: Answer the questions based on the given table.

The following table gives the performances of five Indian cricketers across 4 matches in the World Cup 1999.

Player	South Africa		Australia		Sri Lanka		England	
	Runs scored	Wickets taken	Runs scored	Wickets taken	Runs scored	Wickets taken	Runs scored	Wickets taken
Tendulkar	82	0	33	4	44	0	71	0
Dravid	41	0	9	0	107	0	109	0
Ganguly	28	3	101	0	3	1	8	0
Jadeja	32	0	76	0	54	0	2	0
Robin Singh	18	1	31	3	14	4	38	2

5. What is the ratio of Tendulkar's average runs to Jadeja's total runs across 4 matches in the world cup 1999 (assuming that Tendulkar got out in all four matches)?

a. 1 : 2.86 b. 1.476 : 1 c. 1 : 1.476

d. 1 : 1.467 e. None of these

6. If every 10 runs scored in a match is given one point and each wicket taken gets one point, who scored the maximum points across 4 matches in the world cup 1999?

a. Tendulkar b. Dravid c. Ganguly

d. Jadeja e. Robin Singh

7. Which of the following is definitely false across 4 matches in the world cup 1999?

- a. India was bundled out by Australia for 226 runs.
- b. Australia won the match against India by 2 wickets.
- c. South Africa was set a target of more than 210 runs by India.
- d. Dravid scored the highest runs in the match with England

e. Data insufficient

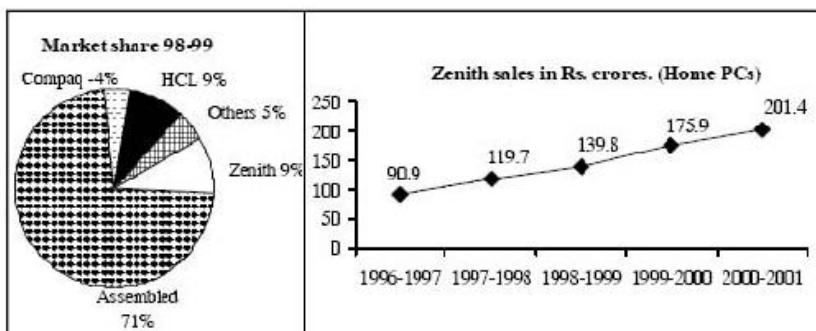
8. If contribution is calculated as runs scored per wicket taken by a player. Against which team was Robin Singh's contribution maximum across 4 matches in the world cup 1999?

a. South Africa b. Australia c. Sri Lanka

d. England e. Cannot be determined

Directions for questions 9 to 12: Answer the questions based on the given data.

The pie chart gives the market share of home PC sellers and the line chart gives the sales of Zenith for 1996-97 to 2000-01.



9. What was the sales of assembled home PCs in 2000-2001?

a. Rs. 143 crore b. Rs. 1,321 crore c. Rs. 1,430 crore

d. Rs. 1,432 crore e. Rs. 1,578 crore

10. What is the percentage increase in Zenith sales from 1996-97 to 1999-2000?

a. 111.12% b. 93.5% c. 122.2%

d. 101.3% e. 25%

11. What was the sales of assembled home PCs in 1997-98?

a. Rs. 85 crore b. Rs. 850 crore c. Rs. 958 crore

d. Rs. 951 crore e. Cannot be determined

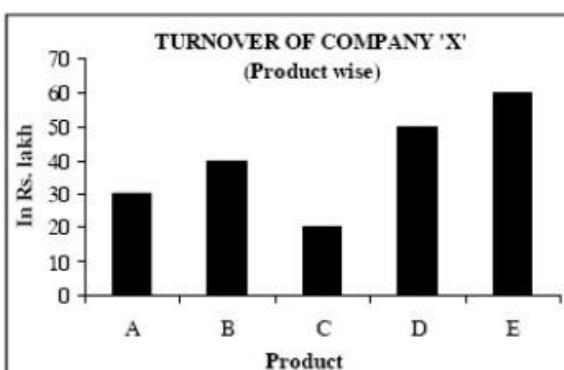
12. If sales of Wipro home PCs in 2000-01 was equal to 40% of the 'Others', then what is the sales of Wipro home PCs in 2000-01?

a. Rs. 44.44 crore b. Rs. 48.2 crore c. Rs. 52.3 crore

d. Rs. 53.2 crore e. Cannot be determined

Directions for questions 13 to 16: Answer the questions based on the given data.

For a company X, the turnover (rupees in lakhs) and profitability (in percentage) are given for 2001 for its five different products. (Profitability refers to returns on investment expressed as a percentage.)



Profitability of Products

	Profit %
A	20
B	10
C	15
D	7.5
E	20

13. Which product has contributed the maximum to the total profit earned by X?

a. B b. C c. D d. E e. A

14. The profit earned by B is what percentage of the profit earned by E?

a. 10% b. 15% c. 36.36% d. 25% e. 20%

15. What is the total profit for X?

a. Rs. 28.75 lakh b. Rs. 25 lakh c. Rs. 24.74 lakh

d. Rs. 23 lakh e. Rs. 15 lakh

16. A and E together enjoy approximately what percentage share of the total profit?

a. 40% b. 50% c. 60% d. 70% e. 31%

Directions for questions 17 to 20: Answer the questions on the basis of the information given below.

Mr. Fasti wants to invest. He can invest only in multiples of Rs. 10,000. Areas of investment can be — agriculture, or dairy or poultry or shares. The chart given below shows returns for different amounts invested in different areas for the given period (one year). However, he has to keep in mind that in one area he can invest only once, i.e. if he wants to invest Rs. 30,000 in agriculture, he will have to invest it in one go and not Rs. 20,000 once and then Rs. 10,000 again. However, for any investment amount exceeding Rs. 50,000, he can invest in two parts — first for Rs. 50,000 and the next for the balance amount.

Return from Various Investments:

Investment amount (in rupees)	Return (in rupees)			
	Agriculture	Dairy	Poultry	Shares
10,000	1300	1400	1500	1100
20,000	2600	2600	2750	2200
30,000	3800	3700	3850	3300
40,000	5000	4600	4850	4400
50,000	6100	5400	5750	5500

17. At what investment amount will the return in dairy and shares be the same?

- a. Rs. 60,000
- b. Rs. 80,000
- c. Rs. 90,000
- d. 70,000
- e. Not possible

18. After what investment level, investing more money in dairy would give lesser returns with respect to shares?

- a. Rs. 10,000
- b. Rs. 20,000
- c. Rs. 30,000
- d. Rs. 40,000
- e. Rs. 50,000

19. If Mr. Fasti has only Rs. 30,000 with him, what would be the most profitable investment?

- a. Rs. 20,000 in poultry and the remaining in dairy.
- b. Equal amounts in agriculture, poultry and dairy.
- c. Rs. 20,000 in poultry and the rest in agriculture.
- d. All in poultry.
- e. Rs. 20,000 in shares and the remaining in dairy.

20. If Mr. Fasti wants to invest Rs. 50,000, then what can be the maximum possible return?

- a. 11%
- b. 11.5%
- c. 15%
- d. 25%
- e. None of these

Directions for questions 21 to 25: Read the following information and answer the questions that follow.

There is a group of six students — M, N, O, P, Q and R — in a class. Each of the six students opt for two subjects: one compulsory and one optional. P's optional subject was geography while three others have it as a compulsory subject. Q and R have chemistry as one of their subjects. R's compulsory subject is physics which is an optional subject of both O and Q. Geography and English are M's subjects, as compulsory and optional

subjects respectively. Biology is an optional subject of only one of them. The only female student in the group is the one who has geography as the optional subject and English as the compulsory one.

21. Who is the female student in the group?

- a. M
- b. N
- c. O
- d. P
- e. Q

22. What is the compulsory subject of O?

- a. Geography
- b. Chemistry
- c. Physics
- d. English
- e. Biology

23. Which of the following has the same compulsory/optional set as that of R?

- a. M
- b. N
- c. O
- d. P
- e. None of these

24. Disregarding which is the compulsory and which is the optional subject, who has the same combination as that of P?

- a. M
- b. N
- c. O
- d. Q
- e. R

25. Which of the following groups of students have geography as their compulsory subject?

- a. M, O and P
- b. O, N and P
- c. O, P and R
- d. M, N and O
- e. O, N and Q

Directions for questions 26 to 30: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Mark (a) if the question can be answered by using the statement I alone but not by using the statement II alone.

Mark (b) if the question can be answered by using the statement II alone but not by using the statement I alone.

Mark (c) if the question can be answered by using either of the statements alone.

Mark (d) if the question can be answered by using both the statements together but not by either of the statements alone.

Mark (e) if the question cannot be answered on the basis of the two statements.

26. A cylindrical glass of 10 cm in height is full of water. How many litres of water does it contain?

I. A cubic metre water is equal to x kg.

II. The diameter of the glass is 5 cm.

27. A spherical volume of radius 20 m is emptied into an inverted pyramid with a square base. What is the altitude of the pyramid?

I. The centre of the pyramid lies on the altitude of the pyramid.

II. The distance of the surface of the liquid from the square base of the pyramid is $80\sqrt{3}$ m.

28. How many unbroken tiles are needed to cover the bathroom floor?

I. The area of the floor is 500 sq. m.

II. Each tile measures 10 cm \times 50 cm.

29. What is the volume of a room in the shape of a cuboid?

I. The length is twice the breadth.

II. Area of the base is 32 sq. m.

30. A uniform circular disc of diameter 9 cm is cut in the centre and a circular hole is generated. Find the diameter of the hole.

I. The weight of the disc is reduced by 30%.

II. The thickness of the disc is 1 cm.

Scoring table

Total questions	Total attempted	Total correct	Total wrong	Score	Time taken
30					

Answer key

DI Practice Exercises

Practice exercise - A1

Practice exercise - A2

Practice exercise - A3

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

Practice exercise - A4

Practice exercise - A5

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

Practice exercise -A6

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

Practice exercise - A7

Practice exercise - A8

Logical Reasoning Practice Exercises

Practice exercise - B1

1	b	2	a	3	a	4	c	5	a	6	c	7	d	8	e	9	b	10	e
11	b	12	a	13	d	14	a	15	d	16	b	17	d	18	b	19	a	20	b

Practice exercise - B2

1	a	2	d	3	b	4	c	5	b	6	e	7	a	8	b	9	a	10	a
11	b	12	e	13	b	14	d	15	b	16	b	17	a	18	b				

Practice exercise - B3

1	e	2	b	3	b	4	b	5	b	6	c	7	b	8	d	9	e	10	e
11	b	12	c	13	a	14	a	15	c	16	c	17	a	18	e				

Practice exercise - B4

1	d	2	a	3	b	4	a	5	a	6	c	7	e	8	a	9	d	10	d
11	c	12	c	13	c	14	c	15	a	16	d	17	b	18	d	19	a	20	c

Practice exercise - B5

1	d	2	a	3	d	4	c	5	d	6	a	7	c	8	d	9	c	10	c
11	b	12	a	13	c	14	c	15	c	16	b	17	d	18	a	19	a	20	a

Practice exercise - B6

DS Practice Exercises

Practice exercise - C1

1	c	2	a	3	b	4	c	5	d	6	d	7	c	8	d	9	d	10	c
11	d	12	b	13	b	14	d	15	a	16	d	17	c	18	b	19	a	20	c

Practice exercise - C2

1	d	2	d	3	c	4	a	5	d	6	b	7	d	8	d	9	a	10	d
11	b	12	a	13	b	14	d	15	d	16	a	17	d	18	d	19	d	20	b



LRDI PRACTICE Test

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



Explanations: Fundamentals of Logical Reasoning & Data Interpretation (Part-I)

Data Interpretation

Practice exercise - A1

From the pie charts, the sales figures in rupees (in crores) are:

Company	2002	2003
HLL	45	150
P & G	37.5	75
Henkel	22.5	75
Nirma	30	56.25
Others	15	18.75

Above table has been made to explain the things. You need not make it. Also, in pie-charts of this sorts, it is very advantageous to identify the ratio and percentage increase of total size of pie in the year after year. In this case the ratio of the total size of market is 6 : 15 i.e. 2 : 5

$$1. b \frac{375-150}{150} \times 100 = 150\%$$

Since one would already have found the ratio of the pies, before starting, as 2 : 5, one could also have mentally just calculated $\frac{5-2}{2} = \frac{3}{2} = 150\%$

$$2. e \text{Growth in sales of P & G} = (0.2 \times 375 - 0.25 \times 150) = \text{Rs. } 37.5 \text{ crore.}$$

$$\text{HLL} = (0.4 \times 375 - 0.25 \times 150) = \text{Rs. } 112.5 \text{ crore. Henkel} = (0.2 \times 375 - 0.15 \times 150) = \text{Rs. } 52.5 \text{ crore.}$$

$$\text{Others} = (0.05 \times 375 - 0.1 \times 150) = \text{Rs. } 3.75 \text{ crore.}$$

Alternative method:

Since growth in total sales has been 150% from 2002 to 2003.

So we can change the pie chart of 2003 as

$$\text{HLL} = 40 \times 2.5 = 100\%$$

$$\text{P & G} = 20 \times 2.5 = 50\%$$

$$\text{Henkel} = 20 \times 2.5 = 50\%$$

$$\text{Nirma} = 15 \times 2.5 = 37.5\%$$

$$\text{Other} = 5 \times 2.5 = 12.5\%$$

These percentages are of market size in 2002, i.e. Rs. 150 crore.

Now, visually, one can figure out the minimum growth in sales is in others.

$$3. b \text{Growth rate of HLL} = \frac{150-45}{45} \times 100 = 233.3\%$$

$$4. e \text{Sale of P & G in 2002} = 25\% \text{ of } 150.$$

$$\text{Sale of P & G in 2003} = 20\% \text{ of } 375.$$

$$\text{Ratio of sales in 2003 : 2002} = \frac{0.2 \times 375}{0.25 \times 150} = \frac{2}{1}.$$

Alternately, since we know the ratio of the pies is 5 : 2, one just needs to do the following 20% of 5 : 25% of 2 i.e. 2 : 1.

$$5. a \text{Detergent market grows by 10\% of } 150 = \text{Rs. } 15 \text{ crore.}$$

$$6. a \text{It is equivalent to that of the whole market} = 10\%.$$

7. a 10% annual growth for 2 years means 21% growth (using the formula, $a + b + \frac{ab}{100}$).

Sales in 2005 = $1.21 \times 375 = \text{Rs. } 453.75 \text{ crore.}$

8. d Costs of HLL in 2002 = $30 \times 1.1 = \text{Rs. } 33 \text{ crore.}$

Profit = $45 - 33 = \text{Rs. } 12 \text{ crore.}$

$$\text{Profit percentage} = \frac{12}{33} \times 100 = 36.4\%$$

$$\text{Margin} = \frac{\text{Profit}}{\text{Sales}} \times 100 = \frac{12}{45} \times 100 = 26.67\%$$

$$9. \text{ a Henkel} = \frac{75-22.5}{22.5} \times 100 = 233.3\%$$

$$\text{P & G} = \frac{75-37.5}{37.5} \times 100 = 100\%$$

$$= \text{Difference} = 133.33\%$$

Alternative method:

If we keep base for 2002 and 2003, then (As shown in the solution of question 2)

$$\text{Henkel} = \frac{50-15}{15} = \frac{7}{3} \times 100 = 233\%$$

$$\text{P & G} = \frac{50-25}{25} = 100\%$$

10. c The ratio will not change because if the total sales are doubled, the sales of Nirma will also double for both the years.

$$\text{Hence, the ratio will be } \frac{56.25}{30} = \frac{15}{8}.$$

Again one could have used the ratio of pie 2 : 5 effectively and answer would have been 15% of 5 : 20% of 2 i.e. 75 : 40 i.e. 15 : 8

11. c Surf Excel = 30% of HLL.

HLL = 30% of detergent market.

Surf Excel = 30% of (30% of detergent market) = 9% of detergent market.

12. c Profit = 25%. Hence, margin = 20%.

Profit amount = 20% of sales = $0.2 \times 22.5 = \text{Rs. } 4.5 \text{ crore.}$

13. a Since all the companies have the same expenditure, the company with the maximum sales will have the highest profit as well as profit percentage.

$$14. \text{ d Cost} = \frac{\text{Sale}}{100 + \text{Profit percentage}} \times 100$$

$$\text{Cost of Henkel in 2002} = \frac{150 \times 15\%}{1.25} = \frac{22.5}{1.25} = 18 \text{ crore.}$$

Henkel's cost in 2003 = 19.8.

Henkel's sale in 2003 = 75.

$$\text{Profit percentage} = \frac{55}{19.8} \times 100 = 278\%.$$

$$15. \text{ c P & G's profit in 2003} = \frac{S - 0.8S}{0.8S} \times 100 = 25\%.$$

If both sales and costs increase by 10%, then sales will be 1.1S and cost will be 1.1(0.8S) and hence the profit percentage will remain at 25%.

Practice exercise - A2

Index is a representation of actual value. A year is designated as the base year and the index for the base year is taken as 100, e.g. in the given graph for sales, cost and profit, the base year is 1993 (index = 100). For 1994, the sales index is 120, which means that sales in 1994 is 20% more than the sales in 1993 and sales in 1995 (index 131) is 31% more than in the base year (1993) sales. Similarly, the cost index of 98 in 1994 indicates that the cost has gone down by 2% over the base year of 1993 and in 1996 the cost has gone up by 10% over cost in 1993. (Index = 110)

Index is used to compare data over a large number of years and to determine trends. Because the base year value is always taken as 100, it is easy to determine the percentage change in any year with respect to the base year. An index cannot give the actual value for any year unless the actual value and the index of any one year is given to us.

e.g. if, for the given graph, actual sales in 1994 (sales index 120) is Rs. 144 crore, then we can say that:

Sales index of 120 = Sales of 144 crore.

$$\text{Sales index of 1} = \text{Sales of } \left(\frac{144}{120} \right) = \text{Rs. 1.2 crore.}$$

Sales index of 100 = Sales of Rs. 120 crore.

Thus, we now have the **conversion factors**, i.e. to convert sales index to sales : Multiply index with 1.2 and to convert sales into sales index : Divide sales by 1.2.

Thus, now we can determine the index of sales for any year if the sales (rupees in crores) is known and also the sales (rupees in crores) of any year if the sales index is known.

In the solutions below the abbreviations being used are:

SV = Sales value **SI** = Sales index

CV = Cost value **CI** = Cost index

PV = Profit value **PI** = Profit index

1. e Index does not give the actual value. The profit index is 110.

2. a Sales in 1993 = Rs. 500 crore = Index of 100.

In 1998, SI = 154, which is 54% above the index of 1993. Thus, sales of 1998 should be 54% more than the sales in 1993.

Thus, sales in 1998 = 500×1.54 = Rs. 770 crore

OR

Index of 100 = Sales of Rs. 500 crore.

Index of 1 = Sales of Rs. 5 crore.

Index of 154 = Sales of 154×5 = Rs. 770 crore.

3. c In 1996, CI = 110 and CV = Rs. 550.

In 2002, CI = 190. Thus, CV = $\frac{550}{110} \times 190$ = Rs. 950.

4. e It is not possible to find the value across indices. With one value of cost we can find out all the values of cost but none of the values of sales or profits.

5. e Gross profit = (Sales - Cost), since we do not have SV and CV for various years, the gross profit cannot be calculated.

6. b In 2003, PI = 130 and PV = Rs. 780.

In 2001, PI = 110. Thus, PV = $\frac{780}{130} \times 110$ = Rs. 660.

7. a In 1993, SI = CI = 100, SV = Rs. 300 and

CV = Rs.120. Thus, SV in 1998 = 154×3 = Rs. 462 and CV in 1998 = 153×1.2 = Rs. 183.6.

Gross profit = 462 - 183.6 = Rs. 278.4.

In the given question, we cannot determine the profit because it is defined as (Sales - Cost - Tax) and we do not have the tax for 1998.

8. b In 1993, SI = CI = 100, SV = Rs. 300 and

CV = Rs.120. Thus, SV in 2003 = 188×3 = Rs. 564 and CV in 2003 = 166×1.2 = Rs. 199.2.

Gross profit = 564 - 199.2 = Rs. 364.8.

9. c In 1993, SI = 100 and SV = Rs. 700.

Thus, SV in 1998 = 154×7 = Rs. 1078.

In 1996, CI = 110 and CV = 600.

Thus, CV in 1998 = $153 \times \frac{600}{110}$ = 834.54.

Gross profit = 1078 - 834.54 = Rs. 243.45.

10. b Current SI in 1993 = 100 and SI in 1994 = 120.

New SI in 1994 = 120.

Thus, new SI in 1993 = $\left(\frac{100}{120}\right) \times 100$ = 83.33.

11. a Current PI in 1996 = 125 and PI in 2003 = 130.

New PI in 1996 = 100.

Thus, new PI in 2003 = $\left(\frac{100}{125}\right) \times 130$ = 104.

12. b Only 3 years – 2000, 2001 and 2002 – have their CI more than the CI for 2003. So for these years, CI will be more than 100.

13. b Total Sales Value for the period 1993-98

= $1200 + (1.2 \times 1200) + (1.31 \times 1200) + (1.52 \times 1200) + (1.62 \times 1200) + (1.54 \times 1200)$ =
Rs. 9828

or (Sum of SI from 1993 to 1998) $\times \frac{1200}{100}$.

14. a Sales Value for the period 1993-98 = 9828.

(Refer question 13)

Total Cost Value for the period 1993-98 = $(100 + 98 + 95 + 110 + 121 + 153) \times \frac{800}{100}$ =
5416.

Difference = 9828 - 5416 = Rs. 4412.

15. c Average of Cost Index = $\frac{1537}{11} = 139.72$

Average of Sales Index - Average of Cost Index = $147.27 - 139.72 = 7.54$

Practice exercise - A3

1.e We need the total number of students opting for finance in three institutes to arrive at the average.

2. c Average salary at IIIML = $\frac{(60 \times 550000) + (40 \times 420000) + (50 \times 725000)}{150}$ = 574000.

Rather than multiplying by 60,40 and 50 you can also multiply by 6,4,5 and then divide by $6 + 4 + 5 = 15$.

3. a Calculating as above, average salary at IIMK = 75900.

Average salary of IIMK - IIML = $759000 - 574000 = 185000$.

$$4. b \text{ Average salary at IIMB} = \frac{(50 \times 540000) + (45 \times 453000) + (110 \times 775000)}{205} = 647000.$$

5. d The average salary for finance in IIMB is significantly lower than that for systems. Since the number in finance has gone up, the average salary will be lower than what we calculated for question 4.

Thus, the answer is 626. (Check by calculation)

6. c Now since the number in systems has increased, the average salary will be more than the average salary in question 5 by a large margin.

So the answer is 667.

$$7. c \text{ Average salary for finance in IIMA, IIMB and IIMC} = \frac{(540000 \times 50) + (520000 \times 90) + (725000 \times 45)}{185} = 624000$$

$$8. b \text{ Average salary of the remaining students of systems} = \frac{(500 \times 850000 - 1000000 \times 200)}{300} = 750000.$$

Instead of the above calculation, one could also have done the following mentally : Of 5 students with average salary 850000, 2 are in dotcom companies with average 1000000. Thus they contribute 300000 more than overall average and thus on an average each of the 3 non-dotcom students would have a salary of $(850000 - 100000) = 750000$.

$$9. b \text{ Average salary of IIMA finance students placed in India} = \frac{(1 \times 620 - 0.6 \times 800)}{0.4} = 350.$$

Alternately, as explained in the oral calculations for solutions to 8, in this question 60% could have been taken as the fraction $3/5$ and thus 5 students have average of 620. Of these 3 have average of 800 and thus contribute a total of 540 more to the sum than the average. Thus the remaining 2 students on an average has $620 - 270 = 350$

10. d Rather than taking number as 150 and 50, to reduce calculations, we can take their ratio 3 : 1.

$$\text{Hence, average} = \frac{(3 \times 453 + 1 \times 575)}{4} = 483.5$$

Practice exercise -A4

1. e Land used for paddy in 2001-02 = 12.71 Mn Ha.

Total land used in 2001-02 = 29.93 Mn Ha.

$$\text{Percentage of land used for paddy} = \frac{12.71}{29.93} \times 100 = 42.5\%$$

2. c Productivity = Production/Area = Yield.

Yield of ragi in 2002-03 = 1327 kg/Ha.

Yield of ragi in 2001-02 = 1378 kg/Ha.

$$\text{Percentage change in yield} = \frac{1378 - 1327}{1378} \times 100 = 3.72\%$$

3. b Barley. We do not need to solve it. Mere inspection reveals the answer.

4. c Production = Area \times Yield.

If yield increases by 10% and the area remains the same, then the production will also go up by 10%.

Hence production in 2003-04 = Production in 2002-03 $\times 1.1 = 2.43 \times 1.1 = 2.43 + 0.243 = 2.67$ Mn T.

5. d Production = Area \times Yield.

$$\text{Production} = 521 \times 12.71 / 1000 = 6.62 \text{ Mn T.}$$

Alternatively, we know $12.5\% = \frac{1}{8}$.

$$\text{So } 521 \times \frac{1 \times 100}{8 \times 1000} = 6.5 \text{ Mn T.}$$

It would be higher than 6.5 Mn T as $12.71 > 12.5$

6. a Rephrase the question as, "Which crop has the highest yield over the years?" Answer is barley.

7. b Percentage increase in production of maize in 2000-01 = $(9.99 - 8.06) \times 100 / 8.06 = 24\%$.

Production in 2002-03 = $9.99 \times (1.24)^2 = 15.36$ Mn T. Yield = Production/Area.

$$\text{Thus, yield} = 15.36 \times 1000 / 6.1 = 2518 \text{ kg/Ha.}$$

Alternative method:

We can approximate, though some risk is involved. But whenever you approximate, you need to understand how much error you are introducing and whether your actual answer would be more than or less than the calculated answer.

$$\text{Percentage increase in production of maize in 2000-01} = \frac{10 - 8}{8} \times 100 = 25\%.$$

$$\text{Production in 2002-03} = 10 \times (1.25)^2 = 10 \times 1.5625 = 15.62 \text{ Mn T.}$$

But actual answer would be less than this.

Let us say $\rightarrow 15.30$ Mn T

$$\text{Now yield} = \frac{15.3 \times 1000}{6.1} = 2,508 \text{ kg/ma.}$$

8. c It can be visually figured out that the year would be 2000-01 therefore total production would be 35.52 Mn T.

9. a In the year 2000-01, the production should be 2.53 + 2.58 i.e. the production should be a little more than double the original production. Thus yield also should be a little more than double of the given yield i.e. a little more than $2 \times 1329 = 2658$. Only one option is in that range.

$$10. d \text{ Production of paddy in 2001-02} = 1602 \times 12.71 = 20.36 \text{ Mn Ha.}$$

Production of paddy in 2000-01 = 12.81 Mn T.

$$\text{Increase in production} = \frac{20.36 - 12.81}{12.81} \times 100 = 59\%.$$

Alternatively, we can approximate as well.

$$\text{Production of paddy in 2001-02} = 1600 \times 12.71 = 1600 \times \frac{100}{8 \times 100} = 20 \text{ Mn Ha as } \frac{1}{8} = 12.5$$

Production of paddy in 2000-01 = 12.81 Mn Ha $\simeq 12.5$ Mn Ha.

$$\text{Increase in production} = \frac{20 - 12.5}{12.5} \times 100 \simeq 60\%.$$

11.c In such questions use options. Start with an intelligent choice of option e.g. as maize appears in 3 of the four choices, check trend for maize. As trend for maize does not satisfy the required condition, safely mark the fourth option i.e. (c).

12. e The given data pertains to production and not sales. We cannot assume that 100% of paddy produced, was sold. Thus, data is inadequate to solve the given problem.

13. c Cost of production of barley = Rs. 1,250 per quintal.

If there is no loss of produce, then selling price for 25% profit = $1250 \times 1.25 = \text{Rs. } 1562.5$.

Loss in produce is 10%.

Thus, for every 100 kg produced, only 90 kg can be sold. So for 25% profit, SP = $(1562.5 / 0.9)$

= Rs. 1,736 per quintal.

14. b By rule of alligation, ratio of quantity available to PDS to open market = 2 : 5.

Therefore, 2/7th or 28.57% is allocated for PDS.

15. d Yield required = 1518 kg/Ha.

Amount of production = 8.06 Mn T.

Thus, land required = $\frac{8.06 \times 1000}{1518} = 5.31 \text{ Mn Ha.}$

Land should be less by $(5.86 - 5.31) = 0.55 \text{ Mn Ha.}$

Practice exercise - A5

For questions 1 to 10:

Again we are making the table, but you can avoid that.

The following figures, based on the graph, have been used for the calculations. The table gives the percentage change over the previous year or the growth rates.

1. b Growth rate of manufacturing in 2001-02 = 6.5%.

Thus, growth in manufacturing in 2001-02 = 6.5% of 80 = 5.2

Mining data is redundant over here.

2. d Average of GDP growth rate = $\frac{4.2 + 5 + 4 + 6 + 5.5}{5} = 5\%$

3. b Add the growth rate of 5 years for all the items, this sum will give the relative ranking of the growth rates. This sum for mining and electricity is less than that of fiscal deficit.

In question of this type where one has to eliminate using options, choose which sector to start with very intelligently. Choose that one which appears in two options and thus with just one calculations, atleast you can shortlist your choice to two options.

4. e The chart gives us the percentage change from the previous year. With the GDP given, Fiscal deficit can not be calculated because the data does not give the relation between GDP and fiscal deficit.

5. c Add the percentage change for the four items from 1999-2000 to 2002-03, the item which has the highest sum will end up with the highest figure.

6. e Cannot be determined because the data gives us the percentage change only and we do not have the actual values for any of the years.

7. b GDP 1999-2000 = $3,09,000 \times 1.05 = \text{Rs. } 3,24,450 \text{ crore}$

Fiscal deficit 1999-2000 = $11,200 \times 1.10 \times 1.08 = \text{Rs. } 13,305 \text{ crore}$

Fiscal deficit as percentage of GDP in 1999-2000 = $\frac{13305}{324450} = \frac{13}{324} = 4.1\%$

8. c If initially the amount of electricity = 1, then at the end of period amount of electricity = $1.085 \times 1.08 \times 1.04 \times 1.065 \times 1.063 = 1.3796$ or electricity will grow by 37.96%

If growth rate of electricity in 2000-01 is replaced with growth rate of mining 1999-2000 (9.5%), then electricity

$$= 1.085 \times 1.08 \times 1.095 \times 1.065 \times 1.063 = 1.4526$$

or electricity will grow by 45.26%

Hence, difference = $45.26 - 37.96 = 7.3\%$

9. d The highest total production would be in 2001-02, because in the last year 2002-03, there is a negative growth and thus is less than the figure in 2001-02.

10. c The highest growth rate for the various years are:

1998-99-10%, 1999-2000-14%, 2000-01-7.5%

2001-02-6.5% and 2002-03-6.3%

Thus, figure at the end of the period = $1.1 \times 1.14 \times 1.075 \times 1.065 \times 1.063 = 1.526$

Hence, overall growth = 52.6%

Practice exercise - A6

We have made the table for convenience sake, but you should not make it.

Let production of :

A in the various years be given by A_{2000}, A_{01}, A_{02} and A_{03}

B in the various years be given by B_{2000}, B_{01}, B_{02} and B_{03}

C in the various years be given by C_{2000}, C_{01}, C_{02} and C_{03}

D in the various years be given by D_{2000}, D_{01}, D_{02} and D_{03}

The following table, based on the graph, gives the values of the percentage share of production for A, B, C and D for the four years

Year	A	B	C	D
2000	23%	37%	20%	20%
2001	23%	35%	22%	20%
2002	20%	30%	30%	20%
2003	10%	30%	20%	40%

Let total production in 2001 = p, thus total production in 2003 = $1.21p$

Given $C_{03} - A_{01} = 1320$ thus $0.2 \times 1.21p - 0.23p = 1320$

thus $p = 110,000$ MT, and total production in MT in

2000 = 1,00,000 2001 = 1,10,000

2002 = 1,21,000 2003 = 1,33,100

1. a $C_{2000} = 20\%$ of 1,00,000 = 20,000 MT.

$C_{02} = 30\%$ of 1,21,000 = 36,300 MT

Thus, $36300 = 20000(1+r/100)^2 \Rightarrow r = 35\%$

One could also have approximated it as follows: The production increases from 20k to 36k i.e. a increase of 80%. Thus CAGR has to be less than 40% and once could check with 35%

2. e Given data pertains to production and not sales.

3. a Product B

4. d Cumulative production of B will still be the highest because the ratio of production for the various products for the various years is constant.

5. e Cannot be determined because the price of A is not known for the four years.

6. c Ratio of production of B and D in 2002 is 3 : 2.

Let $3k$ and $2k$ be the units of B and D produced in 2002.

The total revenue from selling B and D = $3k \times 150 + 2k \times 120 = 690k$.

$$\text{Thus total cost in producing B and D} = \frac{690k}{1.05} = 657k$$

Cost in producing D = $2k \times 100 = 200k$.

$$\{\because \text{cost of one unit} = \frac{\text{Rs. } 120}{1.20} = \text{Rs. } 100\}$$

= Cost in producing B = $457k$

$$\begin{aligned} \text{Loss percentage on selling B} &= \frac{\text{Total sales price of B} - \text{Total cost price of B}}{\text{Total cost price of B}} \times 100 \\ &= \frac{457k - 450k}{457k} \times 100 \approx 1.53\% \end{aligned}$$

7. b Remember that in this question you cannot use the total production in 2003 as 133,100 because this was arrived at when there is a 10% increase in production in each year. So all calculations have to be done again for this question.

$$C_{03} - A_{01} = 1320$$

$$20\% \times \text{Total}_{03} - 23\% \times \text{Total}_{01} = 1320$$

$$20\% \times 1.5625 \times \text{Total}_{01} - 23\% \times \text{Total}_{01} = 1320$$

$$(0.3125 - 0.23) \times \text{Total}_{01} = 1320$$

$$\text{Total}_{01} = 16,000$$

$$\text{Total production in 2003} = 16,000 \times 1.5625 = 25000$$

$$\text{Thus required difference} = 10\% \text{ of } 25000 = 2500$$

8. c All this problems asks is that what is the value of $x\%$ such that -5% and $x\%$ successively amounts to 21% . Thus $0.95 \times k = 1.21$

$$k = 1.2736$$

Thus growth in 2002 should be 27.36%

Though data of growth rate given originally is changed, but since this question has nothing to do with actual production amounts and we do not have to use 1320 MT, the question is easy.

9. e This is very similar to question number 7. The original data of 10% increase every year is changed and hence we cannot use the production figures found earlier. With the new growth rates we have,

$$C_{03} - A_{01} = 1320$$

$$20\% \times \text{Total}_{03} - 23\% \times \text{Total}_{01} = 1320$$

$$20\% \times 0.95 \times 1.1 \times \text{Total}_{01} - 23\% \times \text{Total}_{01} = 1320$$

$$20\% \times 1.045 \times \text{Total}_{01} - 23\% \times \text{Total}_{01} = 1320$$

This gives a negative production figure for 2001 and hence data is inconsistent.

10. e Total production of B in given 4 years = $37000 + 38500 + 36300 + 39930 = 151730$ MT.

$$\text{Total cost production of B} = 151730 \times (200 + 100) = \text{Rs. } 4,55,19,000$$

Total amount of B sold in given 4 years = $37000 + 38500 + 36300 + 39930 \times 0.5 = 131765$ MT.

$$\text{Total sales value of B} = 131765 \times 400 = \text{Rs. } 5,27,06,000$$

$$\therefore \text{Profit percentage} = \frac{\text{Sales price} - \text{Cost price}}{\text{Cost price}} \times 100 = \frac{52706000 - 45519000}{45519000} \times 100 \approx 15.79\%.$$

Practice Exercise - A7

This set is DI type reasoning set, where the reasoning is primarily used in solving individual questions.

1. d Total bill amount:

$$(150 \times 1 + 50 \times 3.5 + 25 \times 7 + 14 \times 5 + 15 \times 2) + 99 = 699$$

2. b Total bill amount:

$$(150 \times 1 + 50 \times 3.5 + 25 \times 7 + 14 \times 5 + 15 \times 2) + 99 + 12\% \text{ on } (25 \times 7) = 720$$

3. a Since, in STD calls it's not mentioned that the call has been made to which operator, (like: Airtel, WLL etc.) one may get tempted to mark option (d).

But upon solving, and considering all the possible cases, we get

Rohan spent:

On STD: 18×1.5 (Airtel, GSM) = Rs 27

Or

18×2 (WLL) = Rs 36

Local: 60% of 120 = 72 min (because Airtel and GSM have same rates) @ 1 Re. min.

\therefore Amount spent = 72×1 = Rs 72

40% of 120 = 48 min @ Rs. 2/min.

\therefore Amount spent = 48×2 = Rs 96

Total Bill = $(72 + 96 + 27 \text{ or } 36) = \text{Rs } 195 \text{ or } \text{Rs } 204$

Similarly for Mohan:

On STD: 30×1.5 = Rs 45 or 30×2 = 60

Local: 70×1 = Rs 70

30×2 = Rs 60

Minimum and Maximum amounts that Mohan would have spent are Rs.175 and Rs.190.

The maximum possible difference is $(\text{Rs.}204 - \text{Rs.}175) = \text{Rs.}29$.

4. a Normal tariff for 40 SMS/month would have been = 40×1.5 = Rs 60

With SMS scheme: $40 \times 0.60 + 35 = \text{Rs.}59$

In fact, in order to benefit from the scheme, one needs to send a minimum of 39 SMS.

So, option (a) is the correct choice.

5. d **Option (a):** $30 \times 1.5 + 55 + 99$ (Price of Plan) = Rs 199 (assuming local calls are made @ Re. 1)

Option (b): $16 \times 1.5 + 76 + 99$ (Price of Plan) = Rs 199 (assuming local calls are made @ Re. 1)

Option (c): $10 \times 1.5 + 10 \times 2.5 + 10 \times 2.5$ = Rs 65

Now local calls (since not mentioned) may be distributed like 5×2 (WLL/ Landline) + 25×1 (GSM/Airtel) = Rs. 35

Total $65 + 35 + 99$ (Price of Plan) = Rs 199

Therefore, bill amount of Rs 199 per month is possible in each of the three options (a), (b) and (c).

\therefore Option (d)

$$\text{Total bill} = 8 \times 1.5 + 4 \times 3.0 + 7 \times 3.5 + (55 \times 1 \text{ or } 55 \times 2) + 99 = \text{Rs.} 202.5 \text{ or } \text{Rs.} 257.5$$

Hence (d) is correct.

6. a Checking options

Option (a): 8 ISD calls can be distributed as:

4 calls to Rest of the world and another 4 calls to Gulf.

$$\text{Bill amount} = 4 \times 40 + 4 \times 10 + 99 = \text{Rs } 299$$

Option (b): Checking with the maximum rate of both GSM and WLL, maximum possible bill amount

$$= 35 \times 3 + 10 \times 3.5 + 99 = \text{Rs } 239$$

7. b Rates in Delhi-Mathura segment:

Outgoing calls to	Earlier	New	Difference
Airtel	1.5	1	0.5
GSM/CDMA	1.5	1	0.5
WLL/Landline	2	2	0

Option (a): Profit = $40 \times 0.5 - 20$

= 0 i.e. No profit

Option (b): Profit = $50 \times 0.5 - 20 = \text{Rs. } 5$

Option (c): Profit = $35 \times 0.5 - 20$

= Rs. (-3.50) i.e. loss.

Option (d): Profit = $20 \times 0 - 20$

= Rs. (20) i.e. loss.

8. c In order to have no loss from the plan, user have to balance out additional charge of Rs. 250 by making calls.

For to be definitely sure, we will take that existing STD rate which will give us minimum difference when compared with new scheme

\therefore STD of Airtel = Rs. 1.5/min

Difference = $1.5 - 1 = 0.50/\text{min}$

\therefore Minimum calls = $\frac{250}{0.5} = 500$

Minimum 500 calls has to be made such that I am definitely sure of having no loss from opting for this plan.

9. b Checking options:

(a) Difference in the rates

In STD = $1.5 - 0.5 = \text{Rs } 1/\text{min}$

Amount saved = $1 \times 12 = \text{Rs } 12$

In local = $1.0 - 0.5 = \text{Rs } 0.5/\text{min}$

Amount saved = $0.5 \times 8 = \text{Rs } 4$

Total saved amount = $12 + 4 = \text{Rs } 16$

Additional Charge levied @ Rs. 5/day for 3 days = Rs 15

∴ One can gain Re. 1 in this calling pattern.

(b) Difference in the rates:

In STD = 1.5 - 0.5 = Rs 1/min

Amount saved = 1 × 14 = Rs 14

In local = 1.0 - 0.5 = 0.5/min

Amount saved = 0.5 × 18 = Rs 9

Total amount saved = 9 + 14 = Rs 23

Additional charge paid = 5 × 5 = Rs 25

∴ Loss = Rs (25 - 23) = Rs 2

Option (b) is the correct choice.

Rest of the options need not be checked.

10. b Difference in amount = 1 (Airtel local) - 0.5

= Rs 0.5/ call is saved

Additional Rent paid = Rs. 5 daily

To balance the additional charge, minimum no. of calls that should be made = $\frac{5}{0.5} = 10$ calls

∴ In order to GAIN one should make atleast

$10 + 1 = 11$ calls

11. e This was a tricky one.

There is no need to calculate anything.

As all the couples are sharing at least 100 calls and 100 SMS, all of them will enjoy the same benefit.

Absolute profit will always remain the same.

Profit will always be :

$$[100 \times 1 (\text{free calls}) + 100 \times 1.5 (\text{free SMS}) - \text{Rs. } 200] = \text{Rs. } 250 - \text{Rs. } 200 = \text{Rs. } 50$$

Note: Has it been said which will have "maximum profit percentage", then one has to calculate.

Be careful while reading the question.

12. a Let 'a' be the number of calls made to group of countries "USA, Canada, Europe (Fixed line)", 'b' be the number of calls made to group of countries "Gulf, Europe (Mobile), SAARC" and 'c' be the number of calls made to group of countries "Rest of the world".

∴ Total bills from ISD calls = 7a + 10b + 40c and $a + b + c = 12$

$$= 40c = \frac{80}{100} \times (7a + 10b + 40c)$$

$$= 5 \times 40c = 4 \times (7a + 10b + 40c)$$

$$= 40c = 4 \times (7a + 10b)$$

$$= a = \frac{10(c-b)}{7}$$

As 'a' is an integer, therefore $c - b$ can be either 0 or 7.

Case I : When $c - b = 0$, then $a = 0$ and $b = c = 6$

Case II : When $c - b = 7$, then $a = 10$ and $c = 7 + b$

$$\Rightarrow a + c \text{ is } \geq 17, \text{ but } a + b + c = 12.$$

\therefore This is not possible.

Hence, minimum 6 calls were made to group of countries "USA, Canada, Europe (Fixed line)".

For questions 13 and 14: The outgoing call and SMS charges are reduced to half.

13. b Since, 20% drop in the total bill was because of drop in the rates by 50%.

\therefore In order to get 20% drop, he needs to spend $\frac{20}{0.5} = 40\%$ of the call-time during the Happy Hours.

\Rightarrow He made 60% of the calls during the day and 40% during Happy Hours

$$\text{Ratio} = \frac{60}{40} = \frac{3}{2}$$

14. e Since, details of local calls made and SMS sent is not available, percentage of local calls made during the day cannot be determined.

Practice exercise - A8

If N is the number of LPS students who took standard X examination, then the number of students who passed the examination is 0.8 N.

Number who joined the various streams:

$$\text{Science} = 0.2 \times 0.8N = 0.16N$$

$$\text{Arts} = 0.3 \times 0.8N = 0.24N$$

$$\text{Commerce} = 0.5 \times 0.8N = 0.4N$$

Number of students joining from outside = $0.2 \times 0.8N = 0.16N$ Ratio of these students in Science : Arts : Commerce

= 2 : 3 : 5, thus number of these students in

$$\text{Science} = 0.2 \times 0.16N = 0.032N$$

$$\text{Arts} = 0.3 \times 0.16N = 0.048N$$

$$\text{Commerce} = 0.5 \times 0.16N = 0.08N$$

Number of students in XI Arts = 720 (Given), thus

$$0.24N + 0.048N = 0.288N = 720, \text{ thus } N = 2500$$

We will have the following:

	LPS	Outside	Total
Total standard X	2500		
Total standard XI	2000	400	2400
XI science	400	80	480
XI commerce	1000	200	1200
XI arts	600	120	720

1. b As $N = 2500$.
2. a 2000 (solved above)
3. c $(0.4 + 0.08) \times 2500 = 1200$
4. b Percentage of arts students in LJC standard XI = $\frac{720}{2400} = 30\%$
5. c 480 (solved above)
6. a Number of science students in XI = 480

Number of science students in XI from LPS = 400

Percentage of science students in LJC standard XI who are from LPS = $\frac{400}{480} = 83.33\%$

7. e We do not know what percentage of the girls took arts though we can find out the total number of girls.

8. c 10% of commerce stream = 10% of 1200 = 120

5% of the arts stream = 5% of 720 = 36, thus number of students in XII arts = 720 + 120 - 36 = 804

9. a 5% of arts stream = 5% of 720 = 36

6% of commerce stream = 6% of 1200 = 72, thus

number of students in XII LJC = 2400 - 36 - 72 = 2292

10. c 8% of commerce stream = 8% of 1200 = 96,

10% of science stream = 10% of 480 = 48, thus change in number of commerce students = -48

Percentage change in commerce students = $-48/1200 = -4\%$

11. e Though we know the ratio, we do not have the ratio of number of boys and girls in any stream or in total.

12. b Number of girls in science = 50% of boys in science

Thus, girls form 33.33% of science = $480/3 = 160$

Thus, number of girls in arts = $3/2 \times 160 = 240$ because the ratios Arts : Science is 3 : 2.

13. b Number that failed in XI class = 10% 2400 = 240

14. b Number of boys in science stream = 320 (from question 12)

Number of boys in arts stream = $720 - 240 = 480$

Thus, ratio = $320 : 480 = 2 : 3$

15. b Total number of students in standard XI after introduction of home science = $2400 + 300 = 2700$

Percentage of home science students in standard XI = $300 / 2700 = 11.11\%$

Logical Reasoning

Practice Exercise - B1

For questions 1 to 5: Note that from statements I, IV and VI we can make out that Chandra lives in New Delhi. Now from V, we can make out that Aparna is not the dancer; and from II, since Chandra lives in New Delhi, she is also not the dancer. Therefore, Bharti is the dancer and lives in Kolkata. Also from VIII, Bharti is married to Ramsingh. Now since Chandra lives in New Delhi and Bharti in Kolkata, it is obvious that Aparna lives in Mumbai, and from IX, she (Aparna) is married to Mansingh. Hence, the result is as follows.

	Kolkata	New Delhi	Mumbai
Sisters	Bharti (Dancer)	Chandra	Aparna
Brothers	Ram Singh	Bhim Singh	Man Singh

1. b 2. a 3. a 4. c 5. a

For questions 6 to 10:

According to the question from VI, we get

— — — 20 pounds — — ... (1)
American

From VIII, we get

Trunk
25 pounds — — 20 pounds — — ... (2)
American

From V, we get

Trunk Box
25 pounds 5 pounds 20 pounds — — ... (3)
American

From II, we get

Trunk Box
25 pounds 5 pounds 20 pounds — 10 pounds ... (4)
American

Logically, the left place in (4) will be occupied by 15 pounds belonging to Indian as per IV

Trunk Box
25 pounds 5 pounds 20 pounds 15 pounds 10 pounds ... (5)
American Indian

From III, Swede can occupy the second spot from left only

Trunk Box
25 pounds 5 pounds 20 pounds 15 pounds 10 pounds ... (6)
Swede American Indian

From VII, we get

Trunk Box Crate/Suitcase Crate/Suitcase Carton
25 pounds 5 pounds 20 pounds 15 pounds 10 pounds ...
German Swede American Indian Belgian

Here 10 pounds weight will be owned by Belgian because it is the one which is not owned by German as it is a carton. Therefore, owned by Belgian and consequently 25 pounds will be owned by German.

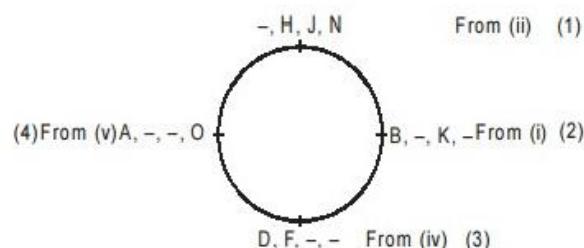
6. c 7. d 8. e 9. b 10. e

For questions 11 to 16:

According to the question, we have

Persons	Campsites	Lakes	States
A	E	I	M
B	F	J	N
C	G	K	O
D	H	L	P

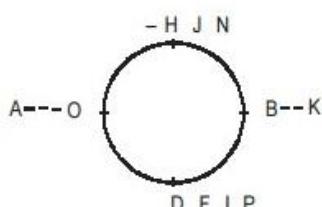
If we represent the data in the following way, we get



We have I camping on P ... from (iii) ... (3)

Now, from (3), I and P have to be together. These I and P cannot be with (1), (2) or (4) as they are already occupied. Therefore, I and P will be there with (3).

So we have



Logically, as all the states are occupied except M, M will come along with B and K. Therefore, we have the final arrangement depicted by the table given below.

Person	A	B	C	D
Campsite			H	F
Lake	L	K	J	I
State	O	M	N	P

And on the basis of this table we can solve rest of the questions very easily.

11. b 12. a 13. d 14. a 15. d 16. b

For questions 17 and 18: As given that the names of brothers and sisters do not begin with the same letter and Pinku and Gaurav are not Saroj or Sangeeta's brothers, Pinku cannot be the brother of Pooja and hence he is the brother of Rakhi.

Now we have that Gaurav cannot be the brother of Saroj, Sangeeta or Rakhi. Therefore, Gaurav is the brother of Pooja. As given that Saroj is not Ratan's sister and Rakhi and Pooja can also not be the sister's of Ratan (from above conclusions), Ratan is the brother of Sangeeta. Anil will have to be the brother of Saroj as this is the only valid combination left. Therefore, we have this table finally.

Brother	Sister
Pinku	Rakhi
Gaurav	Pooja
Ratan	Sangeeta
Anil	Saroj

17. d 18. b

19. a Relative speed of approach of the cyclists = $(15 + 15) = 30$ miles per hour.

Therefore, they will meet after $\frac{30}{30} = 1$ hr.

Since the fly has travelled throughout this 1 hr (regardless of direction) at a speed of 20 miles per hour, total distance travelled by it is $(1 \times 20) = 20$ miles.

20. b He has got = $\frac{49}{7} = 7$ cigarettes.

The duration of time he will take to smoke these 7 cigarettes

$$= 7 \times \frac{3}{4} \text{ hr} = 5.25 \text{ hr (i.e. 5 hr and 15 min).}$$

Now note that after he has smoked these 7 cigarettes, he will collect 7 more stubs (one from each), from which he will be able to make another cigarette.

This will take him another $\frac{3}{4}$ hr (45 min) to smoke. Therefore, total time taken = 6 hr.

Practice exercise - B2

For questions 1 and 2: Check out the numbers that have four factors and try to understand, e.g. 6 has 1, 2, 3, 6.

Note that in case of 1, 2, 4, 8, $x = 2$ (not 4), which is prime.

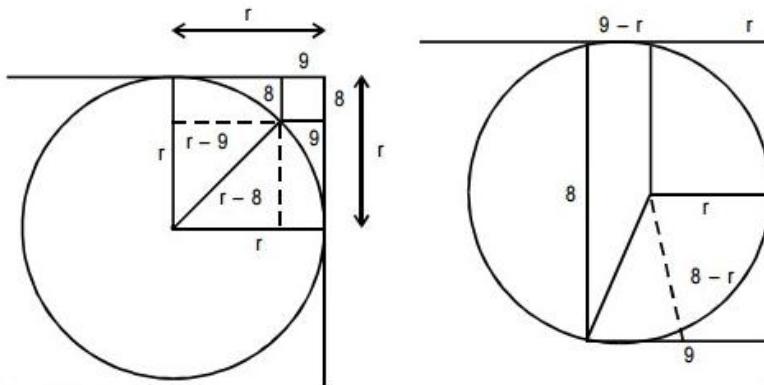
Note that x and y will always be prime.

Therefore, $x \cdot y = N$

Therefore, $x \cdot x \cdot y = x \cdot N$

1. a 2. d

For questions 3 to 5:



$$(r - 8)^2 + (r - 9)^2 = r^2$$

$$\therefore r = 29, 5$$

3. b 4. c 5. b

For questions 6 and 7:

$$1000009 = 293 \times 3413$$

You could get the factors using options.

6. e 7. a

For questions 8 to 11:

The prime numbers less than 45 are as follows: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43.

So there are 14 prime numbers. Now, since the average of the goals scored is also a prime number, for question (8), we can readily eliminate choice (a). Now the sum of all the prime numbers listed above is 281. So the sum of total goals scored must be less than 281. Note that only choice (b), i.e. 23 gives a total number of goals of $(23 \times 11) = 253$ which is less than 281. Hence, average is 23.

Thus, 23 is not the number of goals scored by any player. Of the remaining 13 numbers, whose sum is $(281 - 23) = 258$, we have to delete two numbers, such that the sum of the other 11 numbers is 253. That means the sum of those two numbers, (which are to be deleted) is 5. Obviously, those two numbers must be 2 and 3.

8. b 9. a 10. a 11. b

12. e $222221 = 619 * 359$. However, we do not know what is the number of compartments, and what is the number of soldiers in each compartment. Therefore, the answer cannot be determined due to insufficient data.

13. b Now, since we know that the number of compartments is less than the number of soldiers in each compartment, there have to be 359 compartments.

For questions 14 and 15:

Obviously, the maximum number of such points possible would be 3, where the points are the vertices of an equilateral triangle.

If the points do not have to lie in a plane, then we can have four such points, where they form the vertices of a trapezoid.

14. d 15. b

For questions 16 to 18:

Let the length be x, and the breadth y.

Since area = Perimeter, $xy = 2(x + y)$.

The only values of x and y which satisfy this equation are $(x, y) = (4, 4)$ and $(x, y) = (3, 6)$.

Therefore, there are two such rectangles, and only one such square.

Therefore, if the rectangle is not a square, its dimensions will be 6 by 3.

16. b 17. a 18. b

Practice Exercise - B3

For questions 1 and 2:

Five such pairs are possible. $(10x + y) - (10y + x) = 36$

$$\Rightarrow x - y = 4$$

∴ Numbers are 15 and 51, 26 and 62, 37 and 73, 48 and 84, and 59 and 95.

1. e 2. b

For questions 3 and 4:

$$x = 10a + b, x^2 = 100a^2 + 20ab + b^2$$

$$y = 10b + a, y^2 = 100b^2 + 20ab + a^2$$

⇒ In the square, middle number (ten's place) will always be the same.

$$12^2 = 144, 21^2 = 441$$

$$13^2 = 169, 31^2 = 961$$

3. b 4. b

For questions 5 and 6:

	Black cat	White cat
Initially:	x	y
When the white cat gives z ladoos to black cat:	$x + z$	$y - z$ ⇒ $(y - z)$ = 3 $(x + z)$
Black cat gives z ladoos to white cat	$x - z$	$y + z$ ⇒ $(y + z)$ = 5 $(x - z)$

Solving the two equations, we get

$$x = 5z \text{ and } y = 19z.$$

Therefore, the ratio $y : x = 19 : 5$.

$19 + 5 = 24$ which means that there must be at least 24 ladoos as the cats have an integral number of ladoos. If there are 30 ladoos, the monkey must have cheated the cats of 6 ladoos (i.e. $30 - 6$).

5. b 6. c

For questions 7 and 8: From the given data, we can make the following table with the help of which rest of the questions can be solved very easily.

	Male (40)	Female (30)
Above 25		
Married	7	12
Unmarried	5	0
Below 25		
Married	8	3
Unmarried	20	15
Total	40	3

7. b 8. d

For questions 9 and 10:

21 can be factorized as 3×7 . Thus, to have 21 hand shakes the combinations for number of males in the two families can be as follows.

	P	R
Case 1	7	3
Case 2	3	7
Case 3	1	21
Case 4	21	1

Let there be x females in P family and y females in R family. Then for the first case, number of kisses will be

$$7y + 3x + xy = 34.$$

Note that $y = 2$ and $x = 4$ satisfy the equation. So the total number of females will be 6. This will be true for the second case also. For case 3, total number of kisses will be equal to $1y + 21x + xy = 34$.

Note: That $x = 0, y = 34$ satisfy the equation. Therefore, the number of females will be 34. This will be true for case 4 also. Thus, the number of females can be 34.

9. e 10. e

For questions 11 and 12:

$$1 \times 2 \times 3 = 2 \times 3$$

$$5 \times 6 \times 7 = 14 \times 15$$

The choices in question 12 give the answer.

11. b 12. c

For questions 13 and 14:

ABCABC is divisible by 2 since it is even. Also, according to the divisibility rule of 7, ABC - ABC

$= 0 \rightarrow$ The number is divisible by 7.

\Rightarrow It is divisible by 14.

Also, with the same logic it is also divisible by 13.

13. a 14. a

For questions 15 and 16:

$$1001 = 7 \times 11 \times 13$$

I am obviously more than $95\frac{1}{2}$ -year-old. Therefore, my only possible age is $11 \times 13 = 143$ years. One of my great-grandsons is 7-year-old and one of them is 1-year-old.

15. c 16. c

For questions 17 and 18:

Suppose the holiday lasted for x days.

- ∴ There were 11 nice morning.
- ∴ On $x - 11$ days it rained in the morning.

Similarly, on $x - 12$ days it rained in the afternoon.

It never rained in the morning as well as afternoon.

- ∴ We have $x - 11 + x - 12 = 13$ or $x = 18$.

Therefore, the holiday lasted for 18 days.

It obviously never rained in the morning as well as in the afternoon.

17. a 18. e

Practice Exercise - B4

1. d Shikha is to the left of Reena and Manju is to her right. Rita is between Reena and Manju. So the order is: Shikha, Reena, Rita, Manju. In the photograph, Rita will be second from left.

2. a B is to the right of D. A is to the right of B. E is to the right of A and left of C. So the order is: D, B, A, E, C. Clearly, A is in the middle.

3. b Q is to the left of R and to the right of P, i.e. P, Q, R.

O is to the right of N and to the left of P, i.e. N, O, P.

S is to the right of R and to the left of T, i.e. R, S, T.

So the order is: N, O, P, Q, R, S, T.

Clearly, Q is in the middle.

4. a S is sitting next to P. So the order S, P or P, S is followed. K is sitting next to R. So the order R, K is followed because R is on the extreme left. T is sitting not next to K or S (as given). So the arrangement will be R, K, S, P, T. Clearly, P and K are sitting adjacent to S.

5. a Clearly, the order is Anuradha, Rashi, Monika, Sulekha, Abha because Rashi is not adjacent to Sulekha or Abha and Anuradha is not adjacent to Sulekha. Therefore, Anuradha is adjacent to Rashi.

6. c Putting the conditions given in the question, the position of swimmers can be:

1	2	3	4	5
A	C/D	B	D/C	E

7. e	1	2	3	4	5
A	D	C	B	E	

Positions of B and E violate rule 1.

8. a There are two possible arrangements, which satisfies the rule, i.e.

1	2	3	4	5
B	D	A	C	E
B	D	A	E	C

9. d D is to the left of C, i.e. C, D, B is to the right of E, i.e. B, E. A is to the right of C, i.e. A, C, B is to the left of D, i.e. D, B. From the above statements, the correct order is: A, C, D, B, E. Clearly, D is sitting in the centre.

Note: It is given that A, B, C, D and E are sitting facing you. So your right and left will be considered as left and right respectively.

For questions 10 to 14: According to the question

From III, Indian is wearing a green cap and a Jacket ... (1)

From VI, Kurta is worn alongwith red cap and sits next to Japanese ... (2)

From VIII, T-shirt with white cap combination is seated at one end.

So from (1), (2), (3), VII and I we conclude that the Japanese wear a shirt of yellow colour.

From IV, V, VI and VII, we conclude that the placement of people will be like

(1) (2) (3) (4)

German American Japanese Indian

From (2) and IV, we arrive at the following table with the help of which rest of the questions can be solved very easily.

Nationality	German	American	Japanese	Indian
Clothes	T-shirt	Kurta	Shirt	Jacket
Caps	Whitecap	Red cap	Yellow cap	Green cap

10. d 11. c 12. c 13. c 14. c

15. a From I, we get France, America, India ... (i)

From (II), we get India, Australia, Japan, China ... (ii)

Combining (i) and (ii), we get the correct sequence as: France, America, India, Australia, Japan, China. The two flags in the centre are of India and Australia.

For questions 16 to 20: According to the given question,

From I Fargo Cadillac } ... (i)

 Fiat
 Fargo
From II Fargo Cadillac } ... (ii)

From III, we get

 Fiat
 Bedford
 Maruti
 Ambassador
 Fargo
 Cadillac
 Mercedes [logically
 it has to be here only]

From IV

 Fiat

 Ambassador
 Fargo

Hence, the sequence of cars is as follows:

Fiat, Bedford, Maruti, Ambassador, Fargo, Cadillac, Mercedes.

16. d Clearly, Maruti is in the third place and Mercedes in the seventh, i.e. Mercedes is fourth to the right of Maruti.

17. b Clearly, Cadillac is in the sixth place, to the immediate left of Mercedes, which is in the seventh place (from the top).

18. d On the sides of the Cadillac are the Fargo and the Mercedes.

19. a Clearly, Maruti is in third place (from top), and is to the immediate left of the Ambassador, which is in the fourth place.

20. c To the right of Ambassador are Fargo, Cadillac and Mercedes.

Practice Exercise - B5

For questions 1 to 5: On the basis of the given information in the statement (I and II)

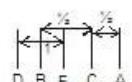


Similarly by 6th and 7th statements



1. d From the above diagram, only (d) option must be true.

2. a Here E is between B and C and by III, D is 1 km west of E, we can deduce.



So, distance between D and A will be less than 2 km.

3. d By using the explanation of Q. 2, Distance between A and D must be more than 1.5 km but less than 2 km.

4. c For option (a)

$$\begin{array}{l} M > 1 \\ K > \frac{1}{2} \\ L > \frac{1}{2} \\ J > 1 \end{array}$$

No two roads coincide

For option (b)

$$\begin{array}{l} B < C < A < D < E \\ \frac{1}{2} \quad \frac{1}{2} \quad \frac{1}{2} \quad 1 \end{array}$$

No two roads coincide.

For Option (c)

$$\begin{array}{l} M > \frac{1}{2} \\ I > \frac{1}{2} \\ K > \frac{1}{2} \\ L > \frac{1}{2} \end{array}$$

Now since I is 1 km north of J.
So, J and L roads will coincide.

5. d By using the additional information given in the question

$$\begin{array}{l} I > \frac{1}{2} \\ M > \frac{1}{2} \\ J > \frac{1}{2} \\ K > \frac{1}{2} \\ L > \frac{1}{2} \\ G > \frac{1}{2} \\ H > \frac{1}{2} \end{array}$$

So, only J and K, among the given options, are $\frac{1}{2}$ km apart.

6. a According to the given question, we have

	Total audience	Male	Female
At 12 noon (Waiting)	180	108	72
After announcement (Waiting)	108	72	36
Left audience	72	36	36
At 12.50 p.m.	(108 + 18)	90	36

$$\text{Required percentage} = \frac{90}{108} \times 100 = \frac{250}{3}\% = 83.3\%$$

7. c Let A, M, P denote the sets of people liking apples, mangoes and pineapples respectively.

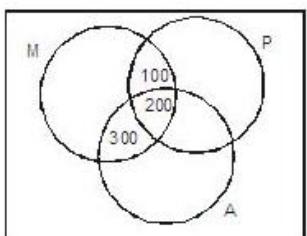
$$n(M) = 20\% \text{ of } 10,000 = 2000$$

$$n(A \cap M) = 5\% \text{ of } 10,000 = 500, n(M \cap P) = 3\% \text{ of } 10,000 = 300.$$

$$n(A \cap M \cap P) = 2\% \text{ of } 10,000 = 200$$

So, Americans who like mango and pineapple but not apple = $300 - 200 = 100$

Similarly Americans who like mango and apple but not pineapple = $500 - 200 = 300$



So, from the above ven-diagram Americans who likes only mangoes = $2000 - (100 + 200 + 300) = 1400$

8. d Using the data given, the seven friends are sitting in the following order.

E A G B D F C

Therefore, E was sitting fourth to the left of D.

9. c Given information can be rewritten as

(Nidhi - Pavbhaji) ___ \times ... (i)

(Dhruv - Kriti) ___ \checkmark ... (ii)

(Parul - Movie) ___ \times ... (iii)

(If beach - Paanipuri) ___ \checkmark ... (iv)

(Nidhi - Beach) ___ \times ... (v)

(Circus - Pavbhaji) ___ \times ... (vi)

(Harsh - Parul) ___ \times ... (vii)

Clearly (ii) and (vii) implies Dhruv - Kriti, Harsh - Nidhi, and Amit - Parul.

Also (iv) and (v) implies that Nidhi did not eat paani - puri.

Also using (i), we conclude that Nidhi and Harsh ate chaat. Now clearly only the following combinations of place to visit and food items are possible.

They are Movie - Pavbhaji or Chaat (using iv)

Beach - Paanipuri

Circus - Chaat, Paanipuri

Applying elimination method and using (iv) we get beach - paanipuri, and using (vi) we get circus - chaat as the true combination

and finally Movie - pavbhaji

Thus we have

Harsh - Nidhi - Circus - *Chaat* as one correct combination.

Then the other combinations are:

Using (iii), we get Amit - Parul - Beach - *Paanipuri* and obviously Dhruv - Kriti - Movie - *Pavbhaji*.

10. c We get the following table directly from the information given.

2	3	4	5	6	7	8	9
-	x Sunday	Physics	-	-	-	-	Physical education

Now, using (VIII) there is a gap of two days between computers and biology. This means that computers examination is either on 2nd or 5th and biology is either on 5th or 8th. If we take the second case, i.e. computer 5th and biology 8th, then using (VII) mathematics will be on 6th but this does not satisfy the (V) condition given.

Now we consider the other case, i.e. computer 2nd and biology 5th. Using (vii), we have mathematics 7th and using (v) chemistry 6th. The remaining engineering drawing is on 8th, the only day left. So, in tabular form we have

2	Computer	Saturday
3	Holiday	Sunday
4	Physics	Monday
5	Biology	Tuesday
6	Chemistry	Wednesday
7	Mathematics	Thursday
8	Engineering drawing	Friday
9	Physical education	Saturday

11. b Y is intelligent in mathematics and physics. Also Y is intelligent in chemistry and physics.

12. a (d) is not possible as rubber and watches cannot be exported together. (b) and (c) are not possible as timber and garlic both are exported. So (a) is the answer.

13. c On the basis of the analysis of the information given, the combinations of the movies and their type and the number of prizes they bagged is as follows.

D	Love story	3 (As it has won maximum awards)
C	Horror	2
A	Action	1
B	Kids	None

So (c) is the answer.

14. c The combinations are as follows.

A	H	Chocolate
B	G	Rose
C	F	Movie
D	E	Beach

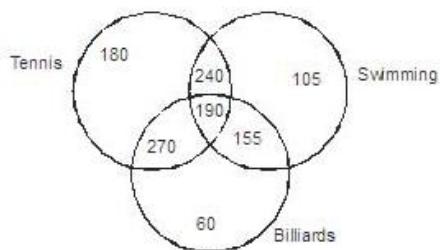
15. c The combinations are as follows.

A	H	Chocolate
B	G	Rose
C	F	Movie
D	E	Beach

16. b If we take first statement of I as false, then discount is with saree and wristwatch is free with it. The only condition where the logic of one statement is false and other true is justified, is possible when second statement of II is false and first statement of III is false.

On this basis, we conclude that cap is free with bedsheets and T-shirt is free with shirt. Hence, choice (b) is the correct answer.

17. d The given information can be depicted with the help of following diagram.



$$460 + (430 - 190) + (345 - 190) = 460 + 240 + 155 = 855$$

18. a Members playing only tennis = $880 - (430 + (460 - 190)) = 880 - (430 + 270) = 880 - 700 = 180$

Members playing only billiards = $675 - (460 + (345 - 190)) = 675 - (460 + 155) = 675 - 615 = 60$

So $180 + 60 = 240$

19. a Option (a) has D and G both which is not allowed. All others are allowed. Therefore, choice (a) is the correct answer.

20. a Both B and C cannot be selected. So the other door paint has to be A. So A is always selected.

Practice Exercise - B6

1. d All of D's children are in Z. So (d) is the answer.

2. c From the question, we get that

Sapna
1 2 3 4 5 6 7 8 9 ... (A)

Given that

(i) Megha, Sapna and Riya cannot sit at 1 or 9.

(ii) Beena and Megha does not have anybody sitting adjacent to them.

(iii) There is only one empty chair between Megha and Riya.

(iv) Charu is adjacent to both Jiya and Riya.

From (iv) it is very clear that Jiya - Charu - Riya or Riya - Charu - Jiya will be the sitting arrangement ... (v)

From (v) and (iii), we get

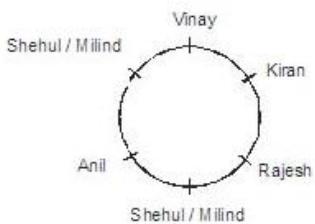
Megha — Riya - Charu - Jiya ... (vi)

From (i) and (ii), we conclude that Beena and Megha must have nobody adjacent to them. It means they must have at least one place empty adjacement to them. Now based on all the conditions (i), (ii), (iii), (iv), (v) and (vi), we get the only possible and valid arrangement as

1 2 3 4 5 6 7 8 9
X Sapna Jiya Charu Riya X Megha X Beena ... (vii)

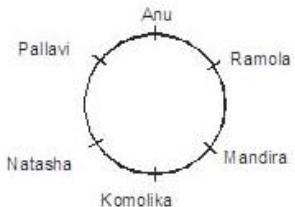
From (vi), we get Megha will sit at chair number 7.

3. e One of the possible sitting arrangements based on given information is depicted by the diagram given below.



Since the given information is not sufficient (because nothing is mentioned about the positioning of Milind and Shehul) to definitely depict the exact seating arrangement, 'none of these' is the correct choice.

4. d On the basis of the analysis of the given information, we arrive at the following diagram with the help of which question can be solved easily.



5. b Applying the rules given in the question, only two combinations are possible.

A	Cricket	or	A	Cricket
B	Football		B	Cricket
C	Football		C	Cricket

So A always play cricket.

6. b (a) is not feasible as it does not satisfy condition (i).

(c) is not feasible as it does not satisfy condition (iii). Again option (d) does not satisfy condition (i).

The only feasible group is given by option (b).

7. c Clearly, using (II) and (III) Poonam and Poornima do not stay on 1st floor and Priya and Priyanka do not stay on top floor.

Using (I), Priya does not stay on 1st floor.

So the only option for the girl staying on 1st floor is Priyanka. Thus, Poornima stays on 2nd floor, so Priya stays on 3rd floor and Poonam on the 4th floor.

8. a Using (II) and (VII), their full names are Sunil Sachdeva, Rohit Sehwag and Sandeep Sharma.

Using (III) Mr. Sachdeva - Purse

Now, using (V) Mr. Sharma - Cosmetics and

Mr. Sehwag - Saree.

Thus, (IV) implies that Himani is Mrs. Sehwag.

Using (I) Dhwani is Mrs. Sachdeva and thus Vidhi is Mrs. Sharma.

Thus can be tabulated as follows.

Name	Surname	Gift	Wife's name
Sunil	Sachdeva	Purse	Dhwani
Rohit	Sehwag	Saree	Himani
Sandeep	Sharma	Cosmetics	Vidhi

9. e Let x be the number of employees at branch A. Then, $320 - x$ is the number of employees at branch B.

Total number of absentees = $\frac{10}{100}$ % of 320 = 32

At branch A, number of absentees = 20% of x

At branch B, number of absentees = $7\frac{9}{13}\%$ of
(320 - x)

$$\text{Now, } \frac{20}{100}x + \frac{100}{13 \times 100}(320 - x) = 32$$

$$\Rightarrow \frac{x}{5} + \frac{1}{13}(320 - x) = 32 \Rightarrow x = 60 \Rightarrow 320 - x = 260$$

But the number of females present on the day is 30% of the total employees present. But it is not given that how many of those who were absent are females. So, we cannot find the total number of males at branch B.

10. d Let us assume that they carried N chapattis.

$$\text{Let } N = 3x + 1 \dots (\text{i})$$

He eats his share.

Number of chapattis left = 2x

$$\text{Let } 2x = 3y + 1 \dots (\text{ii})$$

The second friend eats his share.

Number of chapattis left = 2y

$$\text{Let } 2y = 3z + 1 \dots (\text{iii})$$

The third friend eats his share.

Number of chapattis left = 2z.

$$\text{Let } 2z = 3w + 1 \dots (\text{iv})$$

All three of them get up and eat their shares.

$$\text{Using (i), (ii), (iii) and (iv) we get } N = \frac{81}{8}W + \frac{65}{8}$$

For even W - N will not be an integral number for

$$W = 1, N = \frac{73}{4}$$

$$W = 3, N = \frac{77}{2}$$

$$W = 5, N = \frac{235}{4}$$

$$W = 7, N = 79$$

\therefore Minimum number of chapattis = 79

11. c Gunjan and Piya have to be together.

\therefore Sameer would not be there according to (ii) and hence Priyanka would not be there according to (v). So the four girls are Shikha, Aastha, Gunjan and Piya. Hence, Anand and Vineet would not be there according to (iv) and (iii). Hence one of either Biswas and John will be there according to (vii). Since Biswas and Aastha have to be together, the member of the team are the ones given by choice (c).

12. c Clearly, using (III) the only salaries that satisfy this statement is Rs. 6,000.

$$\because 6000 = \frac{3}{5} \times 10,000$$

\therefore Kishan's salary is Rs. 6,000 ... (1)

Using (IV) and (V) Ganesh's salary is not Rs. 10,000

... (2)

Also Ganesh - EXCEL

Convergys - Rs. 10,000 ... (3)

Then (VI) and (I) implies that Shiv's salary is either

Rs. 12,000 or Rs. 15,000 and Shyam's salary is either Rs. 6,000

or Rs. 7,500 ... (4)

Using (VII) person working in Daksha gets

Rs. 15,000 ... (5)

Using (1) and (4), Shyam's salary is Rs. 7,500

∴ Shiv's salary is Rs. 15,000 and hence he works in Daksha [Using (5)].

Thus, Ravi's salary is Rs. 10,000 and he works for Convergys (Using 3)

Using (III), Kishan works in Global Vantedge and Shyam in GE Capital.

(ii) Ankur, ___, 4, Scientist

(iii) ___, Botany, 1, Teacher

(iv) Ankit, ___, ___, Businessman

(v) Amrita, Geometry, ___, Architect

(vi) Mathematician and Physics expert stay on same floor 2.

Using (i), (ii) and (iii). Aman is not a scientist or teacher and Ankur is neither good at algebra nor at botany.

Again (i), (iv) and (v) imply that Aman is not a businessman. So, by elimination method, Aman is an architect. Similarly, Ankur is either good at zoology or physics. But using (vi), Ankur is a zoology expert.

One of the mathematician stays at 2nd floor and that is Aman. So, Amrita is not the one staying on 2nd floor. Hence, by elimination she stays at 3rd floor. Thus the other person staying on 2nd floor is Ankit and he is the physics expert.

So using (iv), Ankit, Physics, 2, Businessman is the correct combination.

Name	Call Centre's name	Salary (in Rs.)
Ram	Convergys	10000
Shyam	GE Capital	7500
Kishan	Global Vantedge	6000
Shiv	Daksha	15000
Ganesh	EXCEL	1200

13. c The information given can be written in a compressed form as follows.

(i) Aman, Algebra, 2

DS Practice Exercises**Practice exercise - C1**

1. c Statement I is very tempting as $4 = 4 \times 1$, but both these numbers can be negative also. Hence, I is not enough. Statement II says that both A and B are positive. So both statements taken together solve the problem.

2. a Since all the 3 are odd and $z - x = 4$, they have to be consecutive.

3. b By statement I, $a + 1 = a + a + 2$

$$\therefore a = -1$$

By statement II,

$$a(a + 2) = -1$$

$$\therefore a = -1$$

\therefore Answer is (c), i.e. it can be found out using either statements alone.

4. c From statement I, we get

$a - 2$	a	$a + 2$
(-1)	1	3
-3	(-1)	1
-5	-3	(-1)

All 3 cases
we get '-1'

So we do not know what the average will be from statement I only.

Using only II we can say that the numbers are

-1, 1, 3 or 1, 3, 5.

Using both the only possibility is -1, 1, 3 and hence we can find the average.

\therefore Answer is (c).

5. d Neither statements I and II alone nor taken together can give remainder as remainder will vary according to the numbers.

\therefore Answer is (d).

6. d Statement I does not have data to find the cost of each album. Statement II gives the total amount spent but we cannot find out the percentage of sales tax per copy.

7. c Combine both the statements to find the answer.

8. d Since nothing about expenditure and the rate of tax is mentioned, the salary cannot be calculated.

9. d There are more unknowns than the number of equations. Hence, both statements I and II are not sufficient.

10. c Both statements are required.

11. d Let the total number of students appear in the examination be x .

Statement I will give the information about passed students.

Statement II is also not complete in itself.

Combining the statements I and II, we get

$$\frac{50}{100}x + 10 = \frac{51}{100}x$$

Hence, x can be calculated.

12. b Statement II clearly gives that a can of beer is costlier. Thus, (b).

$$= 25 K = \frac{1205}{25}$$

13. b $CP = \frac{2}{3} SP \Rightarrow SP = 1.5 CP$

Profit percentage is 50.

14. d Only statement I or II alone is not sufficient.

Combining statements I and II, we can calculate the list price as $(Rs. 1485 \times 12) = Rs. 17820$.

Hence, discount is Rs. 2,320.

15. a From statement I, cost price = Rs. $\frac{15}{12}$ and selling price = Rs. $\frac{6}{4}$

Hence, profit can be worked out. So statement I is sufficient. From statement II, we have no idea about the selling price and hence the profit. So statement II alone is insufficient.

16. d Knowing the highest and the lowest scores tells us nothing about the other scores. So statement I is not enough. Statement II is very tempting but students must realize that suppose 2 people take the GRE, one scores 2300 and the other scores 1000. Surely the average is not 2000. So statement II cannot give us the answer. The two statements taken together also cannot answer our question.

17. c Statement I indicates that the number of 50-paisa coins is 2 and the number of one-rupee coins is 3. Statement II independently gives the same result.

18. b A relation between a and c can be found using both statements I and II, i.e.

$$\frac{a+c}{c} = \frac{a}{c} + 1$$

19. a From statement I, it can be found that the total of the deposits = $75 \times 5 = \$375$

20. c $d = Kt^2$, $u = 0$ from statement I, $1205 = K$.

We need to determine $D_{10} - D_9$

$$D_{10} = \frac{120.5}{25} \times 100, D_9 = \frac{120.5}{25} \times 81$$

$$D_{10} - D_9 = \frac{120.5}{25} (100 - 81) = \frac{120.5}{25} (19)$$

Note:

You do not have to calculate the actual answer.

From statement II, $490.4 = Kt^2$

$$K \cdot (10^2) \Rightarrow K = \frac{490.4}{100}$$

Proceeding as above, $D_{10} - D_9$ can be determined.

Practice exercise - C2

1. d Both the statements do not give any information about the speed limit. Thus, (d).

2. d It is not specified which tap is opened and which one is closed, and what part of the tank was initially full.

3. c From statement I, we cannot find the hours.

From statement II, we get $\frac{x}{5} + \frac{y}{3} = 1$ which enables us to get the answer. By using both the statements together we get the answer.

4. a Statement I gives only the relative efficiencies and no idea of time taken is there.

So statement I is insufficient.

Statement II gives time required by B as $\left(\frac{1}{2} \times 10\right) = 5$ days. Hence, statement II alone is sufficient.

5. d The statements given do not give any information about the number of rooms to be vacuumed.

6. b $\frac{a+b}{a-b} = \left(\frac{a}{b} + 1\right) : \left(\frac{a}{b} - 1\right)$

7. d Both the statements give the same information.

8. d 10 students in statement II may not be the remaining beyond the 30 given in statement I.

9. a $x^2 + 2xy + y^2 = (x + y)(x + y)$

10. d From I and II, we get 2 equations in two variables. But they are dependent. Thus, eventually we get one equation in two variables. Which has infinite solution set. Thus, (d).

11. b From statement I, we can only get an equation in terms of x and y, but not the value of x and y.

From statement II, we can get the value of x as 0.

12. a $\frac{2pq + pq^2}{pq} = 2 + q$

13. b Statement (I) gives us an inequality which is not enough to answer the question. Statement II indicates that g is greater than h because irrespective of the sign of the integer, the integer whose cube is greater will obviously be the greater one. Therefore, statement II alone is enough.

14. d From the given condition, $a^6 = b^6$

But since the power is even we do not know whether a = b. But from I and II we can conclude that both 'a' and 'b' are +ve. Thus, a = b

$\therefore a^3 - b^3 = 0$

\therefore Answer is (d).

15. d From I, we have r = 0 or r = 3. So it is not sufficient. From II, we have r = (-1) or r = 3.

So it is also not enough. The two statements taken together give r = 3.

16. a Using only statement I, $\frac{x}{2} + 18 = \frac{2}{3}x$, where x is the initial amount of money he took to the mall.

17. d Using both statements I and II, we still cannot say anything about the number of students in the class.

18. d Statement II repeats statement I. Hence, the question cannot be solved.

19. d Let the amount of money Prem has be P, and the amount that Jagdish has be Q.

Statement I gives the inequality $P \geq J + 100$.

Statement II gives the inequality $P + J \leq 500$.

It is obvious that we cannot get the answer from statement I alone or statement II alone or even from statements I and II together.

20. b Statement I says that there could be 25 or more books. Statement II says that there could be 25 or less books. The two statements taken together give us the answer as 25 books.

LRDI Practice Test1. e $\approx 9.2 : 28.2 \approx 1 : 3$ 2. c Total sales = $\frac{1.32 \times 100}{7.6} = 17.4$ crore

3. b Answer is 'The Decan Herald' in 1999.

'Others' is not included because it is not a newspaper. 'Other' here includes newspapers which are not mentioned.

4. b Deccan Herald gained Rs. 5.34 crore.

5. a Jadeja's total = 164.

Tendulkar's average = 57.5

Hence, the ratio is 1 : 2.86.

6. a Tendulkar's points are $8 + 3 + 4 + 4 + 7 = 26$.Dravid's points are $4 + 10 + 10 = 24$.

Others are below this.

7. a Since the total of 5 batsmen is more than 226 runs.

8. d Against England = $\frac{38}{2} = 19$ Africa = $\frac{18}{1} = 18$ Australia = $\frac{31}{3} = 7.75$

Sri Lanka = $\frac{14}{4} = 3.5$

9. e Sales = $\frac{71}{9} \times 200 \approx 8 \times 200 \approx 1600$ crore

10. b From a figure of Rs. 90 crore in 1996-97, sales touch Rs. 175 crore in 1999-2000. Since sales have less than doubled, so percentage increase < 100%. It has to be around 95%.

11. e We do not have data on market shares in 1997-98.

12. a 40% of others = 40% of 5% = 2%, which is $\frac{1}{4.5}$ of Zenith home PC market share.

$$\therefore \text{Wipro home PC sales} = \frac{1}{4.5} \text{ of } 200 = \frac{2}{9} \times 200 \\ = \text{Rs. } 44.44 \text{ crore}$$

13. d Among all the products, E has maximum sale as well profitability. So obviously E will be having the highest profit.

Sale = 60 lakh

Profit = 20%

Cost = $\frac{60}{1.2} = 50$ lakh

Profit = $50 \times 20\% = 10$ lakh

14. c Profit earned by B = $\frac{40}{1.1} \times \frac{10}{100} = \frac{40}{11}$ lakh

Profit earned by E = 10 lakh

So $\frac{(\text{Profit})_E}{(\text{Profit})_B} \times 100 = \frac{40 \times 100}{11 \times 10} = \frac{400}{11} = 36.36\%$

15. c Profit earned by A = $\frac{30}{1.2} \times \frac{20}{100} = 5$ lakh

Profit earned by B = $\frac{40}{11}$ lakh = 3.6 lakh

Profit earned by C = $\frac{20}{1.15} \times \frac{15}{100} = \frac{300}{115}$ lakh

= 2.6 lakh

Profit earned by D = $\frac{50}{1.075} \times \frac{7.5}{100} = \frac{300}{86}$ lakh

= 3.5 lakh

Profit earned by E = 10 lakh

Total profit = 24.7 lakh

16. c The percentage share of the profits of A and E = $\frac{15}{24.74} \times 100 = 60.63\%$

For questions 17 to 20:

17. e It can be observed that shares give a flat 11% return.

Now, making all the possible investment from Rs. 10,000 - Rs. 1,00,000, return in dairy does not become equal to the return obtained by shares.

Short cut: Check it through options.

18. c Since after the investment of Rs. 30,000, for every investment of Rs. 10,000, return from dairy is Rs. 900 whereas for the same amount, return from shares is Rs. 1,100.

19. b If equal amount is invested, than net return = Rs. 4,200, which is maximum in all the cases.

20. e It can be observed that if he invests

Rs. 20,000 — Agriculture

Rs. 10,000 — Dairy and

Rs. 20,000 — Poultry

Total return = Rs. 2,600 + Rs. 1,400 + Rs. 2,750 = Rs. 6,750

So, the percentage return = 13.5%

For question 21 to 25:

The best method to solve this question is to make a table and fill the places according to the information given logically.

On analysing the information given in the question, we arrive at the following table.

Student	Compulsory Subject	Optional Subject
M	Geography (given)	English (given)
N	Geography (given)	Biology (given)
O	Geography (given)	Physics (given)
P	English (given)	Geography (given) Female student (given)
Q	Chemistry (given)	Physics (given)
R	Physics (given)	Chemistry (given)

21. d 22. a 23. e 24. a 25. d

26. b Statement I gives us superfluous data. To find out the volume of the glass, we need its height and diameter. Hence, statement II alone is sufficient.

27. e No information has been given about the area or any sides of the square base of pyramid, we are only provided with distance from the square base from IIInd statement. Hence we cannot determine the attitude of the pyramid by using the statements.

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28. e You do not know the shape of the bathroom floor. Thus, the exact number of tiles cannot be determined.

29. e We still do not know the height of the room.

30. a Using statement I, we get

$$(k \times \pi \times 4.5^2 \times t) \times \frac{70}{100} = k \times \pi \times (4.5^2 - r^2) \times t$$

Solving this we can find r.

k is constant of proportionality to convert volume into weight. Thus answer is (a).