



- For the last many years, the questions in the DI-LR section of CAT exam have been testing the analytical and reasoning ability of students along with their observation and calculation skills. In fact, in recent times, the weightage of calculation-intensive questions has gone down and that of the reasoning-based data interpretation (R-DI) questions has increased.

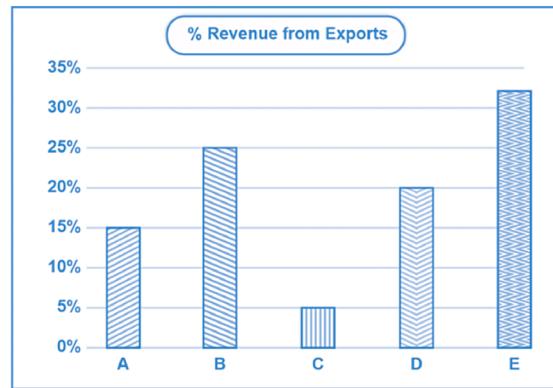
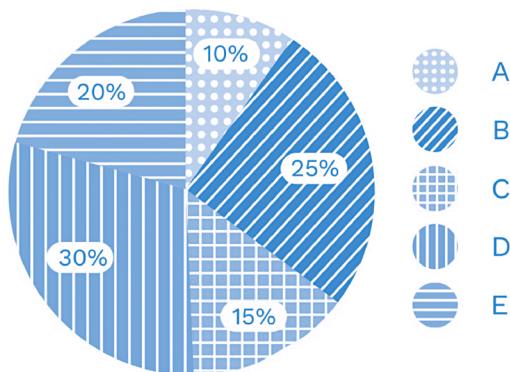
- Difference between Normal DI sets and R-DI sets*

The normal DI questions are slightly more obvious in terms of revealing the information as compared to the R-DI questions.

Look at the following two examples to understand the difference.

Example 1:

The following pie chart shows the % contribution in revenue from five products (i.e., A, B, C, D, and E) of Nano India Ltd in the year 2020. The bar chart shows the % contribution of exports to the total revenue of that product. Also, the total revenue (from these five products) of the company was ₹480 crores. If it is known that the revenue can be generated either from the foreign market (i.e., through exports) or from the domestic market, find the revenue of product C from the domestic market.



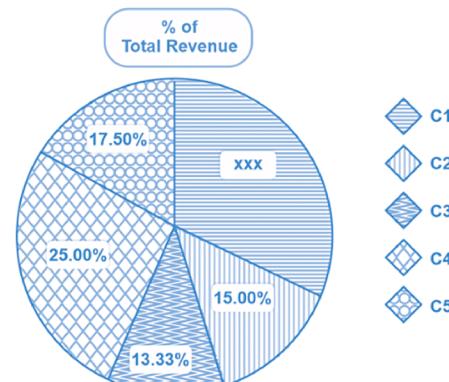
What is the revenue from exports for company C?

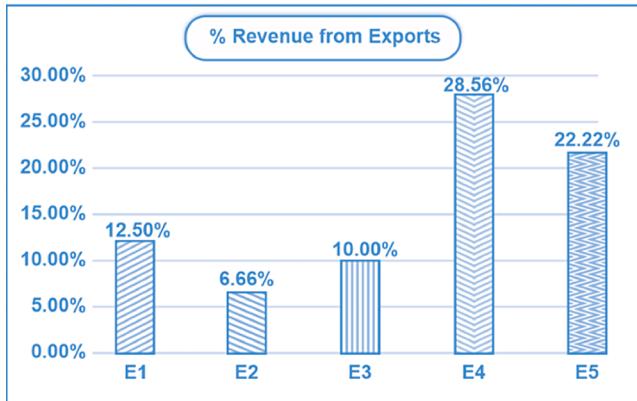
Solution:

The total revenue of company C is ₹72 crores (15% of ₹480 crores). Revenue from exports for company C = 5% of ₹72 crores = ₹3.6 crores.

Example 2:

Mars Ltd, Pluto Ltd, Jupiter, Saturn, and Neptune Ltd are the only companies in the business of chocolate in Wonderland. The companies are disguised as C1, C2, C3, C4, and C5 in the pie chart below which shows the revenue share (in %) of these five companies in the year 2020. The bar chart shows the % contribution of exports to the total revenue of these five companies (disguised as E1, E2, E3, E4, and E5). Also, the total market size of the chocolate business in wonderland was ₹480 crores and the revenue from exports for each company was an integer value.





If it is known that Neptune Ltd had the highest revenue, what was the export's revenue of Neptune Ltd?

Solution:

Based on the data given, the following values can be obtained for the total revenue of five companies:

	% of Total Revenue	Total Revenue (in ₹ Crore)
C1	29.17%	140
C2	15.00%	72
C3	13.33%	64
C4	25.00%	120
C5	17.50%	84

So, the maximum revenue is ₹140 crores.

Also, the following are the exports % and their fraction equivalent for various companies:

% Revenue from Exports	Fractional Equivalent
12.50%	1/8
6.66%	1/15
10.00%	1/10
28.56%	2/7
22.22%	2/9

As the exports' revenue are integer values, the possible fractions with which this can be obtained are 1/10 or 2/7. However, no other value pertaining to the total revenue is

divisible by 7, hence we can conclude that 2/7 should be the fraction of export revenue for the company having a total revenue of ₹140 crores. Hence, the revenue from exports for Neptune Ltd should be $= 2/7 \times 140$, i.e., ₹40 crores.

- The reasoning-based data interpretation sets are sometimes created considering the real-life scenarios (like food delivery, orders at a restaurant, Covid testing, parking lot allocation, business resource constraints, etc.) where you may be given data in a graph, tabular or caselet form, and you are expected to analyse the situation and figure out the solution to the questions asked.
- In this module, we will practice a variety of reasoning-based sets, and learn the art of tackling any new situation in the exams.
- Games and tournaments, set theory, maximisation-minimisation problems, team formation, etc., also test the candidates' ability to reason, and they are covered separately in the later modules.

Let's look at a few solved examples!.

Set 1

Example 3:

Directions for questions 1 to 5: Analyse the graph carefully and answer the questions that follow.

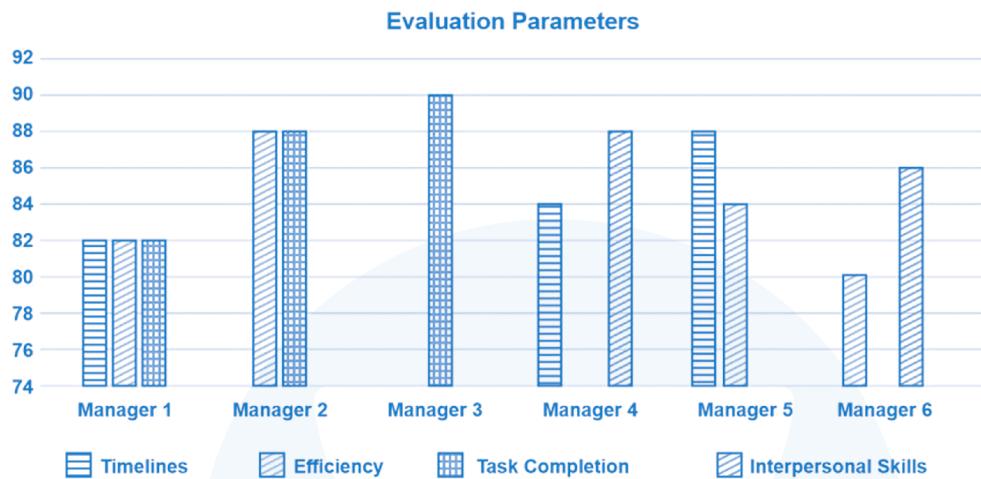
In the upcoming appraisal process of Proton Infotech Pvt. Ltd, all the employees will be evaluated on four parameters (timelines, efficiency, task completion, interpersonal skills). A score (on a scale of 0-100) will be assigned to each employee for each of the mentioned parameters. Six managers of the company have been asked to set a minimum score for one or more of the parameters, along with an overall minimum score, for awarding a star to the employees. The criteria set by each manager for each of the parameters are shown in the bar chart



below. The table below provides the information about the overall minimum score set by each of the managers for awarding the star.

For example, Manager 4 has set the minimum scores of 84 and 88 for timelines and task completion, respectively, and an overall

minimum score of 348. So, whosoever gets 84 or more in timeliness, 88 or more in interpersonal skills, and an overall score of 348 or more, will get a star from Manager 4. Similarly, each manager will assign a star to the employee who satisfies the criteria set by that manager.



Overall Criteria					
Manager 1	Manager 2	Manager 3	Manager 4	Manager 5	Manager 6
344	342	334	348	352	344

At the end of the evaluation process, the salaries of the employees will be revised based on the star/s they receive. The salary revision % are:

- 30% – for getting a total of 5 or more stars
- 20% – for getting a total of 3 or 4 stars
- 10% – for getting a total of 1 or 2 stars
- 0% – if an employee doesn't get any star

1. If Amandeep gets stars from all the managers, what will be his minimum overall score?

- (A) 352
- (B) 354
- (C) 384
- (D) 360

Solution: (B)

To get a star from each of the managers, Amandeep must satisfy the criteria set by each of the managers for each of the parameters.

So, he must get 88 in timeliness (as set by Manager 5), 88 in efficiency (as set by Manager 2), 90 in task completion (as set by Manager 3), and 88 in interpersonal skills (as set by Manager 4) to satisfy the minimum criteria set by each manager. Thus, his overall score will be: $88 + 88 + 90 + 88 = 354$. With this score, he will also satisfy the overall score criteria set by each manager.

Hence, option (B) is correct.

2. Mr. Patel's current salary is ₹35,000, and he wants it to be more than ₹45,000 after the appraisal. However, he knows that he has been absent on a few occasions and hence, expects a score less than 85 in timeliness parameter. What could be the minimum overall score with which he can achieve the desired salary revision?
- (A) 350
(B) 354
(C) 360
(D) Not possible to achieve the desired salary revision

Solution: (A)

₹35,000 to ₹45,000 is an increase of 28.56% (as $2/7 \times 100 = 28.565$).

So, he must aim for 30% revision, i.e., getting 5 or 6 stars.

Since he is expecting a score of less than 85 in timeliness, he will definitely not meet the minimum score criteria set by Manager 5 for this parameter. But he can surely try to achieve 5 stars, and it can be achieved with the following scores. So, he must get 84 in timeliness (as set by Manager 4), 88 in efficiency (as set by Manager 2), 90 in task completion (as set by Manager 3), and 88 in interpersonal skills (as set by Manager 4) to satisfy the minimum criteria set by each of the remaining managers.

Thus, his overall score will be $84 + 88 + 90 + 88 = 350$, which is also sufficient for him to get stars from all the managers except Manager 5.

Hence, option (A) is correct.

3. If Rahul clears the minimum criteria set by each of the managers for each of the parameters but still gets X stars less than the maximum possible stars. What can be the maximum possible value of X ?
- (A) 0
(B) 1
(C) 2
(D) 3

Solution: (A)

As discussed earlier, if Rahul satisfies the minimum criteria set by each of the managers, then his overall score will be $88 + 88 + 90 + 88 = 354$.

So, he will also satisfy the overall criteria set by each of the managers.

Hence, he will surely get all six stars, i.e., $x = 0$.

Hence, option (A) is correct.

4. If Mr. Padhy gets the stars from exactly two managers, what can be the minimum score obtained by him in any of the four parameters?

- (A) 0
(B) 34
(C) 42
(D) 74

Solution: (C)

You will have to think differently to answer this question. This is where your reasoning ability is tested.

Let's look at the least minimum overall scores set by any two of the managers. The scores are 334 and 342 by Manager 3 and Manager 2, respectively. So, let's try to satisfy the parameter criteria set by these two managers only.

As it can be seen in the bar chart, Manager 3 has set a minimum score of 90 in task completion and Manager 2 has set a minimum score of 88 in efficiency and task completion.

So, if Mr. Padhy gets 100 in task completion, 100 in efficiency, and 100 in timeliness or interpersonal skills, he can score just 42 in the 4th parameter and meet individual as well as overall score criteria set by Managers 2 and 3.

So, his minimum score in any of the parameters can be 42.

Hence, option (C) is correct.

5. If Vibhuti gets the scores of 84 and 88 in two of the parameters, what can be the maximum number of stars that she can get?



- (A) 2
 (B) 4
 (C) 6
 (D) None of these

Solution: (D)

Again, an out of the box thinking is required to answer this question quickly. With a score of 84 in one of the parameters, she is definitely going to miss the minimum score set by at least one of the managers for at least one of the parameters. So, she is definitely not getting all six stars.

Now, let's see how we can maximise her stars.

If we assume that she got 84 in timeliness, 88 in efficiency, and 100 each in the remaining two parameters, she will get stars from all except Manager 5 (due to her lower score in timeliness).

So, she can get a maximum of five stars. Hence, option (D) is correct.

Set 2

Example 4:

Directions for questions 6 to 9: Analyse the given data carefully and answer the questions that follow.

Two types of refrigerators—top freezer and bottom freezer—are made by the company PQRS Pvt Ltd. Top freezer was introduced in the market in 2006. Due to some defects, one-fourth of the top-freezer refrigerators bought in any year are disposed of as junk after exactly 2 years from purchase. Bottom-freezer refrigerators were introduced in the market in 2012 after rectifying these defects, but still 20% of them had to be disposed of as junk after exactly 2 years from purchase.

The following table shows the number of top-freezer and bottom-freezer refrigerators in use in the market, from 2010 to 2015. It is also known that 200 top-freezer refrigerators were disposed of in 2012.

6. How many top-freezer refrigerators were disposed of in 2014?
- (A) 100
 (B) 120
 (C) 150
 (D) Cannot be determined

Solution: (C)

Since 200 top-freezer refrigerators were disposed of in 2012, a total of 600 $[(2600 - 2200) + 200] = 600$ top-freezer refrigerators were purchased in 2012. So, 25% of this, i.e., 150 of them were disposed of in 2014.

Hence, option (C) is correct.

7. How many bottom-freezer refrigerators were disposed of by 2015?
- (A) 60
 (B) 190
 (C) 320
 (D) Cannot be determined

Solution: (B)

The question asks the total bottom-freezer refrigerators disposed of by 2015, i.e., those which are disposed of in 2015 or before that.

Out of the 650 bottom-freezer refrigerators purchased in 2012, 130 were disposed of in 2014, and among the 300 ($950 - 650$) bottom-freezer refrigerators purchased in 2013, 60 were disposed of in 2015.

So, a total of 190 bottom-freezer refrigerators were disposed of by 2015.

Hence, option (B) is correct.

	2010	2011	2012	2013	2014	2015
Top Freezer	1750	2200	2600	3100	3550	3770
Bottom Freezer			650	950	1300	1250

8. How many top-freezer refrigerators were disposed of till 2015?
- (A) 100
(B) 125
(C) 140
(D) Cannot be determined
9. How many bottom-freezer refrigerators were purchased in 2014?

Solution: (D)

It is known that 200 top-freezer refrigerators were disposed of in 2012. 800 new top-freezer refrigerators were bought in 2010. But we can't find the number of top-freezer refrigerators purchased or disposed of in 2011 and therefore those in 2013 and 2015 also can't be found.

Hence, option (D).

Solution: 480

Since 650 bottom-freezer refrigerators were bought in 2012, 20% of them, i.e., 130 were disposed of in 2014.

As the net addition in 2014 is $1,300 - 950 = 350$, the actual number of refrigerators bought $= 350 + 130 = 480$.

Hence, the answer is 480.



Practice Exercise

Level of Difficulty – 1

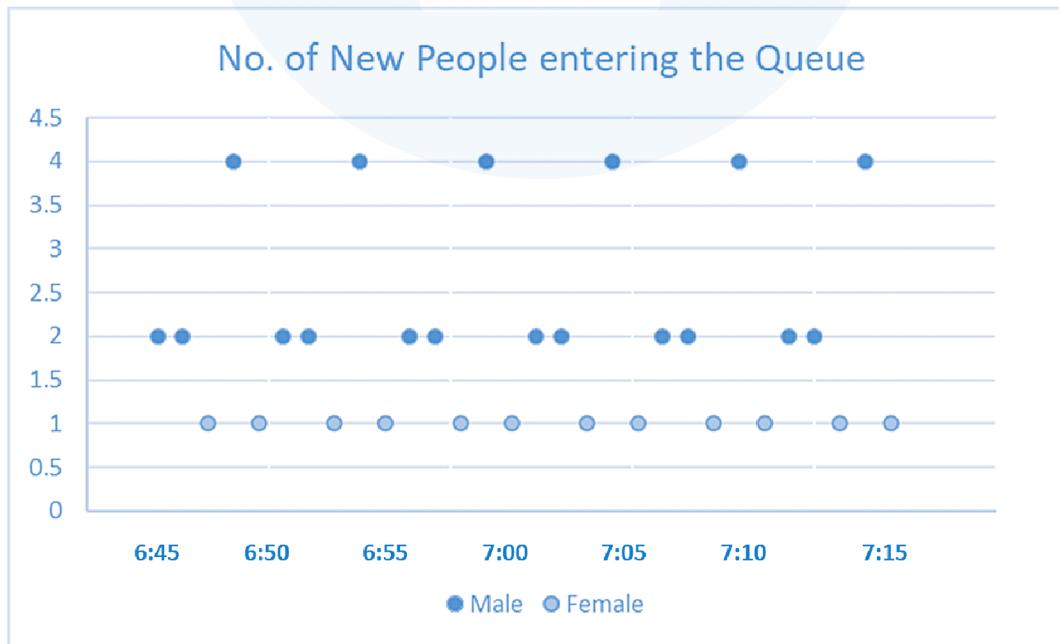
Set 1

Directions for Questions 1 to 5

At a ticket counter at the MCA stadium in Pune, Prakash is waiting for his turn, and he is 17th in the queue. When he joined the queue, he noticed that one person had just moved to the ticket counter. The agent at the ticket counter takes 1 minute to issue a ticket to a male and 2 minutes to issue a ticket to a female. Also, Prakash entered the queue at 6:45 p.m., and there are in total seven females ahead of him. The match is to start at 7:30 p.m.

As per the rules set by the stadium administration, spectators are allowed to join the queue only up to 15 minutes prior to the start of the match, and the tickets will be issued (to those who are already in the queue) only up to 15 minutes after the start of the match. The following chart shows the number of people (male and female) who joined the queue at various time points after Prakash joined.

1. At what time will Prakash be issued a ticket?
(A) 7:08 p.m.
(B) 7:09 p.m.
(C) 7:10 p.m.
(D) Can't say
2. At what time will the person ahead of Prakash be issued a ticket?
(A) 7:06 p.m.
(B) 7:07 p.m.
(C) 7:08 p.m.
(D) Can't say
3. How many people will be joining the queue after Prakash joined, till the time people are allowed to join the queue?
(A) 45
(B) 50
(C) 55
(D) 60



4. How many people, who joined the queue after Prakash, will have to go back empty-handed?
- 20
 - 24
 - 30
 - 36
5. At what new rate the females be issued the tickets (after Prakash left the counter) to make sure that the last person in the queue gets the ticket exactly at 7:45 p.m.? (Assume that the ticket dispatch rate for males remains the same).
- Four tickets per minute
 - Five tickets every 2 minutes
 - Six tickets every 2 minutes
 - Not possible to provide tickets to all

Set 2

Directions for Questions 6 to 8: Refer to the data below and answer the questions that follow.

Replacement Source	2004	2005	2006	2007	2008
Company	----	----	----	3760	4552
3 rd party	3048	4428	5052	5640	6828

6. How many cars were sold by CARS Ltd in 2004?
- 940
 - 980
 - 1,020
 - 1,080
7. How many cars were sold by CARS Ltd in the 3 years from 2001 to 2003?
- 7,500
 - 8,100
 - 8,420
 - None of these
8. How many cars were sold by the company in 2006?
- 1,260
 - 1,440
 - 1,380
 - Cannot be determined

CARS Ltd had introduced a battery-fitted car in year 2001. The batteries would last a year and need to be recharged once a year after that. For the first 2 years, the company would recharge the batteries for free. From the third year onwards, it charges ₹10,000 for a recharge. However, there are third-party vendors who do the same recharge for ₹7,000. Every year, 40% of the customers who opt for a battery recharge, do it from the company while the remaining 60% opt for the cheaper option. The following table gives the details of the number of paid recharges by the company and by third-party vendors for all years from 2004 to 2008. Three values in the table have been intentionally left out. Assume that all cars from 2001 are in operation and are recharged after exactly 1 year.

Set 3

Directions for Questions 9 to 12:

Four countries Akola, Bakola, Cubola, and Dakula sell wheat. The following table shows the quantity of wheat sold by each of the countries in four consecutive years 2011, 2012, 2013, and 2014, as a percentage of their respective total sales in 4 years (e.g., in the



year 2011, Akola sold 20% of its total quantity of wheat sold over 4 years).

It is also known that none of the countries sold the quantity of wheat more than 8 lakh kg and less than 4 lakh kg in any year.

	2011	2012	2013	2014
Akola	20	32	28	20
Bakola	32	20	24	24
Cubola	20	20	24	36
Dakula	16	27	25	32

9. Which of the following can be total quantity of wheat sold by Akola over the given period?
 - (A) 26 lakh
 - (B) 23.5 lakh
 - (C) 18.5 lakh
 - (D) 17 lakh

10. What is the maximum possible difference between the quantity of wheat sold by Cubola and Bakola in 2013 (in lakh kg)?
 - (A) 0.53
 - (B) 1.2
 - (C) 1.04
 - (D) 2

11. What is the sales of Dakula in 2012 (in lakh)?
 - (A) 4.25
 - (B) Cannot be determined uniquely
 - (C) 6.75
 - (D) 5.0

12. If Bakola and Cubola had the same amount of sales in the year 2014, then which of the following is definitely true?
 - (A) Sales of Bakola in 2012 were greater than sales of Cubola in 2013.
 - (B) Sales of Cubola and Bakola both were equal in 2014.

- (C) Sales of Cubola in 2011 were greater than half of the sales of Bakola in 2011.
- (D) Total sales of Bakola and Akola were equal to the total sales of the other two countries.

Set 4

Directions for Questions 13 to 15

Angry Dragon Chinese restaurant is handled by Mr. and Mrs. Wang. It's a small restaurant with a limited seating arrangement, with six small-size tables, four medium-size tables, and two large-size tables. On a small-size table, a maximum of two people can sit. On a medium-size table, a maximum of four people can sit, and on a large-size table, a maximum of six people can sit. Based on the members in the group of diners, they can adjust the seating arrangement as follows.

- i) Tables of the same size can be joined together to form bigger-sized tables.
- ii) Tables of smaller size can be joined with the tables of bigger size also.
- iii) No two different groups are accommodated on the same table arrangement. (Single person can also be considered as a group here).
- iv) If the group of people is sitting on a combination of tables, then it can't happen that a table can be removed from that combination, and still the same group is accommodated on the remaining tables.

13. What is the maximum number of different-sized groups that can be accommodated at once?

14. Three groups of three people, two groups of five people, and one group of seven people arrived as soon as the restaurant is opened on a particular day. What can be the minimum number of groups that can be accommodated after this, on that day?

- 15.** If it is known that the restaurant prefers the groups to sit on the smallest possible table while the groups prefer the single table, and they will agree to sit on a combination of tables only if no single table can accommodate them. Also, groups want to sit on a table combination that has the least number of tables possible, and majority of them (i.e., the members of a group) are sitting on a single table.

Five groups of people come to the restaurant in the following order, one by one.

(Each group comes after the previous group has settled).

- i)** Group 1 (eight people)
- ii)** Group 2 (three people)
- iii)** Group 3 (five people)
- iv)** Group 4 (two people)
- v)** Group 5 (three people)

What is the number of empty tables after all the five groups have occupied the tables following the mentioned conditions?



Level of Difficulty - 2

Set 1

Directions for Questions 1 to 5

A reputed school in city X organised a Math Olympiad for the students from four different grades (i.e., Class 7, Class 8, Class 9, and Class 10). The school reserved 10 classrooms for conducting these exams on a single day. The number of students in each of the 10 classrooms was of 30, 45, 50, 65, and 75.

Further, it is known that:

- i) Students in each of the 10 classrooms were seated together.
- ii) No two classrooms that had students from the same grade, had the same number of students in them.

The table below provides the details about the distribution of students for the Math Olympiad.

Grades	Number of Classrooms
7	1
8	2
9	2
10	5

Number of Classrooms	Number of Students
10	At least 30
4	At most 45
6	At least 50
5	At least 65
8	At most 65

1. How many classrooms had exactly 50 students in them?
 - (A) 2
 - (B) 1
 - (C) 3
 - (D) Cannot be determined
2. What was the total number of students in all the classrooms which were occupied by students writing the Math Olympiad (Class 10)?
 - (A) 180
 - (B) 75
 - (C) 265
 - (D) 215
3. What could have been the maximum number of students who had written the Math Olympiad test conducted by the school?
 - (A) 265
 - (B) 500
 - (C) 485
 - (D) 560
4. If the total number of students in the classes which had students writing the Math Olympiad from Class 8 is the maximum possible, and the total number of students writing the Math Olympiad is the minimum possible, then what could have been the number of students in the classroom that had students writing Math Olympiad from Class 7?
5. How many different values are possible for the total strength of the students appearing from all the grades?



Set 2

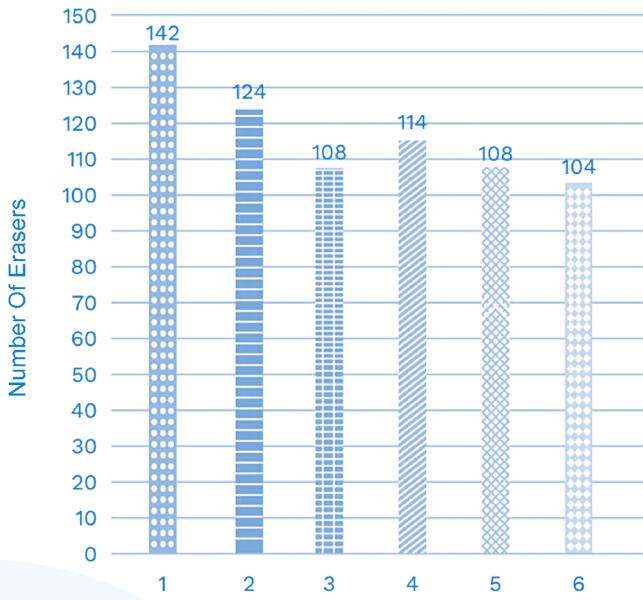
Directions for Questions 6 to 10: Study the following information carefully and answer the given questions.

Albert went to a shop and purchased eight boxes of erasers—Box 1 through Box 8. Each box contained a different number of erasers, and he purchased each box at a different cost. Albert sold the erasers from these eight boxes over 6 days, from day 1 to day 6, such that he first sold all the erasers from Box 1, after which he sold all the erasers from Box 2, and so on, until Box 8.

All the erasers that he sold on any day were sold at the same price, which, however, was different for each of the 6 days. Further for each eraser that he sold, the profit that he made on that eraser is calculated as the selling price of that eraser minus the cost price of that eraser, which in turn, is calculated as the cost of the box which that eraser is from, divided by the number of erasers in that box.

The table below provides the number of erasers in each box and the price (in ₹) at which he purchased each box and the graphs provide the number of erasers that he sold on each of the 6 days and the price (in ₹) per eraser on each day.

Box	Number Of Erasers	Cost Of Box (Rs)
1	54	405
2	122	976
3	88	594
4	74	481
5	120	930
6	96	576
7	64	528
8	82	697



6. What is the profit made by Albert on Day 4?
 (A) 130
 (B) 133
 (C) 138
 (D) 143
7. For how many erasers that Albert sold was the profit percentage more than 20%?



- (A) 324
 (B) 346
 (C) 368
 (D) 388
- 8.** On which day Albert made the lowest profit?
 (A) Day 6
 (B) Day 3
 (C) Day 5
 (D) Day 4
- 9.** What is the average profit per day that Albert made from Day 3 to Day 6 (inclusive of both the days)?
 (A) ₹192.50
 (B) ₹190.50
 (C) ₹188.50
 (D) ₹186.50
- 10.** What was the total profit made by Albert on selling all the erasers from Box 6?
 (A) ₹256.50
 (B) ₹260.50
 (C) ₹269.50
 (D) ₹268.50

Directions for Questions 11 to 15: Study the following information carefully and answer the given questions.

A birthday party was arranged by Carlos. For that, he needed a few items to purchase, and he went to a nearby departmental

store and bought six different items. He returned home and weighed each item and realised that the store seller had cheated while weighing the items. The total amount (in ₹) paid by him for a particular type of item is shown in the table below. Also shown is the effective price (in ₹/kg) of each type of item which is the total amount (in ₹) that he paid for a particular type of item divided by the actual weight (in kg) of that item that he received. Further, it is known that monetary loss (in ₹) for each type of item is the difference between the total amount that he paid for a particular type of item and the total amount that he should have paid (in case the store seller did not cheat).

- 11.** What is the weight of potato that Carlos received from the store seller?
 (A) 8 kg
 (B) 4.5 kg
 (C) 6 kg
 (D) 5 kg
- 12.** What is the correct amount that the store seller should have charged for 1 kg of sugar (i.e., considering seller did not cheat)?
 (A) 18
 (B) 22
 (C) 20
 (D) 24

Item	Total Amount Paid	Effective Price	Monetary Loss
Rice	200	26.66	12.5
Atta	144	28.8	12
Dal	90	36	15
Potato	75	16.66	7.5
Tomato	150	33.33	37.5
Sugar	120	30	40

- 13.** What is the weight of dal (in kg) that Carlos should have actually received (if the store seller would have not cheated when he paid ₹90 to the seller)?
- 14.** What is the total amount that Carlos should have paid to the store seller for all the items he actually received?
- (A) 654.5
(B) 685
(C) 604.5
(D) 725.5
- 15.** How much % more did Carlos pay for the dal as compared to what he should have paid (if the seller didn't cheat him)?
- (A) 16.66%
(B) 20%
(C) 14.28%
(D) Cannot be determined



Level of Difficulty - 3

Set 1

Directions for Questions 1 to 5: Study the following information carefully and answer the given questions.

Mathew runs a small-scale manufacturing company that produces items of X type. He sells these items to an authorised dealer in the lots of 1,000 items. Before selling the items to the authorised dealer, he has to decide whether or not to test a batch of 1,000 items. In case he decides to test, he has two options:

- i) Use test I
- ii) Use test II

Test I costs ₹2 per item. However, the test is not perfect. It sends 20% of the bad ones to the dealer as good.

Test II costs ₹3 per item. It brings out all the bad ones (100% accurate). A defective item identified before sending can be converted at a cost of ₹25 per item. For all the defective items which are identified at the dealer's end, Mathew has to pay a penalty of ₹50 per defective item.

1. At which of the following ranges of defective items (in a batch of 1,000), Mathew should not implement either of the tests?
 - (A) Less than 100
 - (B) More than 200
 - (C) Between 120 and 190
 - (D) Cannot be determined
2. What should be the ideal course of action for Mathew if there are 120 defective items in the lot of 1,000 items?
 - (A) Should either use Test I or send the lot without testing
 - (B) Should either use Test II or send the lot without testing
 - (C) Can use any of Test I or Test II
 - (D) Should use Test I only

3. If the number of defective items in the lot of 1,000 items is between 200 and 400, Mathew:
 - (A) Should use either Test I or Test II
 - (B) Should use Test I only
 - (C) Should use Test II only
 - (D) Cannot be decided
4. What is the ideal course of action if Mathew is told that the lot has 160 defective items?
 - (A) Use Test I only
 - (B) Use Test II only
 - (C) Send without testing
 - (D) Either use Test I or do not test
5. What is the ideal course of action, if the probability of items being defective is 0.2?
 - (A) Should use either Test I or Test II
 - (B) Should use Test I or send the lot without testing
 - (C) Should use Test II or send the lot without testing
 - (D) Cannot be decided

Set 2

Directions for Questions 6 to 9: Answer the following four questions based on the information and data given below.

After a quite humble performance in the fourth financial quarter from January to March of the financial year 2021 to 2022, the top management team of M/S Zata and Sons Ltd led by their chairman, urgently sat down on the drawing board to identify the root causes of the poor performance. They identified the performance of three group companies—Zata Steel, Zata Motors, and Zata Tea to be the main cause of the debacle.

Upon going through the microscopic details of the day-to-day activities and decision-making of the senior marketing management of these three group of companies, the chairman and his team finally identified

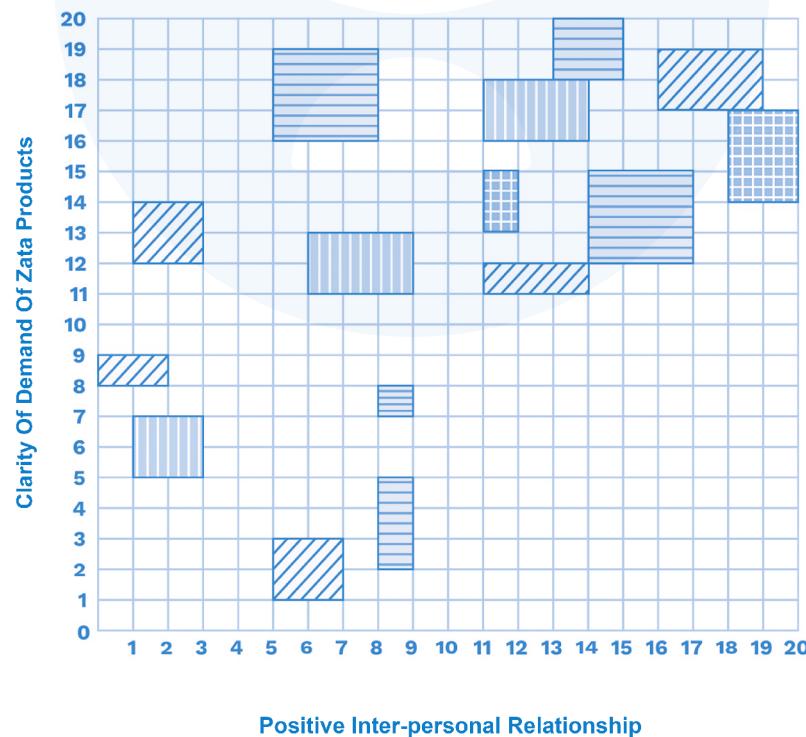
15 senior executive marketing VPs who they felt needed to be specially monitored.

The HR head of M/S Zata and Sons Ltd classified them under four categories based on a combination of scores (out of 20) on the two parameters of 1) positive interpersonal relationship and 2) clarity of market dynamics, as shown below:

The HR head then plotted some statistics pertaining to all the 15 VPs in the form of

boxes on a 20×20 square graphical grid as shown below, where the area of a box is proportional to the per annum remuneration and perks enjoyed by the VP, and the centre of the box depicts the scores out of 20 based on the two parameters mentioned above. However, during this activity, the HR head made a human error of forgetting to identify the parent Zata company group where some of the VPs belonged.

	A Grade VPs	B Grade VPs	C Grade VPs	D Grade VPs
Positive Interpersonal Relationship	> 10	> 10	</= 10	</= 10
Clarity Of Market Dynamics	> 10	</= 10	> 10	</= 10





The following facts were also observed:

- Zata Steel and Zata Motors had the same number of VPs in the A Grade category.
 - Zata Tea had more VPs than Zata Motors, but the same number of VPs as Zata Steel in the Grade D category.
 - None of the three group of companies had any VPs in the Grade B category.
 - Zata Tea did not have any VPs in the Grade C category, while Zata Steel had one VP more than Zata Motors in this category.
 - Total Grade A VPs of Zata Tea had per annum remuneration and perks in the ratio of 4:5 compared to that of total Grade A VPs of Zata Motors.
 - Per annum remuneration and perks of total Grade D VPs of Zata Motors were the same as that of Zata Tea.
6. Behind which grade of VPs (out of the 15 senior executive VPs of marketing who needed to be specially monitored) did M/S Zata and Sons spend the second-highest amount of remuneration and perks per annum?
- (A) Grade A
(B) Grade C
(C) Grade D
(D) Data insufficient
7. What is the count of VPs of Zata Tea (out of the total 15 senior executive VPs of marketing who needed the special monitoring) in Grade D, C, B, and A, respectively?
- (A) 2, 0, 0, 3
(B) 0, 2, 0, 3
(C) 0, 0, 3, 2
(D) 3, 0, 2, 0
8. If the entire 20×20 grid is equivalent to ₹60 crores of annual remuneration and perks, what is the total annual remuneration and perks provided to the VPs of Zata Motors (out of the total 15 needing special monitoring)?

- (A) ₹2.65 crores
(B) ₹3.30 crores
(C) ₹3.75 crores
(D) Data insufficient

9. If after the exit process of the Grade D VPs was completed, no new VPs were appointed and there was no change in the per annum remuneration and perks of the other VPs, then among the VPs who were selected for special monitoring, what would be the average percentage change in the expenditure behind remuneration and perks per annum per man rounded to one decimal place?
- (A) 12.4% decrease
(B) 25.3% increase
(C) 33.5% increase
(D) 20.5% decrease

Set 3

Directions for Questions 10 to 13: Answer the following questions based on the information given.

A trader has ten crates in which he has kept 70 fruits in all. These comprise only apples (●), oranges (▲), and peaches (○), with apples and peaches uniquely and respectively being the least and most in number. The maximum difference between total number of apples and total number of peaches is four. No crate is empty and no crate has more than 11 fruits. For any number of fruits, not more than two crates can have exactly as many fruits. For instance, a maximum of two crates can have eight fruits each. No crate has eight fruits and one in every two crates has all fruits. The first table below shows the number of crates having a certain range of fruits. The second table below shows some fruits present per crate. Each crate in the second table may or may not contain more fruits than shown.



Range Of Fruits	Number Of Crates	Crates	Fruits
≤ 2	1	A	◎◎◆
≤ 4	1	B	◎◎◆◆
≤ 6	5	C	▲▲
≤ 8	6	D	◎▲▲▲▲◆◆◆◆
≤ 10	9	E	◎◆
≤ 12	10	F	▲▲▲
		G	◎◎▲▲▲▲◆◆◆◆
		H	◎▲▲◆◆◆◆
		I	▲▲◆◆◆
		J	◎◎◎▲◆◆

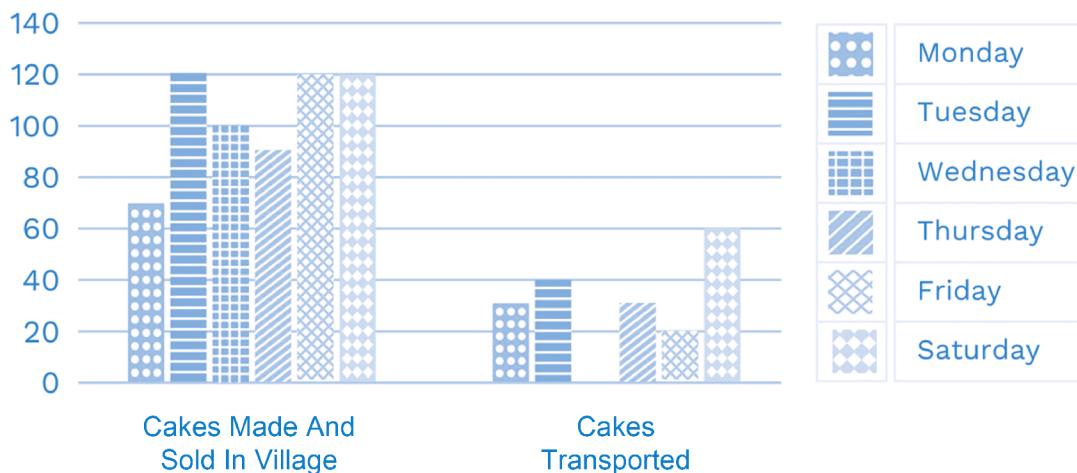
 Apples
  Oranges
  Peaches

10. What is the total number of peaches across all the crates?
 (A) 23
 (B) 25
 (C) 24
 (D) Cannot be determined
11. What is the number of oranges in crates A and E combined?
12. Some fruits are added to crates G and J so that both have the same number of fruits. What is the absolute difference between the number of fruits that were added to G and J?
13. If there are 22 apples in all, what is the maximum number of crates that can be used without any further addition of fruits to them? Assume that already allocated fruits cannot be moved between crates.

Set 3

Directions for Questions 14 and 15: Answer the following four questions based on the information and data given below.

Jack, a small village baker, makes banana cakes 6 days a week and sells them to his local customers. If the cakes he made are more than the requirements of the local customers, then he goes to a town market and sells the remaining. If the local customers need more cakes than he made, then he buys the extra cakes from the town market. He can utilise all his cakes on daily basis either by selling in the local market or the town market at the end of the day. It is also known that on three alternate days, he made the same number of cakes. The first bar graph shows the sum of the number of cakes he made and sold in the village, and the second bar graph shows the cakes he transported every day. It is also known that the total number of cakes made by the baker and the total number of cakes bought by the villagers were the same, at the end of the week.



14. How many cakes did he make in the entire week?

- (A) 510
- (B) 320
- (C) 310
- (D) Cannot be determined

15. Which of the following is true?

- (A) On Monday, villagers bought 30 cakes.
- (B) On Monday, he sold 30 cakes in the town market.
- (C) On Monday, he bought 30 cakes from the town market.
- (D) More than one of these.

Level of Difficulty - 1

1. (B)

This is a typical R-DI set which you find more often, nowadays, in CAT exam. Make sure that you are not bringing any of your personal assumptions while solving such real-life-based sets.

It is mentioned that Prakash is 17th in the queue and seven females are ahead of him, i.e., a total of nine males are ahead of him.

So, total time to dispatch the tickets to 16 people (who are ahead of him) in the queue = $2 \times 7 + 1 \times 9 = 23$ minutes.

Also, one more minute to dispatch the ticket to Prakash. (Needless to mention the gender of the person with the name Prakash in the Indian scenario).

So, Prakash will get the ticket 24 minutes after he joined the queue, i.e., at 7:09 p.m.

Hence, option (B) is correct.

2. (C)

As explained earlier, everyone who is ahead of Prakash got the tickets in 23 minutes. It means that the person ahead of Prakash got his/her ticket at the end of 23rd minute.

Hence, option (C) is correct.

3. (D)

As we can see in the chart, a total of 12 females and 48 males have joined the queue after Prakash (i.e., after 6:45 p.m.).

So, total 60 people joined the queue till 7:15 p.m.

Hence, option (D) is correct.

4. (C)

Prakash will get his ticket at 7:09 p.m. There will be 60 more people behind him, and the tickets will be dispatched

till 7:45 p.m. (i.e., for 15 more minutes after the start of the match).

Also, as we can see in the diagram, behind Prakash, one female joins after every four males join the queue. And this pattern continues.

So, each set (four male, one female) will be issued tickets in $4 \times 1 + 1 \times 2 = 6$ minutes.

From 7:09 to 7:45, the duration is 36 minutes. In this duration, 30 people in total (24 males, 6 females) will be issued the tickets.

Hence, the remaining 30 people will have to go back empty-handed.

Hence, option (C) is correct.

5. (D)

Prakash will get his ticket at 7:09 p.m. There will be 60 more people behind him, and the tickets will be dispatched till 7:45 p.m., i.e., for 36 more mins.

Out of the 60 people, 48 are males and it will take 48 minutes just to dispatch the tickets to the males.

So, it is not possible to dispatch the tickets to all 60 people (behind Prakash) in that 36 minutes, irrespective of the new dispatch rate we set for females.

Hence, option (D) is correct.

6. (B)

The cars which were sold in 2004 would come for a paid recharge in 2007. As 60% of the owners would go for a third party replacement and the increase there is 588 ($5,640 - 5,052$), 588 is 60% of the cars sold, the number of cars sold would be 980.

Hence, option (B) is correct.



7. (C)

All cars manufactured from 2001 to 2003 would come for a paid recharge in 2006. As 60% of them go to third party vendors and 60% of the total = 5,052

Hence, total = 8,420.

Hence, option (C) is correct.

8. (D)

As the cars sold in 2006 would come for a paid recharge in only 2009, we cannot determine the value.

Hence, option (D) is correct.

9. (B)

The trick to solve this question is to decide the range.

- Minimum sales of Akola were in the year 2011 and 2014, i.e., 20%, and the maximum sales of Akola were in the year 2012, i.e., 32%.
- So, the minimum value of total sales of Akola can be 20 lakh kg (as 20% of the total sales should not be below 4 lakh).
- Also, the maximum value of the total sales of Akola can be 25 lakh kg (as 32% of the total sales should not be more than 8 lakh).
- Therefore, the range for the total sales of Akola is 20 lakh to 25 lakh.

Hence, option (B) is correct.

10. (B)

For the maximum difference, we have to consider two cases.

Case 1:

Cubola had maximum possible sales in the year 2013 and Bakola had minimum possible sales in the year 2013.

- To maximise the sales of Cubola in the year 2013, we will have to assume that it has ₹8 lakh kg sales in the year 2014, which had the maximum % share of its total sales. (If we consider

8 lakh in 2013, then the sale of Cubola will exceed 8 lakh in 2014 as the % share [of total sales] was higher in 2014 than that in 2013).

So, if 36% \rightarrow 8 lakh kg, then 24% \rightarrow 5.33 lakh kg.

- To minimise the sales of Bakola in the year 2013 only, we will have to consider that it had 4 lakh kg sales in the year 2012 (as it had the least % share of its total sales in that year).

So, if 20% \rightarrow 4 lakh kg, then 24% \rightarrow 4.8 lakh kg.

- So, the difference between the maximum sales of Cubola and the minimum sales of Bakola in the year 2013 is $5.33 - 4.8 = 0.53$ lakh kg.

Case 2:

Cubola had the minimum possible sales in the year 2013 and Bakola had the maximum possible sales in the year 2013.

- To minimise the sales of Cubola in the year 2013, we will have to consider that it had 4 lakh kg sales in the year 2011, which had minimum % share of its total sales. So, if 20% \rightarrow 4 lakh kg, then 24% \rightarrow 4.8 lakh kg.
- Similarly, Bakola can have maximum sales in the year 2013 only. (If it is considered as ₹8 lakh kg in the year 2011 as it had maximum % share of its total sales in this year). So, if 32% \rightarrow 8 lakh kg, then 24% \rightarrow 6 lakh kg.
- So, the difference between maximum sales of Bakola and minimum sales of Cubola the year is $6 - 4.8 = 1.2$ lakh kg.

As maximum of these two cases is 1.2 lakh, the answer is 1.2 lakh kg.

Hence, option (B) is correct.

11. (C)

- It is given that for any country, the minimum value of sales in any year is 4 lakh kg, and the maximum value of sales in any year is 8 lakh kg.

- For Dakula, maximum sales were in the year 2014 (32%) and minimum sales were in the year 2011 (16%), which was half of the sales in the year 2014.
- It means, sales in 2014 had to be 8 lakh kg and sales in the year 2011 must have been 4 lakh kg (if sales in the year 2014 decrease, the sales in the year 2011 will also go below 4 lakh kg, which is not possible).

Therefore, as the sales in 2011 were 4 lakh, i.e., 16% of the total sales, the sales in the year 2012 were 27%, i.e., 6.75 lakh kg.

Hence, option (C) is correct.

12. (A)

It is given that Bakola and Cubola had the same quantity of sales in the year 2014.

So, let's say the total sales of Bakola over the given period was x and that of Cubola was y .

So, 24% of x = 36% of y

So, $x:y = 3:2$

Now, let's consider the total sales of Bakola over the given period as 300a and that of Cubola as 200a.

Let's evaluate the options.

Option (A): The sales of Bakola in 2012, i.e., 60a (20% of 300a) are surely greater than the sales of Cubola in 2013, i.e., 24% (48a).

So, option A is true. Hence, we don't need to check the other options.

Hence, option (A) is correct.

13. 8

For the optimum utilisation of table space, we will not join any tables for any size of group, unless it's absolutely necessary.

So, the arrangement can be as follows:

$(s - 1), (s - 2), (m - 3), (m - 4), (m + s) - 5, (L - 6), (L + s) - 7, (m + s + s) - 8$
 $(s - \text{small-size table}; m - \text{medium-size table}; L - \text{large-size table})$

So, we can accommodate groups of size 1 to 8 at a time.

Hence, the answer is 8.

14. 0

Since we are asked to find out the minimum number of groups that can be accommodated after the arrival of those six groups, we can try to utilise the maximum possible tables for those groups, i.e., maximizing wastage of space as much as possible.

So, we can think of the following arrangement:

$(s + s + s + s) - 7 (m + m) - 5 (m + m) - 5$
 $(s + s) - 3, L - 3, L - 3$

So, all the tables can be occupied, and no table is empty.

Hence, the answer is 0.

15. 6

By adhering to all the conditions mentioned in the question, the allotment can be done as shown below:

- Group 1 (eight people) – (L + S)
- Group 2 (three People) – (M)
- Group 3 (five people) – (L)
- Group 4 (two people) – (S)
- Group 5 (three people) – (M)

So, six tables are used, i.e., six tables are empty.

Hence, the answer is 6.



Level of Difficulty - 2

1. (B)

It is given that no two classrooms that had students from the same grades, had the same number of students. Also, we know that there were five classrooms for class 10.

∴ The number of students in five classrooms of Grade 10 has to be 30, 45, 50, 65, and 75.

∴ The number of students that were in Grade 10 was 265.

Now, there were eight classrooms with at most 65 students. It implies that there were two classrooms with more than 65 students, i.e., 75 students.

Also, the number of classrooms that had at least 65 students is given as 5.

∴ The number of classrooms which had exactly 65 students must be $5 - 2 = 3$.

Also, the number of classrooms with 30 and 45 students cannot be 0 as we know that one of the classrooms for Math Olympiad (Class 10) has 30 and one has 45 students.

Similarly, it can be worked out to get the number of classrooms with different strengths of the students, as mentioned below:

So, there was only one classroom that had exactly 50 students in it.

Hence, option (B) is correct.

Number Of Students	Number Of Classrooms
30	1, 2 or 3
45	1, 2 or 3
50	$6 - (3 + 2) = 1$
65	$5 - 2 = 3$
75	$10 - 8 = 2$

2. (C)

As explained earlier, the number of students in Grade 10 was 265.

Hence, option (C) is correct.

3. (D)

Let's consider the table that we created earlier.

Number Of Students	Number Of Classrooms
30	1, 2 or 3
45	1, 2 or 3
50	$6 - (3 + 2) = 1$
65	$5 - 2 = 3$
75	$10 - 8 = 2$



Now, we have to maximise the number of students writing the Math Olympiad. So, we can consider three classrooms with 45 students in them, and one classroom with 30 students in it.

∴ The maximum total would be

$$\begin{aligned} & 30 + (45 \times 3) + 50 + (65 \times 3) + (75 \times 2) \\ & = 30 + 135 + 50 + 195 + 150 \\ & = 560 \end{aligned}$$

Hence, option (D) is correct.

4. 30

Since the number of students who wrote the Olympiad exam from Grade 8 was maximum possible, it could be $65 + 75 = 140$ (as there were only two classrooms for Grade 8).

Further, the total number of students writing the Math Olympiad was minimum possible. So, there have to be three classrooms with 30 students each (as explained earlier).

The distribution can be shown as below:
So, the number of students from Grade 7 would be 30.

Hence, the answer is 30.

5. 3

Different values for the total possible strengths can be obtained by assigning 30 students to one classroom and 45 to three classrooms, or by assigning 30 to two classrooms and 45 to two classrooms, or 30 to three classrooms and 45 to one classroom. (Because we know the exact strengths of the other classrooms).

So, we can obtain three different values for the total strength of students appearing from all the grades.

Hence, the answer is 3.

6. (C)

On day 1, Albert sold 142 erasers. The cost of the first 54 erasers (which belonged to Box 1) is ₹405.

The cost of the next 88 erasers (from box 2) = $\frac{976}{122} \times 88 = 704$

On day 2, he sold 124 erasers, of which 34 erasers are from Box 2, 88 erasers are from Box 3, and 2 erasers are from Box 4.

The total cost of the first 34 erasers is $34 \times 8 = ₹272$.

Number Of Students	Number Of Classrooms	Grade
30	3	10 9 7
45	1	10
50	1	10
65	3	10 8 9
75	2	10 8



The cost of the next 88 erasers is ₹594 and the cost of the next 2 erasers is

$$\frac{481}{74} \times 2 = 13$$

Similarly, we can calculate the cost of the erasers for each day and box combination. The table below presents the number of erasers, along with the box the eraser is from, the price, cost, and profits of the erasers.

Day	Number of erasers	Sell Price	Cost	Profit
Day 1	54 (B1)	1,349	1109	240
	88 (B2)			
Day 2	34 (B2)	1,271	879	392
	88 (B3)			
	2 (B4)			
Day 3	72 (B4)	999	747	252
	36 (B5)			
Day 4	84 (B5)	969	831	138
	30 (B6)			
Day 5	66 (B6)	945	742.5	202.5
	42 (B7)			
Day 6	22 (B7)	1,040	878.5	161.5
	82 (B8)			

Therefore, the profit made by Albert on day 4 = ₹138.

Hence, option (C) is correct.

7. (C)

As shown earlier in the table, on day 1, the first 54 erasers have profit percentage of more than 20%.

All the erasers sold on day 2 have more than 20% profit percentage.

On day 3 the first 72 erasers have profit percentage more than 20%.

On day 4, the 30 erasers sold have a profit percentage more than 20%.

On day 5, the first 66 erasers and on day 6, the first 22 erasers have profit percentage more than 20%.

Therefore, total number of erasers = 54 + 34 + 88 + 2 + 72 + 30 + 66 + 22 = 368.

Hence, option (C) is correct.

8. (D)

From the table that we created previously, Albert made the lowest profit on day 4.

Hence, option (D) is correct.

9. (C)

From the values derived in the table presented earlier, we can easily calculate the average profit as mentioned below.

The average profit made by Albert per day from day 3 to day 6

$$= \frac{252 + 138 + 202.5 + 161.5}{4}$$

$$= 188.50$$

Hence, option (C) is correct.

10. (A)

Be careful here. The question is about the total profit from Box 6, and not day 6. Using the information in the table created earlier, we can calculate the total profit from Box 6 as:

Profit was made by selling the erasers in Box 6

$$= 30 \times 8.5 + 66 \times 8.75 - 576$$

$$= ₹256.50$$

Hence, option (A) is correct.



11. (B)

$$\text{Effective price} = \frac{\text{Total amount paid}}{\text{Weight of item received}}$$

\therefore Weight of item received

$$= \frac{\text{Total amount paid}}{\text{Effective price}}$$

So, the weight of potato received

$$= \frac{75}{16.66} = 4.5 \text{ kg}$$

Hence, option (B) is correct.

12. (C)

For sugar,

$$\text{The weight received} = \frac{120}{30} = 4 \text{ kg}$$

Monetary loss = ₹40

So, the actual price of sugar for 4 kg should have been $120 - 40$, i.e., ₹80.

So, the correct selling price of sugar is ₹20/kg.

Hence, option (C) is correct.

13. 3

For dal,

$$\text{The weight received} = \frac{90}{36} = 2.5 \text{ kg}$$

Monetary loss = ₹15

So, the actual price of dal for 2.5 kg should have been $90 - 15$, i.e., ₹75.

So, the actual price per kg should have been $\frac{75}{2.5} = ₹30/\text{kg}$.

Now, in ₹90, he should have received 3 kg dal at the actual price of ₹30/kg.

Shortcut

As the actual price is 16.66% less than the selling price, the quantity received should be 20% more than the quantity actually received (by increase-decrease pairs of %).

So, if we increase 2.5 kg by 20%, we get 3 kg.

Hence, the answer is 3.

14. (A)

$$\begin{aligned}\text{Total amount paid} &= 200 + 144 + 90 + 75 \\ &+ 150 + 120 = ₹779\end{aligned}$$

$$\begin{aligned}\text{Total loss} &= 12.5 + 12 + 15 + 7.5 + 37.5 + \\ &40 = ₹124.5\end{aligned}$$

So, the amount that Carlos should have actually paid = ₹779 – ₹124.5

$$= ₹654.5$$

Hence, option (A) is correct.

15. (B)

As discussed earlier, Carlos paid ₹36 for a kg dal, while he should have paid only ₹30 for a kg

$$\begin{aligned}\text{So, we can say that he paid } &\frac{(36-30)}{30} \times 100\% \\ &= 20\% \text{ more.}\end{aligned}$$

Hence, option (B) is correct.



Level of Difficulty - 3

1. (A)

Let the total number of bad items be x , so the total number of good ones will be $(1000 - x)$.

If he takes test I, his total cost can be calculated as:

(₹2 per item for test + ₹25 per item for the 80% bad items which are identified + penalty of ₹50 per item on the remaining 20% bad items identified by dealer)

$$= 2 \times (1000) + 25 \times 0.8x + 50 \times 0.2x$$

If he takes test II his total cost will be (₹3 per item for test + ₹25 per item for the 100% bad items which are identified)

$$= ₹3 (1000) + 25x$$

If no test is used, then the cost = ₹50 × defective items = $50x$

Now, it will be worth testing if the cost of the testing is less than the cost of penalty required to be paid on the defective pieces. Let us now tabulate different cases.

From the table, it is obvious that for a number of defective items above 100, the cost of any testing is cheaper than the penalty. But for 100 defective items, the cost of the penalty is the same as for testing. So, below 100 defective items, the penalty will be less than the cost of testing and hence it is not worth testing. Hence, option (A) is correct.

2. (D)

As shown in the table in the previous question, if there are 120 items, he should go for Test I as it is cheaper.

Hence, option (D) is correct.

3. (C)

It is clear from the table that if the number of defectives is exactly 200, test I or II will incur an equal minimum cost. However, if the defective items are between 200 and 400, he should go for only Test II as it is cheaper.

Hence, option (C) is correct.

Number Of Defective Items	Cost Of Test I	Cost Of Test II	Penalty If No Tested
100	5000	5500	5000
120	5600	6000	6000
160	6800	7000	8000
190	7700	7750	9500
200	8000	8000	10000
400	14000	13000	20000

4. (A)

If the number of defective items is between 100 and 200, Test I is cheaper option.

So, in the case of 160 defectives, he should use Test I as it is cheaper.

Hence, option (A) is correct.

5. (A)

Probability of 0.2 means 20% defective items, i.e., 200 bad items in a lot of 1,000.

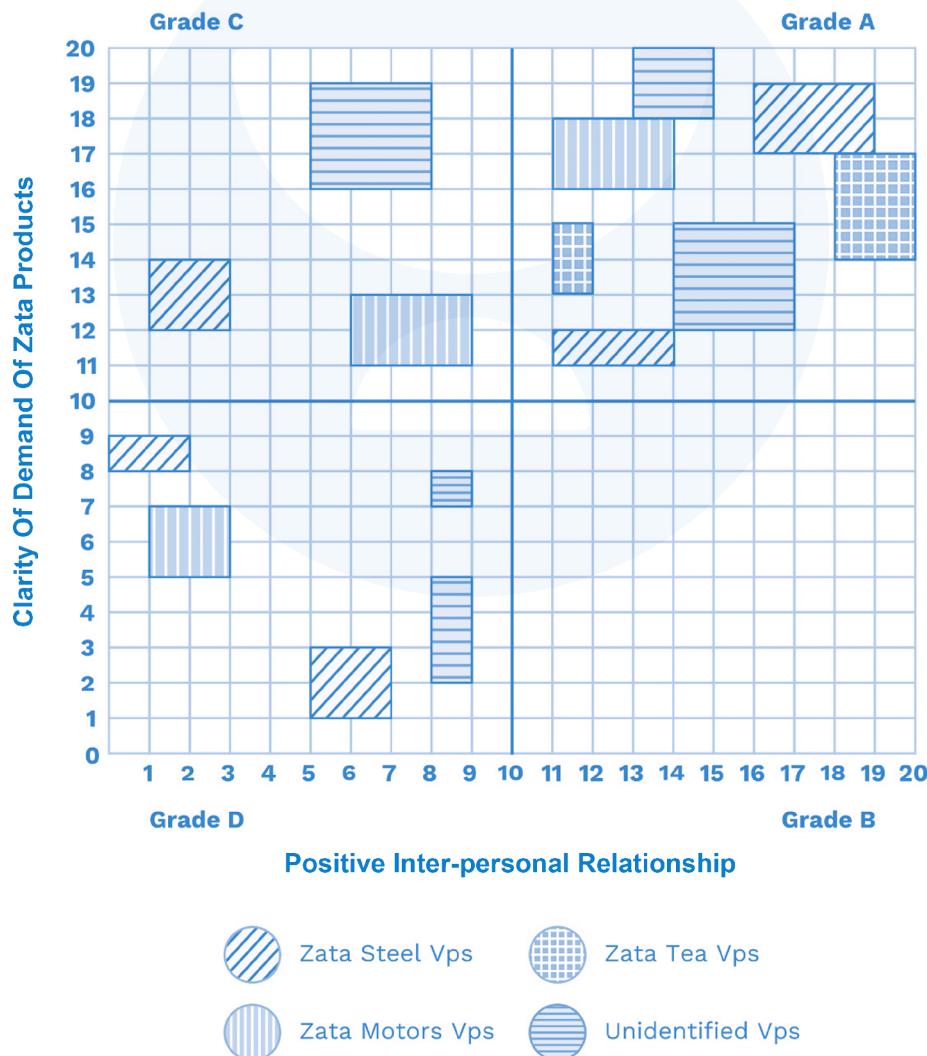
If there are 200 defective items in the lot, Mathew may use either Test I or Test II as the cost of both the tests will be the same, i.e., ₹8,000.

Hence, option (A) is correct.

Solutions for Questions 6 to 9

Common data analysis for all the questions of this set:

- Having studied the table about criteria of Grade A, B, C, and D VPs, we can understand that the 20×20 grid, if divided into four equal parts along the centre, then the top right quadrant belongs to category Grade A, top left quadrant belongs to category Grade C, bottom right quadrant belongs to Grade B and the bottom left quadrant belongs to category Grade D, as shown below.





- From fact no 1 we can understand that Zata Steel VPs cannot be more than two because otherwise fact number 1 can never be fulfilled. Hence one of the unidentified boxes will belong to Zata Motors and the other to Zata Tea.
- The area of a box is proportional to the per annum remuneration and perks enjoyed by the VP it represents. As per fact number 5, we can see that the 3×3 unidentified box must belong to a Zata Motors VP and the 2×2 one to a Zata Tea VP. Because then only the ratio of the per annum remuneration and perks of Zata Tea Grade A VPs and Zata Motors Grade A VPs become $(2 \times 1 + 2 \times 2 + 3 \times 2):(2 \times 3 + 3 \times 3) = 12:15 = 4:5$.
- From fact number 2 we can clearly understand that the two unidentified boxes of Grade D VPs must belong to Zata Tea. Fact number 6 corroborates the logic further.
- Fact number 3 is self-explanatory keeping in mind the 20×20 grid, where there are no VPs in Grade B.
- From fact no 4, it can be clearly understood that the unidentified box in Grade C category belongs to a Zata Steel VP.

6. (B)

Since the area of a box is proportional to the per annum remuneration and perks enjoyed by the VP it represents, Grade A category VPs get per annum remuneration and perks proportional to $(2 \times 3 + 1 \times 3 + 2 \times 3 + 3 \times 3 + 2 \times 1 + 2 \times 2 + 3 \times 2) = (6 + 3 + 6 + 9 + 2 + 4 + 6) = 36$ units, Grade B category VPs get per annum remuneration and perks proportional to 0 units, Grade C category VPs get per annum remuneration and perks proportional to $(2 \times 2 + 3 \times 3 + 2 \times 4) = (4 + 9 + 8) = 21$ units, and Grade D category VPs get per annum remuneration and perks proportional to $(1 \times 2 + 2 \times 2 + 2 \times 2 + 1 \times 1 + 3 \times 1) = (2 + 4 + 4 + 1 + 3) = 14$ units.

Hence second highest belongs to Grade C category VPs.

7. (A)

We can see that the number of VPs of Zata Tea belonging to Grade A is 3, Grade B is 0, Grade C is 0, and Grade D is 2. So, the requisite order is 2, 0, 0, 3.

8. (C)

A 20×20 grid has 400 (1×1) units. Hence the value of each 1×1 unit is $= (60 \text{ crore}/400) = ₹15$ lakh per annum worth of remuneration and perks.

The total units consumed overall by the VPs of Zata Motors, all the Grades taken together $= (2 \times 3 + 3 \times 3 + 2 \times 2 + 2 \times 3) = (6 + 9 + 4 + 6) = 25$ units.

Hence, the total per annum remuneration and perks provided to the VPs of Zata Motors (out of the total 15 needing special monitoring) $= ₹(25 \times 15)$ lakh $= ₹3.75$ crores.

9. (C)

From the solution of answer 1, we can see that before any exit process (but after the start of the special monitoring), the overall per annum remuneration and perks enjoyed by the total 15 VPs present is $(36 + 0 + 21 + 14) = 64$ units

So, per man per annum average $= 64/15 = 4.27$ units

The exit process was applicable to the Grade D VPs, that is five VPs.

From the solution of answer 1, we can see that after the exit process, the overall per annum remuneration and perks enjoyed by the total 10 VPs present is $(36 + 0 + 21 + 0) = 57$ units

So new per man per annum average $= 57/10 = 5.70$ units

Hence, the percentage change will be $(5.70 - 4.27)/4.27 \times 100 = 33.5\%$

10. (B)

The number of apples is the least and the number of peaches is the most. So, the number of oranges will be between the two.

Also, the maximum difference between the number of apples and peaches is four.

Let there be a apples. Hence, the number of peaches can be $(a + 2)$, $(a + 3)$, or $(a + 4)$.

Correspondingly, the number of oranges can be $(a + 1)$, $(a + 2)$ or $(a + 3)$.

For each case, the value of a can be found using:

$$\text{Apples} + \text{oranges} + \text{peaches} = 70$$

Hence, a can be 21 or 22.

Based on the valid cases above:

$$(\text{apples, oranges, peaches}) = (22, 23, 25) \\ \text{or } (21, 24, 25)$$

In either case, there are 25 peaches.

Hence, option (B).

11. 0

It is known that one in every two crates has all fruits, i.e., apples, oranges, and peaches. Hence, five out of ten crates need to have all fruits.

Observe the second table given. It can be seen that crates B, D, G, H, and J have

already been shown with all three types of fruits. Hence, these are the five crates with all fruits.

Each of the remaining crates A, C, E, F, and I has to have at least one fruit missing.

Observe crates A and E. Some apples and peaches have already been assigned to these crates. Hence, for these crates to satisfy the above condition (of one fruit missing), they can never have oranges.

Hence, the number of oranges in crates A and E combined = $0 + 0 = 0$

Hence answer is 0.

Note: This question can be solved directly from the given data and observation. No solving is actually required for this question.

12. 3

Here, the number of fruits per crate has to be found.

Observe that the first table is a cumulative frequency table. So, the number of crates with at most six fruits is five, and the number of crates with at most eight fruits is six. Hence, there is exactly $6 - 5 = 1$ crate with either seven or eight fruits.

Similarly, the entire table can be made as under:

Apples	Oranges	Peaches	a	Status
a	$a + 1$	$a + 2$	22.33	Invalid
a	$a + 1$	$a + 3$	22	Valid
a	$a + 1$	$a + 4$	21.67	Invalid
a	$a + 2$	$a + 3$	21.67	Invalid
a	$a + 2$	$a + 4$	21.33	Invalid
a	$a + 3$	$a + 4$	21	Valid



Number of Fruits	1 or 2	3 or 4	5 or 6	7 or 8	9 or 10	11 or 12
Number of Crates	1	0	4	1	3	1

Now, observe that the second table shows a minimum of two fruits allocated to each crate. Hence, no crate can have one fruit. Since the maximum number of

fruits per crate is 11, no crate can have 12 fruits. Also, it is known that no crate has eight fruits. Hence, the table becomes:

Number of Fruits	1	2	3	4	5	6	7	8	9	10	11	12
Number of Crates	0	1	0	0			1	0			1	0

Now, there are four crates with five or six fruits. For any number of fruits, there cannot be more than two crates for that count. Hence, there have to be two crates with five fruits each and two crates with six fruits each.

∴ Total fruits allocated so far

$$= (2 \times 1) + (5 \times 2) + (6 \times 2) + (7 \times 1) + (11 \times 1) = 2 + 10 + 12 + 7 + 11 = 42$$

Hence, $70 - 42 = 28$ fruits need to be allocated further in the remaining three crates. Also, each of these crates can have 9 or 10 fruits. Both these conditions can be satisfied if the distribution is 9, 9, 10.

Hence, the final breakup of fruits is:

Number of Fruits	1	2	3	4	5	6	7	8	9	10	11	12
Number of Crates	0	1	0	0	2	2	1	0	2	1	1	0

Now, observe that crate G has already been allocated eight fruits but it is given that there is no crate having eight fruits. Hence, it can have 9, 10, or 11 fruits. However, since crates G and J have the same number of fruits, they both need to have exactly nine fruits. (Because there is only one crate with 10 fruits and only one crate with 11 fruits).

Hence, one fruit is to be added to crate G and four fruits need to be added to crate J.

∴ Required difference = $|1 - 4| = 3$

Hence, answer is 3.

13. 4

Consider the total number of fruits already allocated to each crate.

Crate	A	B	C	D	E	F	G	H	I	J
Number of Fruits	3	4	2	9	2	3	8	5	4	5



The number of fruits per crate can only be 2, 5, 6, 7, 9, 10, or 11.

Hence, some fruits will definitely need to be added to crates A, B, (C/E), F, G, and I, i.e., six crates. Hence, so far, a maximum of four crates can be used without any addition (C/E), D, H, and J.

However, since there are 22 apples, there have to be 23 oranges and 25 peaches. Hence, check if the distribution of these three types of fruits can be done without modifying the contents of crates (E/C), D, H, and J.

The table below shows one such allocation. The highlighted crates have not been modified.

Crate	Apples	Oranges	Peaches
A	6	0	4
B	4	1	1
C	0	2	0
D	1	3	5
E	4	0	3
F	0	9	0
G	3	3	5
H	1	1	3
I	0	3	3
J	3	1	1

Hence, a maximum of four crates can be used without any further addition.

Hence, answer is 4.

14. (B)

Let x be the number of cakes he made on a particular day and y be the number of cakes he sold on that day.

So, for the entire week, $x + y = 70 + 120 + 100 + 90 + 120 + 120 = 620$

It is also known that the total number of cakes made by the baker and the total number of the cakes bought by the

villagers were the same, at the end of the week.

$$\text{So, } x = 620/2 = 310$$

Hence, option (B) is correct.

15. (B)

The first bar graph shows the sum of the number of cakes he made and sold in village. On Wednesday, the sum of cakes made and sold is 100, and as per the Graph 2, no cakes were transported.

So, the number of cakes made by him on Wednesday is 50.

It is also known that on three alternate days, he made the same number of cakes.

Let x be the number of cakes he made on a particular day and y be the number of cakes he sold on that day. So, $x + y$ is the value represented in the 1st bar graph. And difference of x and y ($x - y$) indicates the cakes transported (i.e., bought from or sold) to the town market.

Trying all the combinations of $x+y$ and $x - y$, x cannot be the same on Tuesday and Thursday.

(For example, on Tuesday, $x + y = 120$ and $x - y = 40$. So, $x + y = 120$ and $x - y = 40$ or $x + y = 120$ and $y - x = 40$. So, x will be either 80 or 40. Similarly, if we check for Thursday, we get value of x as 50 or 20. Hence, the cakes made on Tuesday and Thursday can't be the same).

So, Monday, Wednesday, and Friday are the days when an equal number of cakes were made.

Also, we know that he made 50 cakes on Wednesday, so number of cakes made (x) on Monday and Friday should also be 50.

On Monday, $x + y = 70$. So, $y = 20$, i.e., he must have transported the remaining 30 cakes to the town market.

Hence, option (B) is correct.