PRACTICE EXERCISES FOR DATA INTERPRETATION

Practice Exercise – 1

Data: The word "data" originates from the Latin word "datum", which means "given" or a "piece of information". "Data" is simply the plural form of datum.

Data can be classified according to the type of source from which it has been obtained. There are two types of data in this form of classification, namely Primary Data and Secondary Data.

Primary Data: Any data that is collected directly from the actual circumstances to which it pertains is referred to as primary data. For example, if a teacher were to count the number of students present in the class, then the teacher would be gathering primary data.

Secondary Data: Unlike primary data, secondary data is always collected from pre-recorded sources like survey reports, records, registers and databases. For example, if the teacher were to find the number students who have never been absent in the last one month, then the teacher would refer to the attendance register, which is a pre-recorded source of data.

Data analysis / interpretation: The data collected has to be organized and then analyzed. Data Interpretation is performing various calculations or operations upon the given data in order to arrive at meaningful conclusions. The conclusions can be either quantitative or qualitative in nature. In some cases, it may be sufficient to merely organise or reorganise the given data without performing any actual calculations on it.

Representation of Data: Data can be represented in the form of tables, charts, graphs, pie charts, caselets, three-dimensional figure etc.

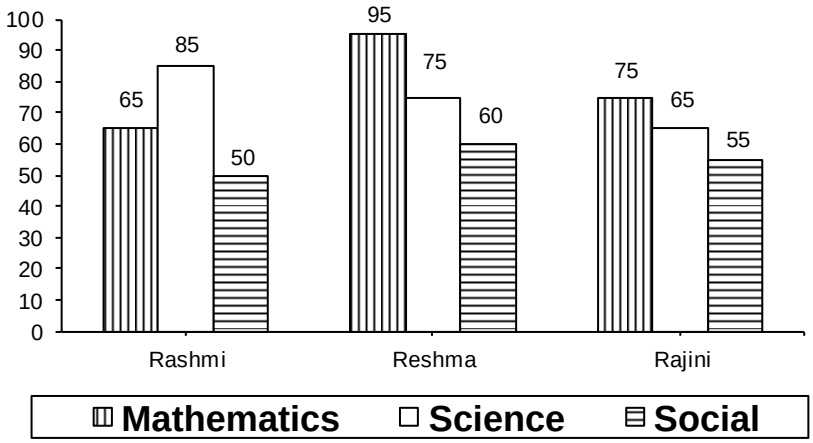
We will now see how the same set of data can be represented in different forms.

Examples 1 and 2: The following table gives information about marks secured (out of 100) by three students in three subjects.

Name	Mathematics	Science	Social
Rashmi	65	85	50
Reshma	95	75	60
Rajini	75	65	55

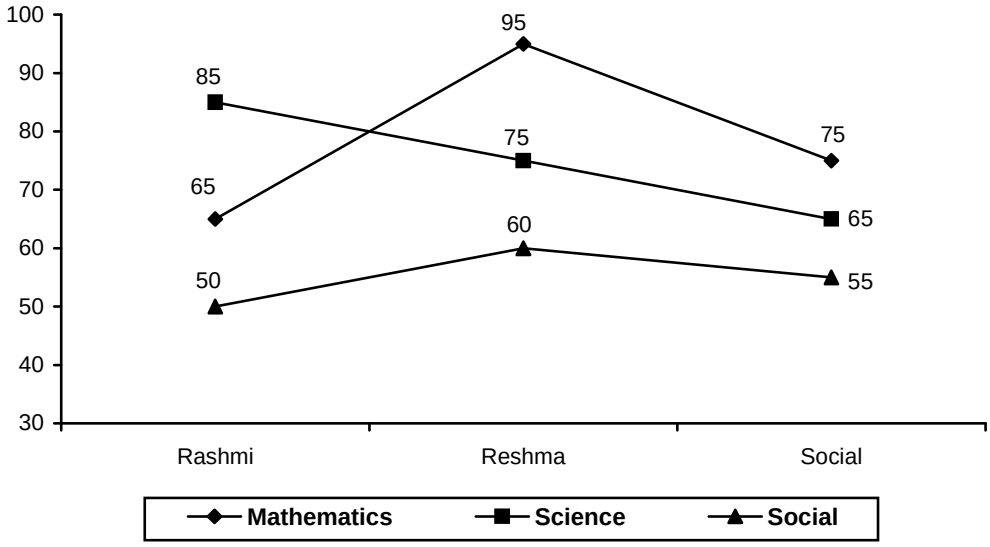
(1) Who scored the highest marks in all the three subjects put together?
(2) The marks scored by Reshma in science is what percentage of the marks she scored in social?

Examples 3 and 4: The following bar chart gives information about marks secured (out of 100) by three students in three subjects.



(3) The total marks scored by Rashmi is what percentage more/less than that scored by Rajini?
(4) The marks scored by Rajini in Social is what percentage less than what she scored in Mathematics?

Examples 5 and 6: The following line graph gives information about marks secured (out of 100) by three students in three subjects.



(5) The total marks scored by Reshma is what percentage more than that scored by Rajini?
(6) In Mathematics, the total marks scored by both Rashmi and Rajini together is how much more than that scored by Reshma?

Note: From the above Examples 1 through 6, whatever by the form in which the data is represented, by and large the logic for solving the questions will be the same.

Directions for questions 1 to 6: These questions are based on the following table which shows the sales figures of pharmaceutical companies in India from 2010-11 through 2015-16.

SALES OF PHARMACEUTICAL COMPANIES

(in ₹Crores)

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Tanbaxy	6746	7813	8761	8093	9257	9809
Pipla	4072	4239	6577	7081	7341	6958
Dr. Meddy's	4185	6164	6328	6961	6916	8011
Mupin	2285	3015	3327	4239	6273	9036
Rockhardt	3819	5648	5841	6179	7214	7645

1. During the period given above, which company recorded the maximum increase in sales between any two consecutive years?
(A) Tanbaxy
(B) Rockhardt
(C) Mupin
(D) Pipla

2. In the year 2011-12, what is the share of Dr. Meddy's out of the total sales of all the companies?
(A) 21.9% (B) 22.4%
(C) 22.9% (D) 23.4%

3. According to the given data, which company has recorded the highest percentage increase in sales between any two consecutive years?
(A) Tanbaxy
(B) Rockhardt
(C) Pipla
(D) Mupin

4. What is the approximate average annual growth rate of the sales of Rockhardt from 2010-11 to 2015-16?
(A) 17% (B) 20%
(C) 18% (D) 100%

5. In 2016-17, the sales of Mupin increases by 25% over the sales of 2015-16. By what percentage should the sales of Rockhardt increase from 2015-16 to 2016-17, so that the sales of Mupin in 2016-17 is equal to that of Rockhardt?
(A) 46.25 (B) 47.25
(C) 47.75 (D) 48.75

6. If any company records an increase of 10% or more in its sales over the previous year, it is awarded 'Star Rating' by S & P consultancy. How many instances were there in the given period where the 'Star Rating' was awarded by S & P consultancy to any of the given companies?
(A) 11 (B) 12
(C) 13 (D) 14

Directions for questions 7 to 11: These questions are based on the table which gives the distribution of recognised educational institutions in a few states in India.

State / Union Territory	Primary Schools	Middle Schools	High Schools	Colleges for general education	Colleges for professional education	Deemed Universities
Andhra Pradesh	58249	14472	14255	1080	279	22
Arunachal Pradesh	1303	333	184	7	1	1
Assam	33236	8019	4832	298	63	6
Bihar	53351	13571	5008	742	47	18
Goa	1267	443	448	20	10	1
Gujarat	15602	21143	6343	422	112	12
Haryana	11013	1892	4228	150	52	5
Himachal Pradesh	10877	1768	1954	65	12	3
Jammu & Kashmir	10926	3728	1504	33	12	4
Karnataka	22404	27712	8612	916	304	16
Kerala	6758	2973	4182	186	62	8
Madhya Pradesh	62530	25090	8471	413	78	16
Maharashtra	45971	24574	16059	1208	535	29
Manipur	1752	795	637	15	7	2
Uttar Pradesh	88927	20429	9063	758	189	27

7. If all the given states are arranged in the ascending order of the total number of primary and middle schools, then which state is the fourth from the last?
(A) Bihar (B) Andhra Pradesh
(C) Kerala (D) Maharashtra

8. A state in which the number of primary schools is more than the number of high schools, while the number of colleges for professional education is more than half that of the colleges for general education is said to be good in educational infrastructure. How many states are good in educational infrastructure?
(A) 0 (B) 1 (C) 2 (D) 3

9. In how many states is the number of high schools more than the number of colleges for general education by at least 300%?
(A) 15 (B) 14
(C) 11 (D) None of these

10. In all the states in which the number of primary schools is more than 50,000, the respective state governments own 50% of these primary schools. Find the least number of such states that should be clubbed together so that the total number of primary schools owned by the state governments of the states is more than 1,00,000.
(A) 2 (B) 3
(C) 4 (D) 5

11. Which State has the largest difference between the total number of primary and middle schools as compared to the number of Deemed Universities?
(A) Bihar
(B) Madhya Pradesh
(C) Andhra Pradesh
(D) Uttar Pradesh

Directions for questions 12 to 15: These questions on based on the following table which gives details of the employees in five companies P, Q, R, S and T.

Company	No. of employees	Ratio of male to female employees	Avg. age of female employees	Avg. age of all employees
P	17865	2 : 1	28	32
Q	18183	8 : 11	31	30
R	21384	7 : 5	26	29
S	27185	3 : 2	29	28
T	16568	3 : 5	34	37

Directions for questions 12 to 15: Type in your answer in the input box provided below the question.

12. In which company is the number of female employees, the highest?

13. By how much does the number of male employees in companies R and S together exceed the number of male employees in the other three companies?

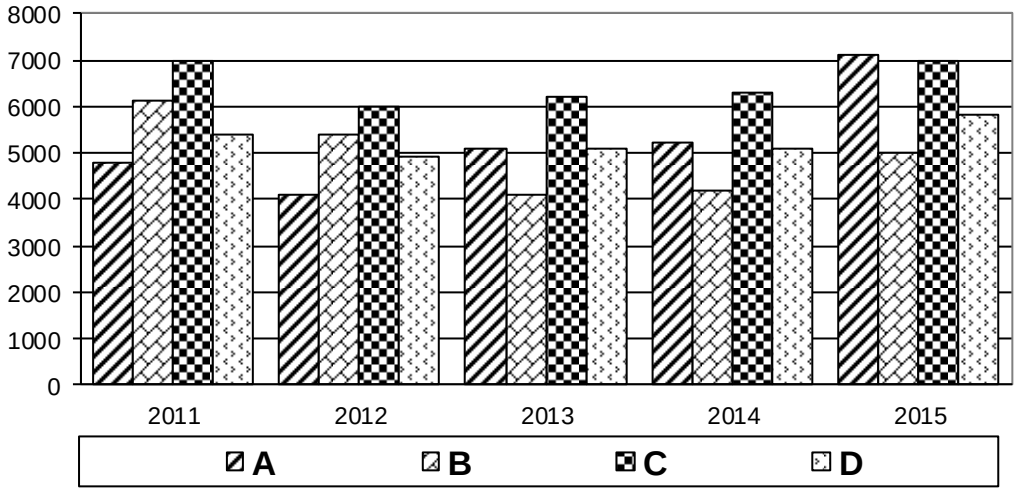
14. What is the average age (approximate to the closest integer) of the male employees in company R?

15. What is the difference between the number of female employees in the company with the highest number of male employees and the number of male employees in the company with the lowest number of female employees?

Practice Exercise – 2

Directions for questions 1 to 6: These questions are based on the following bar graph.

PRODUCTION DETAILS OF ALL THE PRODUCTS MANUFACTURED BY XYZ Ltd.



1. In how many of the given years was the production of D, as a percentage of that of B, more than 80% but less than 120%?
(A) 1 (B) 3 (C) 4 (D) 5

2. In which of the following years was the absolute change in the total production of XYZ Ltd. over that of the previous year, the highest?
(A) 2012 (B) 2013 (C) 2014 (D) 2015

3. In the year 2014, 37.5% of the production of D was exported. If the ratio of the total units exported of D to that of A was 5 : 6, then what percentage of the production of A was exported?
(A) 40% (B) 45% (C) 50% (D) 60%

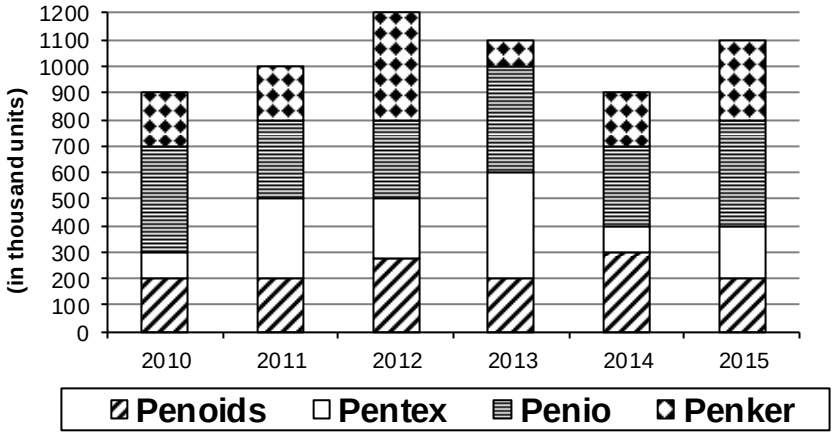
4. From 2015 to 2016, the production of B decreased by 40% and the production of every other product increased by 35%. In 2016, the production of B as a percentage of total production of all the four products is
(A) 10% (B) 15% (C) 20% (D) 25%

5. Which of the following statement/s is/are definitely true?
I. From 2011 to 2014, production of only one of the products decreased and increased in alternate years.
II. For all the years put together, the production of the product D was the highest when compared to other products.
III. The percentage share of the production of D increased by about 1.7 percentage points from 2013 to 2015.
(A) Only II (B) Only I
(C) Both I and II (D) Both II and III

6. If the costs of production per unit of the products A, B, C and D are a, b, c and d respectively, and d > b > a > c, then what is the minimum possible number of years in which the total cost of production of A and D together is more than that of B and C together?
(A) 0 (B) 1
(C) 2 (D) Cannot be determined

Directions for questions 7 to 10: These questions are based on the following stack bar.

SALES OF PENS OF DIFFERENT COMPANIES



The profitability of a company is defined as $\frac{\text{Sales} - \text{Expenditure}}{\text{Sales}} \times 100$.

Directions for questions 7 to 10: Type in your answer in the input box provided below the question

7. In any year, the sales of a company as a percentage of the total sales of the given four companies is called the market share of that company. What is the value of the highest market share of Penolds in any of the given years is

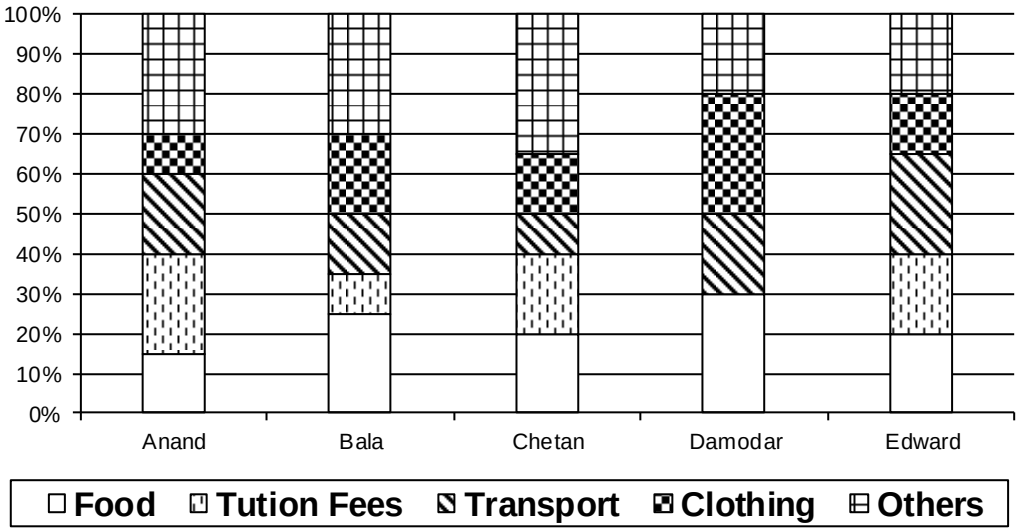
8. If the profitability of Penker in 2014 is 20% and the selling price of each pen sold by Penker is ₹10, then what is the expenditure (in lakhs) incurred by Penker in that year?

9. In 2013, if the expenditures of Penolds, Pentex, Penlo and Penker are in the ratio 2 : 4 : 3 : 5, then which company has the highest profitability? (Assume all companies made profits)

10. For which of the given companies was the average annual percentage change in sales, from 2010 to 2015, the highest?

Directions for questions 11 to 15: These questions are based on the following stack bar.

Percentage breakup of expenses



11. If Bala's expenses on clothing are ₹3700, then how much did he spent on food and tution fees together?
(A) ₹6250
(B) ₹6475
(C) ₹7200
(D) ₹7400

12. If Anand's expenses on food was ₹1620, then what was his expenses on the other four items together?
(A) ₹11400
(B) ₹10,800
(C) ₹9180
(D) None of these

13. If the total expenses of Bala and Chetan are in the ratio of 3 : 5, then what is the ratio of their 'other' expenses?
(A) 18 : 35
(B) 14 : 19
(C) 3 : 5
(D) 7 : 11

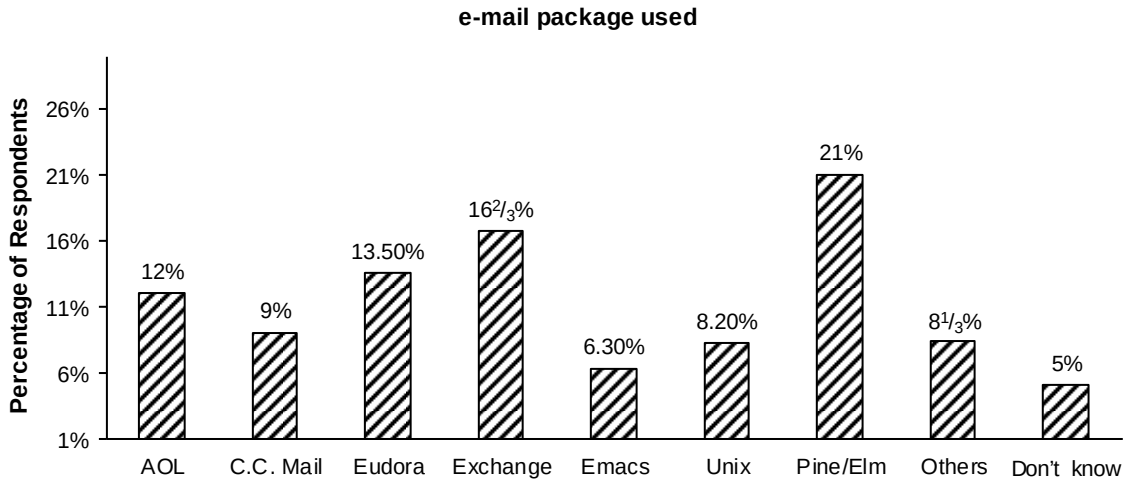
14. If Damodar spends 15% more on transport than Edward on clothing, then the total expenses of Damodar is what percentage more / less than that of Edward?
(A) 16.25% more
(B) 13.75% more
(C) 16.75% less
(D) 13.75% less

15. If Anand's expenses under each of the five heads is not less than that of Chetan's, then the total expenses of Anand is at least how many times that of Chetan's?
(A) 1.2
(B) 1.5
(C) 1.8
(D) 2.0

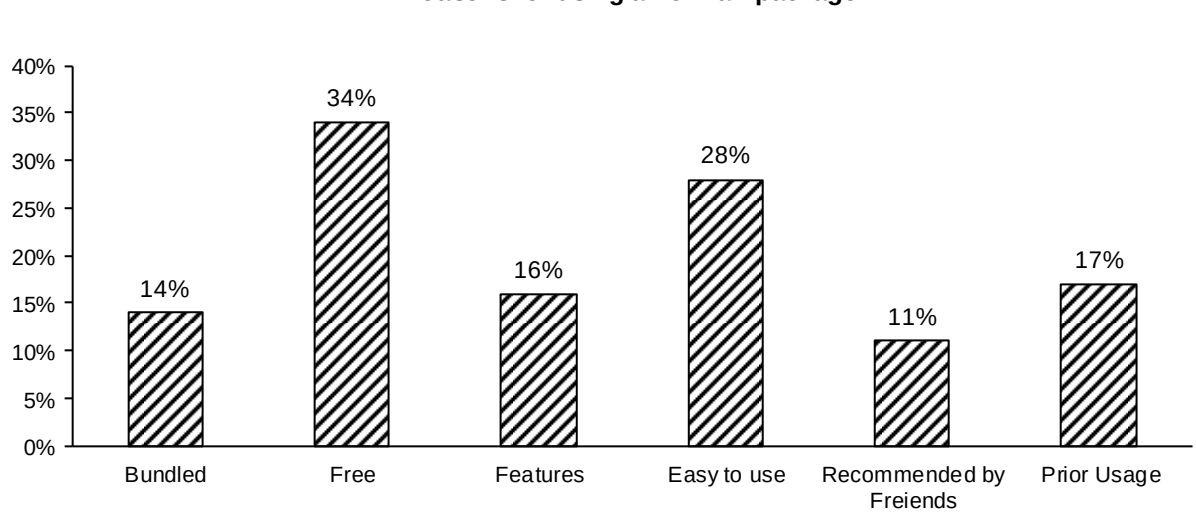
ADDITIONAL QUESTIONS FOR PRACTICE

Directions for questions 1 to 5: Answer the questions on the basis of the information given below.

The graphs give the results of the market survey regarding various e-mail package used.



Note : No respondent uses more than one e-mail package.



Note : Each respondent claimed one or more than one of the above reasons.
Total number of respondents = 25500

1. If half of the number of users whose response was 'Don't know', actually use either AOL or Eudora, then what is the total number of respondents who use AOL or Eudora?
(A) 6120 (B) 7140 (C) 650 (D) 7850

2. Among the respondents, if the users who claim their reason for usage to be 'features' or due to 'prior usage', use only Pile/Elm, then how many Pine/Elm users could have claimed both the reasons?
(A) 3060 (B) 2550 (C) 5355 (D) 5510

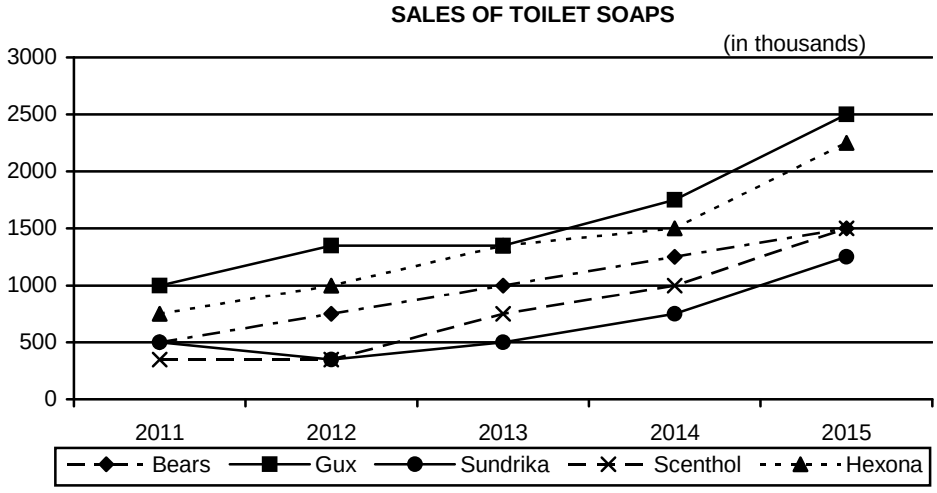
3. If the users of C.C-mail shift to Eudora for the reason that Eudora is 'Easy to use', then what is the percentage increase in the number of users claiming the reason 'Easy to use'?
(A) 32%
(B) 66 2/3%
(C) 48.2%
(D) Cannot be determined

4. If all the respondents except the users of C.C. mail claim only one reason and the group of respondent who said 'don't know', were excluded from the survey of reasons for using an e-mail package, then what is the average number of reasons claimed by C.C. mail users?
(A) 43 (B) 3.8 (C) 1.2 (D) 10.6

5. Exactly 15% of the respondents claimed the combination of at least two reasons. A maximum of how many UNIX or AOL respondents claimed at most one reason?
(A) 5100 (B) 3825
(C) 5151 (4) None of these

Practice Exercise – 3

Directions for questions 1 to 4: These questions are based on the following line graph which shows the sales of different brands of toilet soaps in a country for the period 2011 to 2015.



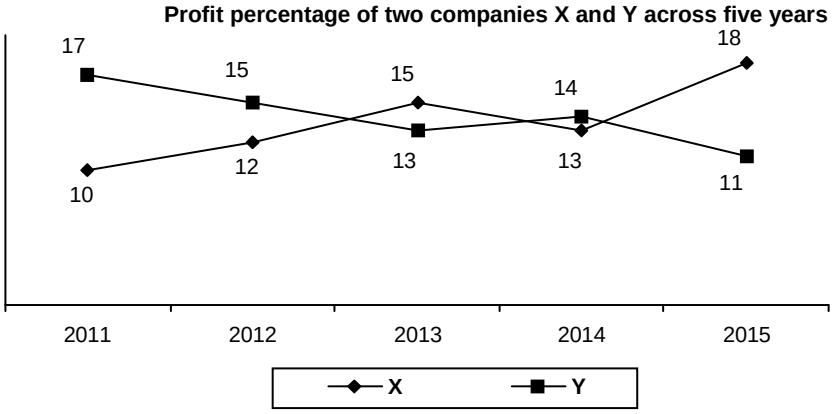
1. During the period 2011 to 2015, which brand of toilet soap showed the largest percentage increase in sales?
(A) Bears (B) Sundrika
(C) Scenthol (D) Hexona

2. In 2015, the sales of Sundrika were how much less than the sales of Hexona?
(A) 33 1/3% (B) 25%
(C) 20% (D) 44 4/9%

3. In 2016, the sales of Scenthol increased by 40%. If, in 2016, the sales of Sundrika and Scenthol were equal, then what was the percentage increase in the sales of Sundrika in 2016 over that of the previous year?
(A) 67% (B) 68% (C) 69% (D) 70%

4. In 2015, the sales of the given brands of toilet soap was 36% of the sales of all the toilet soaps in the country. What is the percentage share of Hexona in the sales of all the toilet soaps in the country during 2015?
(A) 7%
(B) 8%
(C) 9%
(D) Cannot be determined

Directions for questions 5 to 8: These questions are based on the following line graph.



$$\text{Profit percentage} = \frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \times 100$$

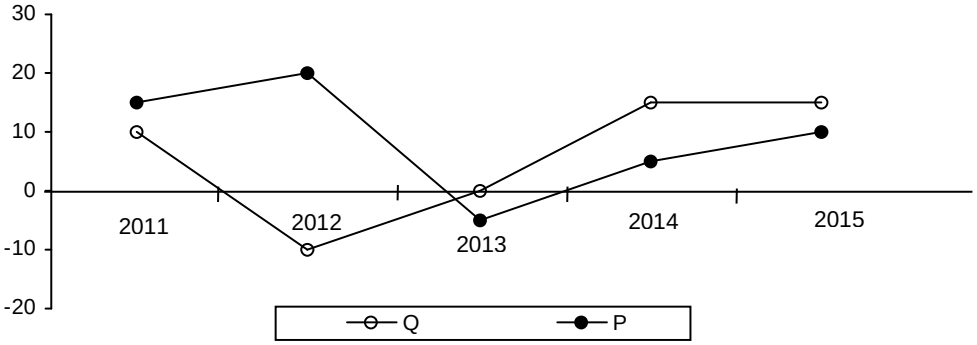
5. If the income of company X in 2013 was ₹368 cr, then what was its expenditure that year?
(A) ₹304 cr
(B) ₹316 cr
(C) ₹320 cr
(D) None of these

6. If the income of company Y increased by 10% each year from 2011 to 2015 then its profit in 2015 is what percentage of the profit in 2012?
(A) 91.2% (B) 97.6%
(C) 101.1% (D) 110.2%

7. If the ratio of the incomes of X and Y in 2014 are 2 : 3, then what is the approximate ratio of their expenses that year?
(A) 2 : 5 (B) 5 : 3
(C) 11 : 19 (D) 17 : 25

8. If in 2015, the expenses of X and Y are equal, then what is the ratio of their incomes?
(A) 111 : 118 (B) 1 : 1
(C) 118 : 111 (D) None of these

Directions for questions 9 to 11: The following line graph gives the percentage increase in sales of two companies P and Q each when compared to that in the previous year.

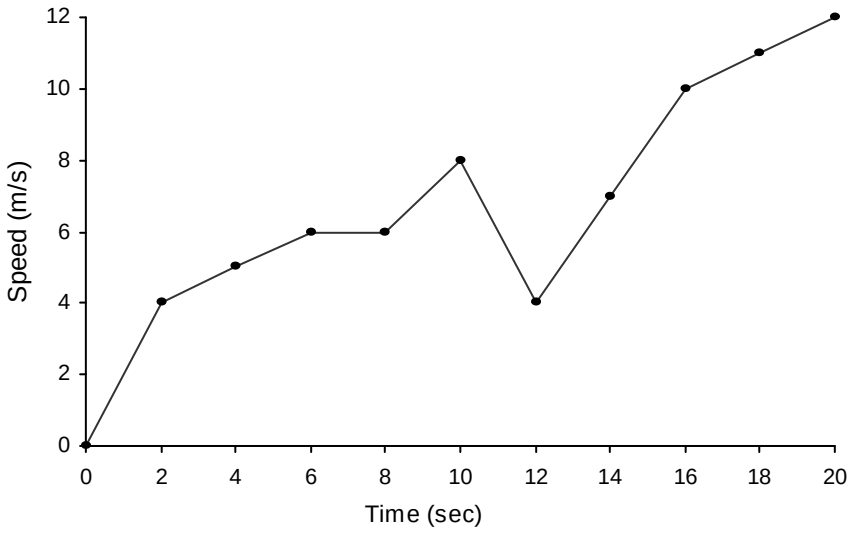


9. What is the percentage increase in the sales of company P from 2011 to 2014?
(A) 19.7 (B) 21.3 (C) 22.6 (D) 25.2

10. If in 2011 the ratio of the sales of companies P and Q were 2 : 1, then what was the ratio of their sales in 2015?
(A) 9 : 5 (B) 7 : 3 (C) 11 : 5 (D) 5 : 2

11. If the sales of both P and Q were equal in 2012, then by what percentage is the sales of Q more than that of P in 2015?
(A) 17.2%
(B) 21.5%
(C) 26.3%
(D) 32.8%

Directions for questions 12 to 15: These questions are based on the line graph given below. The graph gives the speed of a car from (t = 0) to (t = 20) (0 to 20 seconds)



Directions for questions 12 to 15: Type in your answer in the input box provided below the question.

12. What is the speed of the car (in km/hr) at t = 4sec?

13. What is the distance covered (in meters) by the car in the first ten seconds (t = 0 to t = 10)?

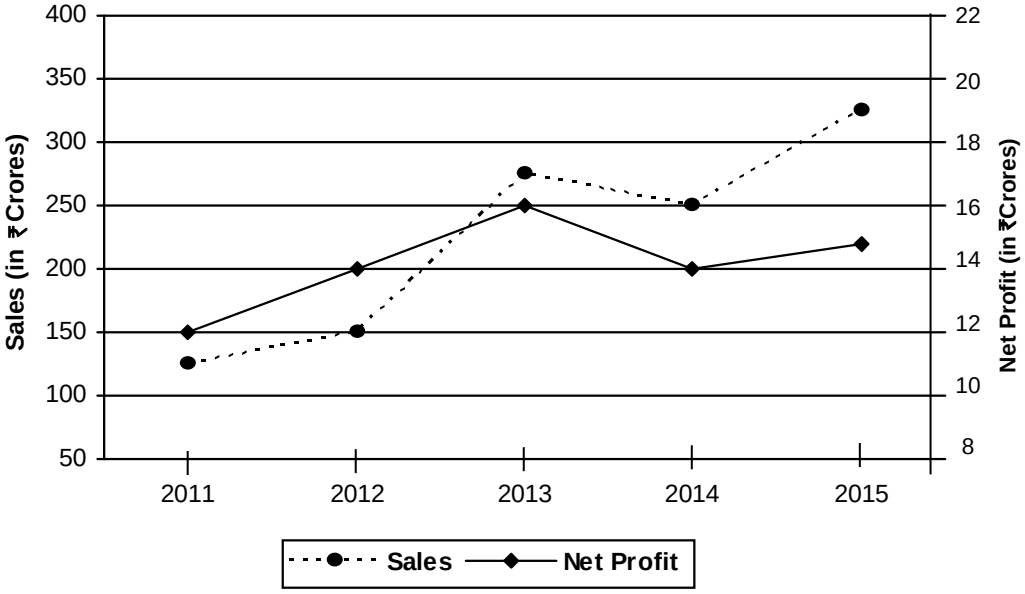
14. How much time (in seconds) did the car take to cover 100 meters, from the start?

15. What is the average speed (in m/s) of the car in the given time period?

ADDITIONAL QUESTIONS FOR PRACTICE

Directions for questions 1 to 5: Answer the questions on the basis of the information given below.

SALES AND NET PROFIT OF COMAPNY FROM 2011 TO 2015



$$\text{Profitability} = \frac{\text{Net Profit}}{\text{Sales}}$$

Expanses = Sales – Net Profit

1. Profitability was the highest in
(A) 2011 (B) 2012 (C) 2014 (D) 2015

2. The highest percentage increase in sales was in
(A) 2012 (B) 2013 (C) 2014 (D) 2015

3. The average annual percentage increase in net profit from 2011 to 2015 is
(A) 25% (B) 12.5% (C) 7.5% (D) 6.25%

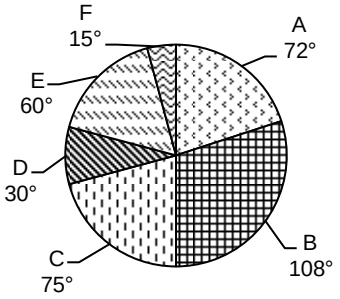
4. The expenses, as a percentage of sales was the highest in the year
(A) 2012 (B) 2013 (C) 2014 (D) 2015

5. If the expenses for the year 2016 increases by 20% over the expenses in 2015 and if net profit decreases by 20% over that in 2015, then the percentage change in the sales in the year 2016 is
(A) 18.1% (B) 20.4% (C) 19.6% (D) 22.6%

Practice Exercise – 4

Directions for questions 1 to 4: Answer the questions based on the information given below.

Profit of Thompson Greaves from various divisions in 2015-16



Total Profit: ₹5 crores

A – Switches	B – Power regulators
C – Fans	D – Pumps
E – Lighting	F – Industrial lighting

1. By what percentage is the profit obtained from the switches division more than that from the pumps division?
(A) 11.66% (B) 58.33%
(C) 140% (D) None of these

2. In 2016-17, the profit from industrial lighting increased by 16.66% over that of the previous year. What is the approximate profit from industrial lighting in 2016-17?
(A) ₹24.5 lakh (B) ₹2.45 crore
(C) ₹2.45 lakh (D) ₹21.00 lakh

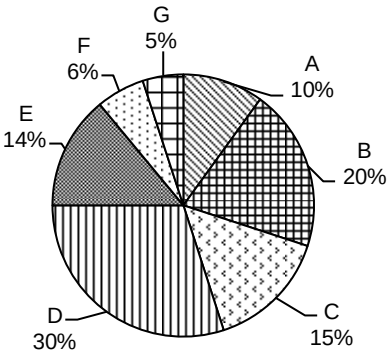
3. From 2015-16 to 2016-17, the profit from switches increased by 25%, that from fans increased by 20%, that from pumps by 10%, while the profit from the remaining divisions remained the same. If a new pie chart is drawn for the profits for 2016-17, what would be the approximate angle of the fans division?
(A) 75° (B) 92°
(C) 82° (D) Cannot be determined

4. By mistake, the share of power regulators in the above chart has been under-reported by 10%. If this mistake is corrected, then the actual share of switches will be
(A) 16.33% (B) 19.35% (C) 21.23% (D) 20.57%

Directions for questions 5 to 10: Answer the questions based on the information given below.

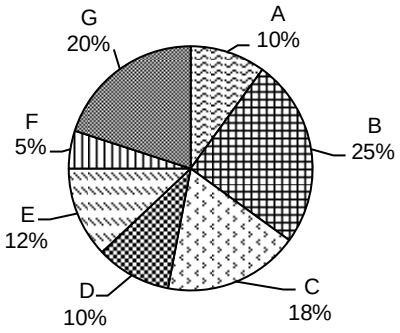
The pie charts give the distribution of monthly expenditure of Mr. Shyamlal in two years.

Monthly Expenditure in 2014 = ₹12,500



A – Food B – Rent
E – Medical Expenses F – Travelling

Monthly Expenditure in 2015 = ₹17,500



C – Provisions D – Entertainment
G – Clothes

5. What is the percentage increase in Mr. Shyamlal's expenditure on provisions from 2014 to 2015?
(A) 20% (B) 68% (C) 16.66% (D) 40%

6. The expenditure under which of the following heads has shown the highest percentage change (increase/decrease) from 2014 to 2015?
(A) Entertainment (B) Rent
(C) Clothes (D) Travelling

7. Under how many heads has the expenditure increased by more than 25% from 2014 to 2015?
(A) 3 (B) 4 (C) 5 (D) 6

8. In 2016, the combined expenditure on food, rent, provisions and entertainment decreased by 20%, while the combined expenditure on travelling, medical expenses and clothes increase by 10%. Find the combined share of the expenditure on food and clothes.
(A) 12.25% (B) 31.8%
(C) 16.5% (D) Cannot be determined

Additional data for questions 9 and 10:

The distribution of the expenditure of Shyamlal in 2016 is the same as that in 2015.

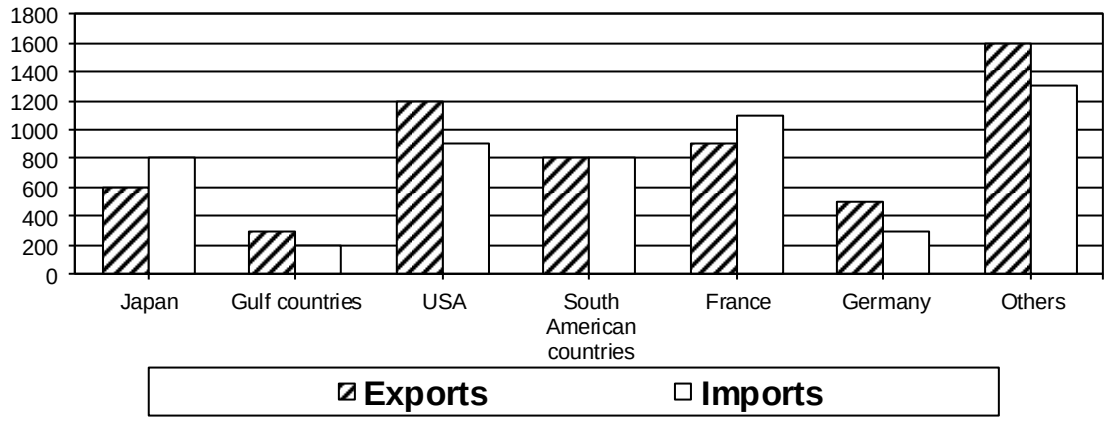
9. In 2016, if the medical expenses of Shyamlal are 20% more than that in the year 2014, then what is the percentage increase in the expenditure on travelling from 2015 to 2016?
(A) $16^{2}/_{3}$%
(B) $33^{1}/_{3}$%
(C) Cannot be determined
(D) None of these

10. In 2016, the expenditure on food increased by 20% over that of 2014. Find the percentage increase in the expenditure on provisions from 2014 to 2016.
(A) 20%
(B) 25%
(C) 44%
(D) Cannot be determined

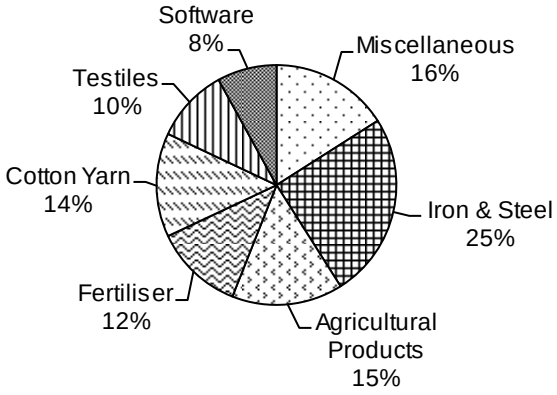
Directions for questions 11 to 15: Answer the questions based on the information given below.

DISTRIBUTION OF EXPORTS & IMPORTS OF COUNTRY X AMONG VARIOUS TRADING GROUPS IN THE YEAR 2015

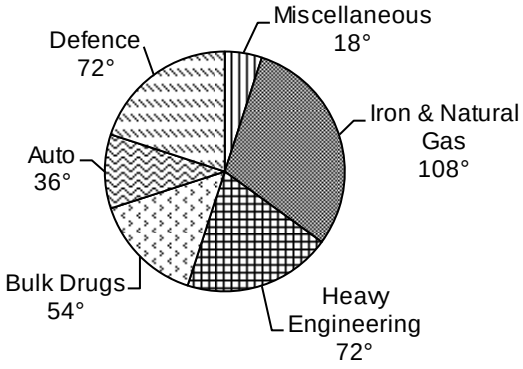
(in crores of ₹)



SECTOR-WISE BREAKUP OF EXPORTS IN 2015



SECTOR-WISE BREAKUP OF IMPORTS IN 2015



11. If Fresh Fruits account for 25% of the Miscellaneous items exported in 2015 then Fresh Fruits exports are what percentage of the Bulk Drug imports in the same year?
(A) 25.71% (B) 26.89%
(C) 29.13% (D) 28.11%

12. What is the ratio of the number of groups with which Country X has a Trade Surplus to those with which It has a Trade Deficit (given that Trade Surplus = Exports – Imports and Trade Deficit = Imports – Exports)
(A) 1 : 1 (B) 3 : 2
(C) 2 : 1 (D) Cannot be determined

13. What is the value of the Software exports to the USA in 2015?
(A) 96 crores (B) 200 crores
(C) 300 crores (D) Cannot be determined

14. Which of the following statements is/are definitely required to calculate the average imports from every country to Country X?
I. The number of Gulf countries from which Country X imports.
II. The number of countries in the South American region from which Country X imports
III. The number of countries in the 'Others' group from which Country X imports.
(A) Only I and II (B) Only I and III
(C) Only III (D) I, II and III

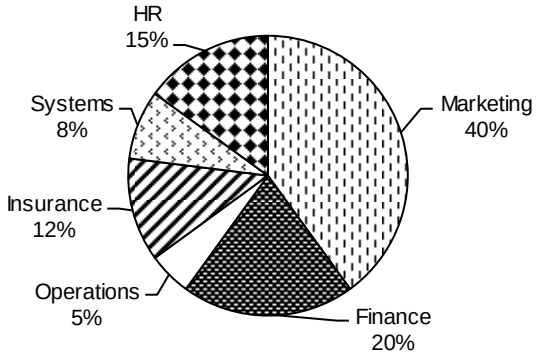
15. If Country X had imported the same amount of agricultural products instead of exporting them, all other things remaining the same, them what will be the percentage points change in the share of Auto imports as a percentage of total imports?
(A) 8.59% (B) 1.41%
(C) 4.52% (D) Cannot be determined

ADDITIONAL QUESTIONS FOR PRACTICE

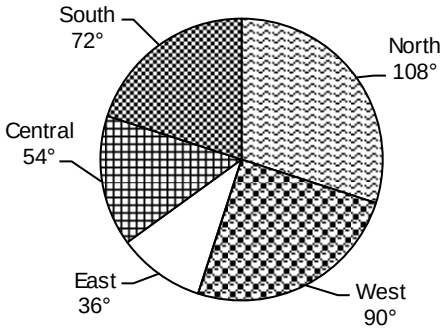
Directions for questions 1 to 5: Answer these questions on the basis of the information given below.

The following pie charts give the details of the students studying at a business school. Pie chart-1 gives the distribution of the students based on their specialization, while Pie chart-2 gives the region wise distribution of the students.

Pie Chart – 1



Pie Chart – 2



Directions for question 1 to 5: Type in your answer in the input box provided in the question.

1. If none of the students from the North and the Central regions are specializing in Marketing, then the percentage of students from the South who are specializing in marketing is at least ☐ .

2. If at least 10% of the students from each region opted for HR as their specialization, then the students specializing in HR from any one region as a percentage of the total students from that region is at most ☐ .

3. The number of specializations for which the students are from two or more regions is at least [ ] .

4. If none of the students specializing in Systems are from the North, then the number of specializations for which all the students are from the North, is at most [ ] .

5. If at most 25% of the students from any region specialize in HR, then the number of regions having students specializing in HR is at least [ ] .

Practice Exercise – 5

Directions for questions 1 to 4: Answer the following questions based on the information given below.

A business school in north India has a total of 2400 students in the first and second years combined, with foreign students accounting for 32.5% of it. All students had to choose one specialization among marketing, finance, operations and systems. The ratio of the students in marketing, finance, operations and systems in the two years together is 2:3:4:3 respectively. Among students who has opted for marketing, 33.5% are foreigners. The ratio of first and second year students among students who opted for finance, operations and systems is 9:11, 11:9 and 3:2 respectively. The total number of students in the second year is 45% of the total students in the school.

1. What percentage of the students who opted for marketing as specialization are in the second year?
(A) 28.5 (B) 32.0 (C) 35.0 (D) 37.5

2. What is the maximum percentage of foreigners among students who have opted for operations?
(A) 72 (B) 75.5
(C) 80.75 (D) None of these

3. The difference between the total number of Indian students and the total number of second year students in the school is
(A) 480 (B) 540 (C) 660 (D) 720

4. If the number of foreigners among students who opted for finance, operations and systems are in the ratio 3:5:9, then the number of Indian students who have opted for operations is
(A) 540 (B) 570 (C) 610 (D) 640

Directions for questions 5 to 8: These questions are based on the following information.

A company XYZ Ltd has three units - P, Q and R. In each of these units there are five departments–Production, Marketing, Finance, HR and Accounts. The total number of employees in P, Q and R are in the ratio 3 : 5 : 4. The total number of employees in Production, Marketing, Finance, HR and Accounts in all the three units together are in the ratio 5 : 3 : 1 : 1 : 2. The ratio of the number of male employees of XYZ Ltd to that of the female employees of XYZ Ltd is 2 : 1. In each of the three units, there is no female employee in the Production department and no male employee in the HR department. In each of Marketing, Finance and Accounts departments at each of the units, males and females are equal in number. Also the total number of employees in Marketing, Finance and Accounts departments are equally distributed among each of the units. The company has 36,000 employees in total and the number of male employees in the production department at P, Q and R are in the ratio 2 : 8 : 5.

5. What is the total number of male employees in units P and R together?
(A) 7500 (B) 9000
(C) 10000 (D) None of these

6. The number of female employees in the HR and the Marketing departments together is what percentage of the total number of employees in Q?
(A) 25% (B) 50% (C) $33^1/_3\%$ (D) 20%

7. In which unit is the number of female employees as a percentage of the total number of employees, the highest?
(A) P (B) Q
(C) R (D) All of the above

8. In how many departments of XYZ Ltd is the number of employees, as a percentage of the number of employees in P, more than 80%?
(A) 2 (B) 3 (C) 1 (D) 4

Directions for questions 9 to 12: Answer the following questions based on the information given below.

Anand, Bala, Chandu, David and Emanuel are members of the school basketball team. When asked about the number of points they scored in the previous match, they gave the following answers.

Anand: Bala, David and Emanuel together scored 77 points.
Bala: Chandu, Emanuel and Anand together scored 60 points.
Chandu: Anand, Bala and David together scored 58 points.
David: Emanuel, Bala and Chandu together scored 69 points.
Emanuel: Anand, Chandu and David together scored 54 points.

Directions for questions 9 to 12: Type in your answer in the input box provided below the question.

9. Who scored the highest points in the match?

[ ]

10. How many points did David score in the match?

[ ]

11. If only these five players had played for the team, then what was the total points that the team scored?

[ ]

12. How many of the given players scored more points than Chandu scored?

Directions for questions 13 to 16: These questions are based on the following information.

Anand invested in the shares of four companies – A, B, C and D. Each of these companies belonged to a different industry – Metals, IT, Autmobiles and Infrastructure, in no particular order. At the time of investment, the price of each share was ₹400. Anand purchased ten shares of each of these companies. He was expecting returns of 25%, 10%, 20% and 45% from the shares of companies A, B, C and D respectively. Returns are defined as the percentage change in the value of the share after one year. The returns for two companies were higher than the expected returns. One of these two companies belonged to the metals or automobile sector while the other one belonged to the IT or infrastructure sector. For the company belonging to the metals or automobile sector, the returns were twice those of the expected returns and for the company belonging to the IT or infrastructure sector, the returns were three times the expected returns. For the remaining two companies, the returns were the same as expected.

13. What is the minimum average return Anand could have earned during the year?
(A) 35% (B) 32%
(C) 30% (D) None of these

14. What is the maximum average returns Anand could have earned during the year?
(A) 47.5% (B) 50%
(C) 53.75% (D) None of these

15. If Anand earned 42.5% returns during the year, then which of these statements is definitely true?
I. Company A belonged to either IT or infrastructure sector.
II. Company B belonged to either metals or automobiles sector.
III. For company C, the returns were more than expected.
IV. For company D, the returns were more than expected.
(A) I and III (B) II and IV
(C) I and IV (D) II and III

16. If company C belonged to the IT or the infrastructure sector, and the returns from C were more than expected, then which of the following statements would necessarily be true?
I. Anand earned at most 45% returns.
II. Anand earned at least 37.5% returns.
III. If Anand earned 41.25% returns, then company D belonged to the Metal or Automobile sector.
IV. If Anand earned 41.25% returns, then company A gave more than the expected returns.
(A) I and II (B) I and III
(C) III and IV (D) II and IV

ADDITIONAL QUESTIONS FOR PRACTICE

Directions for questions 1 to 4: Answer these questions on the basis of the information given below.

The country of Buildaroad is planning to improve its transport infrastructure by laying roads connecting all parts of the country. The National Road Construction Board (NRCB) has the following guidelines in place for building roads. The roads are to be laid using only three types of materials viz. Bitumen, Cement or Tar. There are three categories of roads – Rural, National Highways (NH) and Inter-State Freeways (ISF) and four types of contractors A, B, C and D. A contractor of type A can only lay Rural roads of length upto 200 km whereas a contractor B can lay rural roads (of all lengths) and NH upto 200 km. A contractor of type C can lay all type of roads except ISF beyond 400 km, while a contractor of type D is a super-contractor who can lay all types of roads (of any length).

COST STRUCTURE
The average cost of a Road in a Rural Area

Length of the road (km)	Standard cost/km (₹lakhs)	Cost expressed as a percentage of the standard cost depending on the material used		
		Bitumen	Tar	Cement
0 – 50	10	100%	110%	120%
51 – 100	8	100%	110%	120%
Any length above 100	5	100%	110%	120%

That is, if the length of the road is 200 kms, cost for the first 50 kms is 50 $\times$ 10 (standard cost) (cost depending on material used) for the next 50 kms it is 50 $\times$ 8 (cost depending on material used) and for the next 100 kms it is 100 $\times$ 5 (cost depending on material used)

In case the road happens to be a NH, then the contractor is paid an additional ₹1 lakh/km over and above the cost of laying the road (as calculated, based on the above table).

In case the road happens to be an ISF, then the contractor is paid an additional ₹1.5 lakh/km over and above the cost of laying the road (as calculated, based on the above table).

It is also known that the average rate of laying roads is 2 km/day and that the NRCB pays a bonus of ₹20 lakh per day to a contractor for early completion of any project and also levies a penalty of ₹10 lakh per day on the contractor for any delay in the project.

1. What is the cost of laying a 160 km rural road made of cement by a type A contractor who works 25% faster than the average rate of laying roads?
(A) ₹1760 lakh
(B) ₹1440 lakh
(C) ₹1520 lakh
(D) Cannot be determined

2. What is the penalty levied on account of the delay, in laying a 510 km ISF made of Bitumen by a contractor who works 25% slower than the average rate of laying roads?
(A) ₹2950 lakh (B) ₹3715 lakh
(C) ₹2865 lakh (D) ₹850 lakh

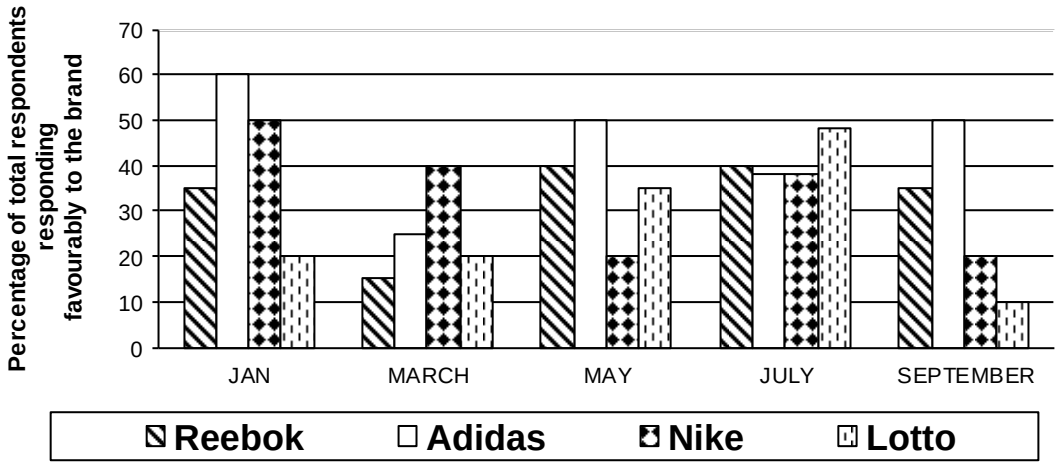
3. If a contractor who lays a 360 km cement ISF gets a bonus of ₹540 lakh on account of early completion of the project, then what is the approximate average length of the road laid by him per day?
(A) 2 km (B) 2.1 km
(C) 2.2 km (D) 2.3 km

4. What is the difference in the cost of laying an 84 km cement ISF by a type D contractor, who works 50% faster than the average rate of laying roads, and that of laying a 140 km Tar NH by a type B contractor, who finishes 2 days behind schedule?
(A) ₹2.4 lakh (B) ₹17.6 lakh
(C) ₹32.8 lakh (D) No difference

Practice Exercise – 6

Directions for questions 1 to 4: Answer the questions based on the information given below.

Consumer preferences of major sportswear brands



Note: (i) A respondent could give a favourable response for more than one brand.
(ii) The percentage of total respondents responding favourably to a brand represents the consumer liking of that brand.

It is also known that, the sample size (i.e., the total number of respondents in the survey) in March was larger than that in January. The sample size in July was greater than that in March, while the sample size in September is the largest among all the surveys.

1. When the survey results of January and September are considered together, which brand was liked by the maximum number of consumers?
(A) Reebok
(B) Adidas
(C) Nike
(D) Cannot be determined

2. If the sample size in March was 1200, then the number of respondents who did not respond favourably to any of the four brands in that month could be at most
(A) 720 (B) 480
(C) 180 (D) None of these

3. If the number of respondents responding favourably to a brand is represented by N, then which of the following statements is/are definitely false?
(I) The value of N for at least one brand in July was more than that in January.
(II) The value of N for at most one brand in September was less than that in July.
(III) The value of N for exactly one brand in March was the same as that in September.
(A) Only I (B) Only III
(C) Both II and III (D) None of the above

4. The sample size in January was 800 and in May it increased by 25%. The number of respondents, who responded favourably in May, to more than one brand (from among the given four brands), must be at least
(A) 100 (B) 150 (C) 250 (D) 400

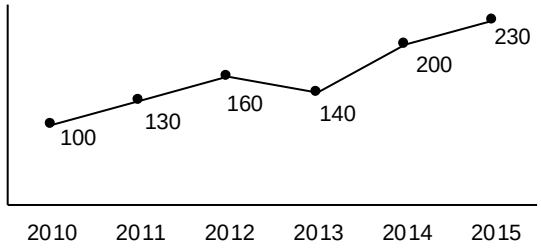
Directions for questions 5 to 8: Answer the questions based on the information given.

The graphs give the trends of sales and expenses of ABC Corporation for the years 2010 to 2015. Both sales and expenses of the year 2010 are indexed to 100 and there was a profit in each of the given years.

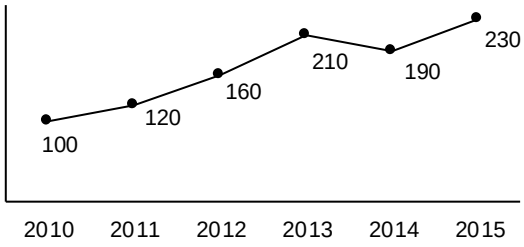
5. At least in how many of the given years did all of sales, expenses and profit increase or decrease in unison?
(A) 2 (B) 3 C) 1 (D) 4

6. At least in how many of the given years did the profits of ABC Corporation increase, when compared to the previous year?
(A) 4 (B) 3 (C) 2 (D) 1

Sales



Expenses



Profit = Sales – Expenses

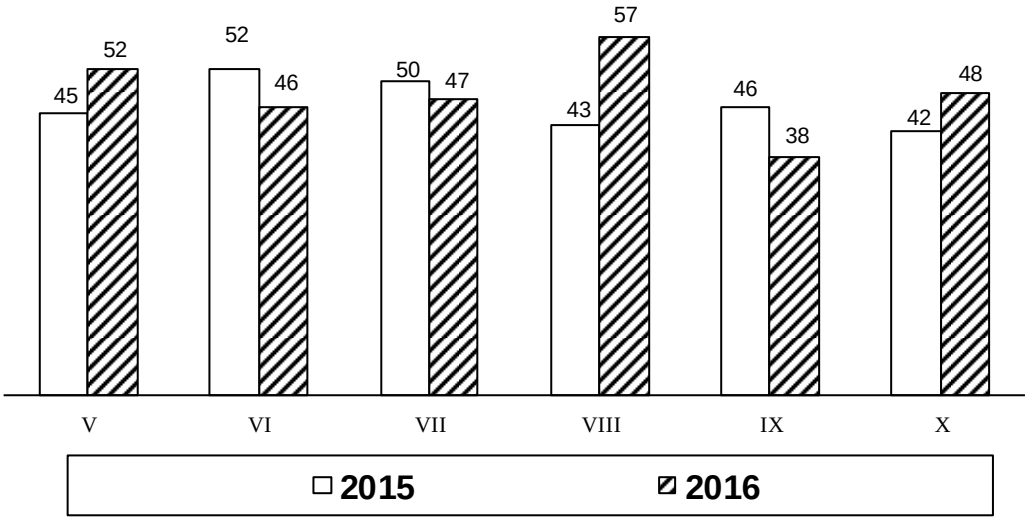
Profitability(%) = $\frac{\text{Profit}}{\text{Sales}} \times 100$

7. If profitability in the year 2012 was 50%, then what was the profitability in the year 2014?
(A) 47% (B) 52.5%
(C) 60% (D) Cannot be determined

8. In which of the following years did ABC Corporation make the highest profit?
(A) 2011 (B) 2012
(C) 2015 (D) Cannot be determined

Directions for questions 9 to 12: Answer these questions on the basis of the information given below

The bar graph gives the details of students studying in classes V to X at Model Public School, for the years 2015 and 2016. Students join the school in class V and leave the school only after they pass class X. No student leaves or joins any other class. Students who pass the final examination in any class are promoted to the next higher class in the next year while students who fail have to continue in the same class in the next year also. It was also known that the pass percentage in class V in 2015 was at least 90.



Directions for questions 9 to 12: Type in your answer in the input box provided below the question.

9. How many students joined class V in the year 2016?

10. In the year 2015,what is the number of students who failed in all the classes from V to X put together?

11. For which class was the pass percentage in the year 2015, the highest?

12. In the year 2015, for how many of the given classes was the pass percentage less than the overall pass percentage of the school?

ADDITIONAL QUESTIONS FOR PRACTICE

Directions for questions 1 to 4: Answer these questions on the basis of the information given.

The tables given below provide the data about the GDP (Gross Domestic Product), PCI (Per Capita Income) and LR (Literacy Rate) of 150 countries surveyed in the year 2015. For any particular value of GDP given in the first column in Table 1, the corresponding value in the second column gives the number of countries whose GDP is more than that value. For example, the data in the first row in Table 1 provides the information that the number of countries having a GDP of more than $100 billion is 150. Table 2 and Table 3 give the data for PCI and LR in a similar format as in Table 1.

It is known that among any two countries, the country with higher GDP always has higher PCI and higher LR.

Table 1

GDP ($ billion)	Number of countries
100	150
200	129
300	115
400	104
500	90
600	72
700	63
800	52
900	33
1000	18

Table 2

PCI ($ '000)	Number of countries
2	150
4	140
6	121
8	112
10	93
12	80
14	68
16	54
18	36
20	16

Table 3

LR (%)	Number of countries
0	150
10	136
20	126
30	100
40	81
50	69
60	50
70	42
80	25
90	20

1. What is the number of countries whose GDP is more than $400 billion but PCI is not more than $12000?
(A) 80 (B) 44
(C) 24 (D) Cannot be determined

2. A country is said to be a 'developing country' if its GDP is more than $800 billion, PCI is more than $12,000 and literacy rate is not more than 70%. How many of the given countries are 'developing countries'?
(A) 10 (B) 20 (C) 16 (D) 24

3. How many countries are there such that their GDP is more than $200 billion but not more than $700 billion and literacy rate is more than 20% but not more than 60%?
(A) 66 (B) 76
(C) 63 (D) Cannot be determined

4. Each of the countries in the above table is given a different rank from 1 to 150, such that the country with the highest GDP gets the 1st rank the country with the 2nd highest GDP gets the 2nd rank and so on. Find which of the following statements is/are true.

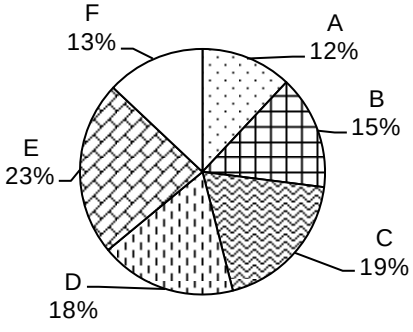
I. A country with a GDP of more than $600 billion and a literacy rate of not more than 50% can get the 70th rank.
II. A country with a GDP of less than $300 billion and a literacy rate of more than 10% cannot get a rank better than 135.
III. A country with a PCI of more than $10,000 but not more than $12,000 may be ranked 75.

(A) Only I and II (B) Only I and III
(C) I, II, and III (D) Only I

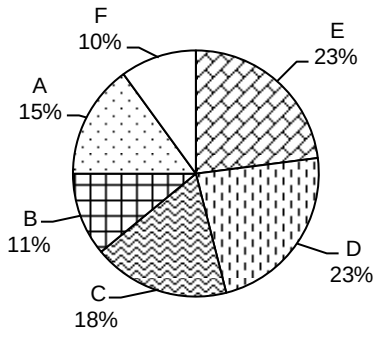
Directions for questions 5 to 8: Answer the questions based on the information given below.

The following pie charts give the break up of the sales (by volume) and sales (by value) of all the six products – A, B, C, D, E and F of a company.

Sales (by volume)



Sales (by value)



Profit percentage = $\frac{\text{Profit}}{\text{Sales}} \times 100$

5. For which product is the selling price per unit the highest?
(A) A (B) B (C) C (D) D

6. For how many of the given products is the selling price per unit more than the average selling price of all the six units?
(A) 1 (B) 2 (C) 3 (D) 4

Additional data for questions 7 and 8: The break-up of costs is exactly the same as the break up of sales (by volume).

7. If the company made an overall profit, then on at most how many products did it incur a loss?
(A) 3 (B) 4 (C) 2 (D) 5

8. If the company did not make a loss on any of the six products, then the overall profit percentage is at least _____.
(A) 25%
(B) 33.33%
(C) 40%
(D) None of these

Practice Exercise – 7

Directions for questions 1 to 3: Answer these questions based on the information given below.

India, Pakistan, Malaysia, South Korea, Japan and China are to take part in the Asian Hockey Championship. In the first round, each team plays each of the other teams exactly once. At this stage two points are awarded for a win, one point for a draw and zero points for a loss. After all the matches are played, the top two teams, in terms of the points scored, advance to the finals. In case two or more teams end up with the same number of points, the team with a better goal difference is placed higher.

1. The total number of matches in the tournament is
(A) 21 (B) 22 (C) 15 (D) 16

2. What is the minimum number of points with which a team can advance to the finals?
(A) 6 (B) 5 (C) 4 (D) 3

3. What is the maximum number of points that can be scored by a team, which failed to advance to the finals?
(A) 8 (B) 9 (C) 6 (D) 7

Directions for questions 4 to 8: Answer these questions based on the information given below.

128 players take part in a Grand Slam tennis tournament. The tournament is scheduled to be held in seven rounds and in each round, in a match between two players, the winner advances to the next round and the loser is eliminated. There are no draws or byes in the tournament. The players who take part in the tournament are seeded from 1 to 128, with seed 1 being the top seed, seed 2 next and so on. The matches are scheduled in such a way that in any round, assuming there are no upsets, the highest seeded player plays against the lowest seeded player at that point, the next highest seeded player always plays against the next lowest seeded player and so on. An upset is said to happen when a lower seeded player beats a higher seeded player. The schedule of matches in the next round remains unchanged in case of an upset in a round, with the only difference that the player who caused the upset advances to the next round and takes the designated place of the player he upset.

4. In case of no upsets in the tournament, in which round would the player seeded 10 face a player seeded higher than him?
(A) 2nd round (B) 3rd round
(C) 4th round (D) 5th round

5. How many players in the tournament won exactly one match?
(A) 15 (B) 24
(C) 30 (D) None of these

6. Assuming no upsets, which player beat seed No.25?
(A) Seed 8 (B) Seed 6 (C) Seed 1 (D) Seed 14

7. If the player seeded 13 won the tournament, then what is the minimum number of upsets in the tournament?
(A) 2 (B) 3 (C) 4 (D) 5

8. Which of the following players could have faced player seeded 1 in the fourth round?
(A) Seed 64 (B) Seed 32
(C) Seed 17 (D) Seed 8

Directions for questions 9 to 12: Answer these questions based on the information given below.

Ten teams that are to take part in the Champions Challenge were divided into two pools – Pool A and Pool B. Each team in a pool was to play every other team in that pool. Two points are awarded for a win and zero points for a loss with there being no draws or ties. The top three teams in each pool would advance to the next stage called the super six stage and they would carry forward all points they scored in matches against the other two teams which advanced to the super six stage from it's pool. In the super six stage all teams that advance from pool A are to be in group 1 and all teams that advanced from pool B are to be in group 2. Each team in group 1 plays against every team in group 2, with points awarded as in the pool stage. At the end of the super six stage the top two teams in each group, according to their total points (super six points + carry forward points) advance to the semi finals with the top team in group 1 playing the second team from group 2 and vice versa. The winners of the semi finals advance to the finals. If two or more teams end up with the same number of points at the end of the pool or the super six stage, the tie is resolved using tiebreak rules.

Directions for questions 9 to 12: Type in your answer in the input box provided in the question.

9. The total number of matches in the tournament is [ ]

10. The number of points scored by a team which advanced to the super six stage is at least [ ]

11. The total points (super six points + carry forward points) of a team that advanced to the semi finals is at least [ ]

12. The maximum number of wins by a team that failed to advance to the semi finals is [ ]

Directions for questions 13 to 16: Answer these questions based on the information given below.

Geeta and Neeta are playing a game which involves picking up coins kept on a table. The players take turns alternately and each player in her turn has to pick at least two and at most five coins except when there is only one coin left on the table and the player has to pick that coin in her turn. Both players are equally intelligent and play to the best of their abilities so as to win the game.

Additional data for questions 13 and 14: Assume that the player who picks up the last coin loses the game.

13. During a game, when it was Geeta's turn to play, there were 32 coins left on the table. Which of the following can be the number of coins Geeta should pick up so as to win the game, no matter how Neeta plays?
(A) 1 (B) 2 (C) 4 (D) 5

14. During Neeta's turn if she removed four coins from the table which made sure that she won the game, then which of the following could have been the number of coins on the table before she removed the four coins?
(A) 45 (B) 52
(C) 76 (D) None of these

Additional data for questions 15 and 16: Assume that the player who picks up the last coin wins the game.

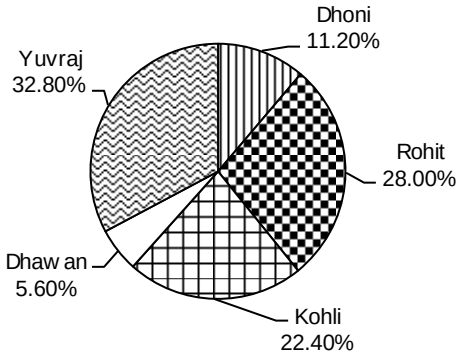
15. During a game when it was Neeta's turn to play, there were 28 coins left on the table. Which of the following is the number of coins she should pick up so as to ensure her win?
(A) 1 (B) 2
(C) 4 (D) Neeta cannot win

16. If during her turn Neeta had to remove two coins so as to ensure her win, then which of the following could have been the number of coins on the table before she removed the coins?
(A) 25
(B) 30
(C) 50
(D) More then one of the above

ADDITIONAL QUESTIONS FOR PRACTICE

Directions for questions 1 to 4: Answer these questions on the basis of the information given below.

The pie chart gives the distribution of runs scored by all the five Indian batsmen in a one-day international match as a percentage of the total runs scored by the five batsmen. The table gives the distribution of the fours (4's) and sixers (6's) scored by each of the batsmen as a percentage of the total 4's and total 6's respectively scored by all of them. India's total score is the sum of the scores made by these batsmen and the extras, which were numerically equal to the runs scored in sixers (6's) by these batsmen. It is also known that none of the batsmen made a double century (200 or more runs) in the match.



Player	4's	6's
Rohit	20%	20%
Kohli	8%	0%
Dhawan	8%	20%
Yuvraj	44%	40%
Dhoni	20%	20%

1. The number of 4's scored by the Indian batsmen was at least
(A) 20 (B) 25
(C) 50 (D) None of these

2. Which of the following cannot be India's score in the match?
(A) 405 (B) 435 (C) 250 (D) 560

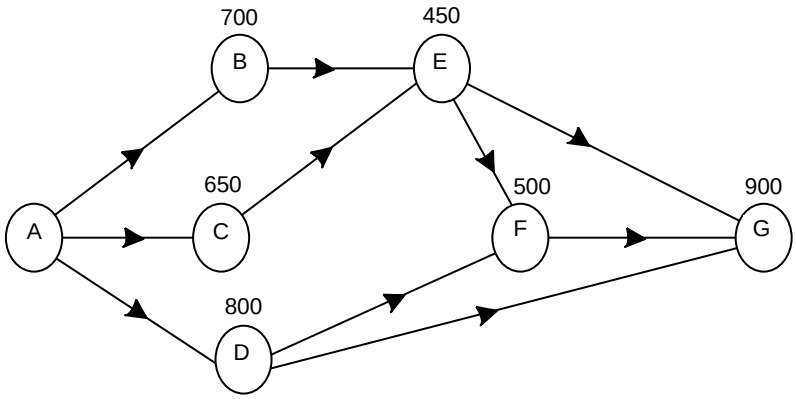
3. The player who scored the maximum percentage of his runs through 4's and 6's was
(A) Rohit (B) Dhawan
(C) Yuvraj (D) cannot be determined

4. If runs can be scored only through 1's, 2's, 4's and 6's, the minimum number of balls faced by Yuvraj was
(A) 18 (B) 21 (C) 28 (D) 26

Practice Exercise – 8

Directions for questions 1 to 4: Answer these questions on the basis of the information given below:

The diagram given below is the network for transporting oil from refinery A to depots B, C, D, E, F and G. The arrows indicate the direction in which oil flows and the value above each depot denotes its capacity (in thousand litres). The supply is arranged such that only after a depot is full will the excess oil be transferred to the depots next in the supply line. The maximum capacity (in thousands of litres) of the pipeline connecting the refinery with the depots is 1500 and those connecting the depots is 750. The slack in a pipeline is defined as the extra flow required to bring the pipeline to full capacity. The flow in the pipeline is such that the demand at each depot is completely met.



Note: All capacities mentioned are in thousand litres.

Directions for questions 1 to 4: Type in your answer in the input box provided in the question.

1. What is the minimum flow (in thousand litres) in the pipeline connecting A and D?

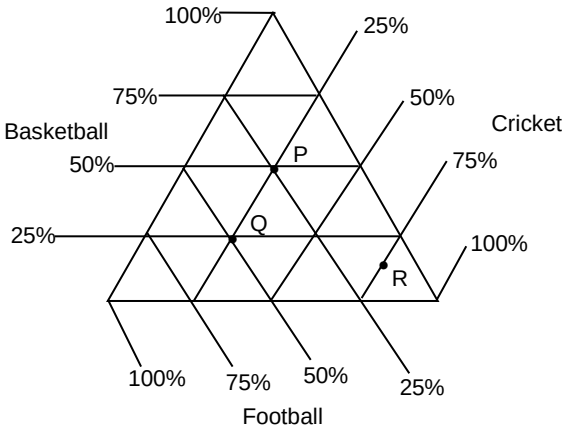
2. If the pipeline connecting A and B is under repair as a result of which its maximum capacity is reduced by 20%, what is the minimum flow (in thousand litres) in the pipeline connecting D and F?

3. What is the maximum value (in thousand litres) of the sum of the slacks in all the pipeline supplying oil to depot E?

4. If the slack in the pipeline connecting D and G is 50, then what is the minimum slack (in thousand litres) in the pipeline connecting E and F?

Directions for questions 5 to 8: Answer these questions on the basis of the information given below.

The figure given below gives the percentage of people who like three sports – Cricket, Football and Basketball in three schools P, Q and R. No student likes more than one sport and each student likes atleast one sport.



The total number of students in the three schools are as follows:

School	Number of Students
P	2,500
Q	4,000
R	3,000

5. What is the total number of students, in the three schools together, who like Cricket?
(A) 3500
(B) 3625
(C) 3875
(D) None of these

6. What sport is liked by the highest number of students?
(A) Cricket
(B) Football
(C) Basketball
(D) Cannot be determined

7. What percentage of the total students like basketball?
(A) 25.2%
(B) 27.6%
(C) 29.1%
(D) 31.2%

8. For any of the three given sports, what is the minimum difference between the numbers of students who like that sport in any two schools?
(A) 175
(B) 250
(C) 375
(D) None of these

***Directions for questions 9 to 12*:** Answer these questions on the basis of the information given below:

A certain paper manufacturing company converts six different raw materials – RM_1, RM_2, RM_3, RM_4, RM_5, RM_6 – into six different semi-finished products – SF_1, SF_2, SF_3, SF_4, SF_5, SF_6 – which in turn are converted into eight different finished products – FP_1, FP_2, FP_3, FP_4, FP_5, FP_6, FP_7, FP_8.

Table I gives the cost of converting any given raw material into any given semi-finished product and Table II gives the cost of converting any given semi-finished product into any given finished product.

Table I

(₹ Per tonne)

	RM_1	RM_2	RM_3	RM_4	RM_5	RM_6
SF_1	895.6.	756.3	896.3	990.2	548.8	224.6
SF_2	748.6	842.2	744.5	768.6	688.1	832.3
SF_3	695.2	62.5	666.6	841.6	762.8	675.5
SF_4	315.9	911.7	918.6	1248.8	647.6	488.6
SF_5	381	288	101.3	669.8	700.4	891.6
SF_6	443.7	615.6	866.4	716.4	861.8	776.2

Table II

(₹ Per tonne)

	SF_1	SF_2	SF_3	SF_4	SF_5	SF_6
FP_1	988.6	688.4	684.6	769.2	910.6	768.6
FP_2	765.5	917.6	922.5	688.4	841.9	756.6
FP_3	877.4	755.6	31.6	1058	878.6	998
FP_4	608.6	1139.6	665.6	1139.6	544	742.8
FP_5	108.5	844.8	756.8	562.2	616.6	668.6
FP_6	131.9	761.0	816.4	448.6	92	541.2
FP_7	700.9	166	998.6	399.2	588.6	676.6
FP_8	698.6	258.6	768.4	718.4	919.9	814.2

Note: One tonne of a raw material yields one tonne of a semi-finished product, while one tonne of a semi-finished product yields one tonne of a finished product.

9. What is the highest cost (in ₹per tonne) of preparing any finished product from any raw material?
(A) 2264.8 (B) 2466.5
(C) 2388.4 (D) 2115.9

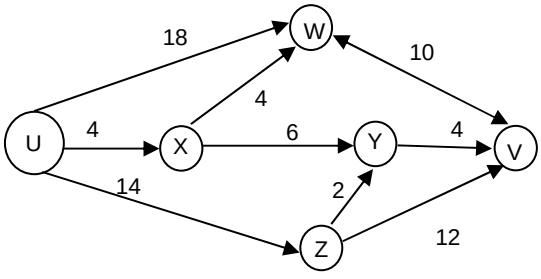
10. What is the highest cost (in ₹per tonne) of preparing FP_8 from RM_2?
(A) 1630.1 (B) 1284.5
(C) 1866.3 (D) None of these

11. What is the least cost (in ₹per tonne) of preparing any finished product from RM_5?
(A) 213.7 (B) 657.3
(C) 526.4 (D) None of these

12. In how many different ways can a given finished product be developed?
(A) 36 (B) 72
(C) 48 (D) 288

Directions for questions 13 to 16: These questions are based on the information given below.

The network below represents a busy one-way street network starting at U and ending at V. Points W, X, Y and Z are junctions in the network, and the arrows mark the direction of traffic flow. The time taken (in minutes) to travel between the points is indicated by the number adjacent to the arrow representing the street.



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

The flow of traffic can be controlled only by having a checking point before a junction which would lead to a delay (of the traffic). For example, if a motorist takes the route U-W-V (using junction W alone), then the total time of travel would be 28 mins. (i.e. 18 + 10) plus the delay at junction W.

13. If no traffic is to flow on the street from Z to V due to some repair work and equal amount of traffic is to flow through the junctions W and Y to avoid traffic jams, a feasible set of delay times (in mins) at junctions W, X, Y and Z respectively would be
(A) 2, 10, 6, 6
(B) 2, 8, 8, 6
(C) 2, 10, 8, 4
(D) 0, 10, 4, 4

14. To ensure that all motorists travelling from U to V take the same time, (travelling and checking delays combined) regardless of the route they choose when the street from X to Y is under repair (and hence unusable), a feasible set of time delays (in mins) at junctions W, X, Y and Z respectively would be
(A) 4, 10, 6, 4 (B) 0, 10, 6, 4
(C) 2, 10, 6, 4 (D) 4, 6, 10, 2

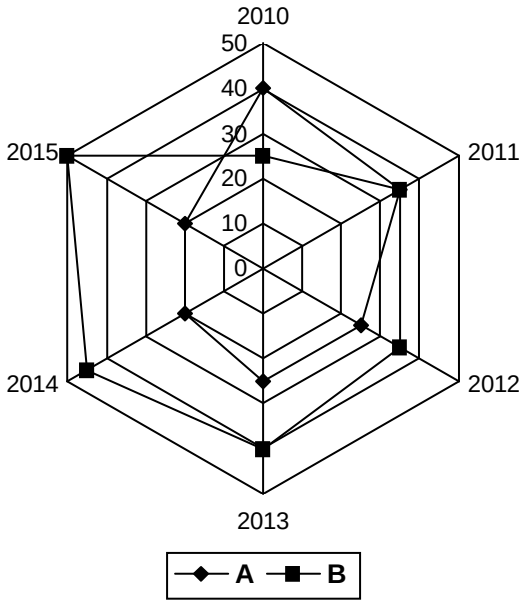
15. To ensure that the traffic at U gets evenly distributed along streets from U to W, from U to X and from U to Z, a feasible set of delays (in mins.) at junctions W, X, Y and Z respectively would be
(A) 0, 10, 8, 2 (B) 0, 10, 4, 4
(C) 2, 10, 6, 6 (D) 2, 10, 6, 4

16. To ensure that all routes from U to V get the same amounts of traffic, then a feasible set of delay times (in mins) at junctions W, X, Y and Z respectively would be
(A) 0, 10, 4, 4 (B) 0, 10, 8, 2
(C) 2, 10, 6, 6 (D) 2, 10, 6, 4

ADDITIONAL QUESTIONS FOR PRACTICE

Directions for questions 1 to 4: Answer these questions on the basis of the information given below.

The following diagram gives the market share of the top two companies, for each of the years from 2010 to 2015, for a product for which there were four companies A, B, C and D in the market. No two companies had the same market share (in percentage) in a year other than companies A and B in 2011 and in none of the years did any company have a sales more than four times that of any other company.



Total sales of the product in different years

(in ₹Crores)

Year	2010	2011	2012	2013	2014	2015
Total product sales	1200	1400	1800	2000	2600	3000

Assume that market share (in percentage) of each of the companies in each of the given years was an integer.

1. What is the percentage increase in the sales for company B from 2010 to 2015?
(A) 100
(B) 250
(C) 400
(D) 500

2. The percentage increase in the market share of any company in a year, when compared to the previous year is at most _____.
(A) 100
(B) 166.67
(C) 50
(D) None of these

3. If company C had the maximum percentage increase in the sales from 2013 to 2014, the increase in sales was _____.
(A) ₹200 cr.
(B) ₹208 cr.
(C) ₹274 cr.
(D) ₹294 cr.

4. If company D had a decrease in sales from 2010 to 2011, the percentage decrease in its sales was at most
(A) 50.
(B) 56.25.
(C) 60.
(D) 66.67.

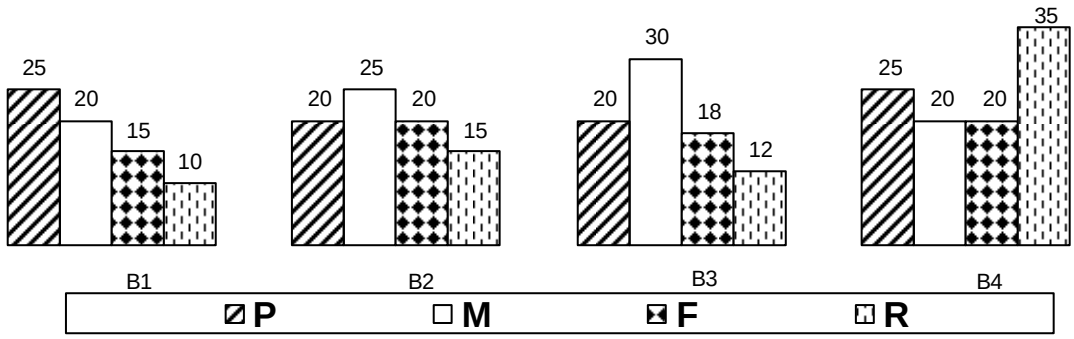
Practice Exercise – 9

Directions for questions 1 to 5: Answer these questions on the basis of the information given below.

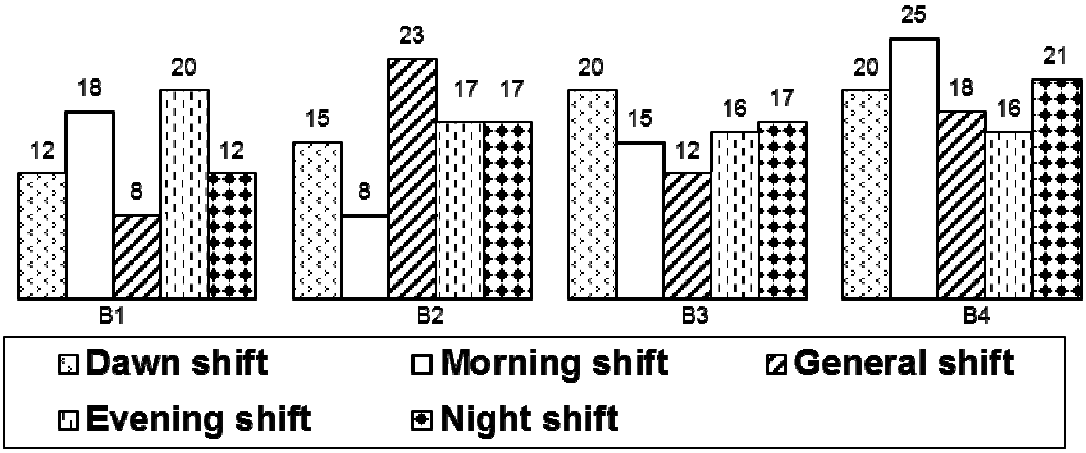
A company has four branches B_1, B_2, B_3 and B_4. There are four departments – Production (P), Marketing (M), Finance (F) and Research (R) at each of the four branches.

At each of the branches, every employee has opted for exactly one of the five shifts among Dawn shift, Morning shift, General shift, Evening shift and Night shift. Further, at each of the four branches, in each of the four departments, there was at least one employee working in each of the five shifts.

DEPARTMENTWISE CLASSIFICATION OF EMPLOYEES



SHIFTWISE CLASSIFICATION OF EMPLOYEES



1. Considering all the four branches, the total number of marketing employees who work in the morning shift is at most
(A) 54 (B) 49 (C) 53 (D) 48

2. In branch B_3, the difference between the number of Production employees who work in the morning shift and that of Finance employees who work in the general shift is at most
(A) 10 (B) 11
(C) 12 (D) None of these

3. Considering all the four branches, the number of employees from the Marketing department, who work in either the morning shift or the general shift is at most
(A) 75 (B) 77 (C) 78 (D) 79

4. The company shifted a total of *x* employees working in the evening shift into the night shift, so that the number of employees working in the night shift is more than those working in the evening shift in each branch. What is the least value of *x*?
(A) 3 (B) 4
(C) 5 (D) 6

5. Considering all the four branches, the total number of employees from Production and Marketing departments, who work either in the evening shift or in the night shift is at least
(A) 27 (B) 29
(C) 31 (D) 32

Directions for questions 6 to 10: Answer these questions on the basis of the information given below.

The tables given below give the details regarding the students of a Business School. Each student chooses exactly one specialisation from among the five specialisations – Marketing, Finance, HR, Systems and Agri-Business Management (ABM) that are available. Each student belongs to exactly one educational background among Arts, Science, Commerce, Engineering and Medicine. The distribution of the students according to their educational backgrounds and according to their management specialisations are given in the tables.

Distribution of students in different specialisations according to their educational backgrounds.

Specialisation → / Background ↓	Marketing	Finance	HR	Systems	ABM
Arts	10%	20%	5%	10%	5%
Science	20%	10%	28%	20%	20%
Commerce	25%	40%	24%	20%	10%
Engineering	40%	25%	40%	40%	60%
Medicine	5%	5%	3%	10%	5%
Total	100%	100%	100%	100%	100%

Distribution of students from different educational backgrounds according to their specialization

Background → / Specialisation ↓	Arts	Science	Commerce	Engineering	Medicine
Marketing	30%	30%	30%	30%	30%
Finance	40%	10%	32%	12·5%	20%
HR	12·5%	35%	24%	25%	15%
Systems	10%	10%	8%	10%	20%
ABM	7·5%	15%	6%	22·5%	15%
Total	100%	100%	100%	100%	100%

For example, the first table shows that 20% of the Finance students are with an Arts background.

6. The total number of students belonging to Science background is exactly the same as the total number of students choosing which specialisation?
(A) Finance (B) ABM
(C) HR (D) Systems

7. If the number of students who choose Finance as their specialisation is 400, then what is the total number of students who do not choose Finance as their specilisation?
(A) 1250 (B) 1200
(C) 1600 (D) Cannot be determined

8. If the number of students choosing Marketing as their specialisation is 600, then what is the number of students choosing Systems as their specialisation?
(A) 100 (B) 200
(C) 400 (D) Cannot be determined

9. What is the total number of students in the business school, if the number of students belonging to the Arts background is 400?
(A) 2400 (B) 3000
(C) 4000 (D) 1600

10. Which of the following can be the minimum number of students in the business school?
(A) 200 (B) 400
(C) 800 (D) None of these

Directions for questions 11 to 15: Answer these questions on the basis of the information given below.

The following table gives the number of students who secured more than 90% marks in each of the five subjects – English, Physics, Chemistry, Mathematics and Biology from class 6 to class 10 at a school, in the year 2012.

Subject / Class	English	Physics	Chemistry	Maths	Biology
6	12	16	15	22	18
7	15	22	22	21	15
8	7	18	16	23	17
9	10	19	15	22	18
10	15	25	21	29	16

The table gives the number of students in the different classes in 2012.

Class	Number of Students
6	30
7	35
8	38
9	36
10	40

11. In class 7, the number of students who scored more than 90% in a minimum of two of the five subjects is at least
(A) 12 (B) 15 (C) 18 (D) 20

12. The number of students who scored more than 90% in exactly four subjects in all the classes together is at most
(A) 28 (B) 61 (C) 96 (D) 107

13. If a scholarship is awarded to all the students from class 6 to class 10 who score more than 90% in each of the five subjects, then the number of students who won the scholarship is at most
(A) 120 (B) 104 (C) 62 (D) 59

14. The number of students in class 10 who scored more than 90%, in exactly three subjects is at most
(A) 32 (B) 34 (C) 35 (D) 38

15. The number of students in class 6 who scored more than 90% in a maximum of two subjects is at most
(A) 19 (B) 21 (C) 22 (D) 26

ADDITIONAL QUESTIONS FOR PRACTICE

Directions for questions 1 to 5: These questions are based on the following data.

All the 150 students in a CAT coaching centre wrote at least one of the three exams among CAT, XAT and NMAT. It was found that more students wrote CAT than XAT and the number of students who wrote XAT was more than those who wrote NMAT. The number of students who wrote exactly one test was more than those who wrote exactly two tests which in turn was more than those who wrote all the three tests. It is also known that the number of students who wrote NMAT was more than the number of students who wrote exactly one test.

Directions for questions 1 to 4: Type in your answer in the input box provided in the question.

1. What is the highest number of students from the coaching centre who could have written NMAT?

2. What is the least number of students from the coaching centre who could have written CAT?

3. At most how many students from the coaching centre would have written all the three tests?

4. What is the maximum number of students from the coaching centre who could have written CAT?

5. What is the minimum number of students from the coaching centre who could have written NMAT?

Practice Exercise – 10

Directions for questions 1 to 4: Answer these questions on the basis of the information given below.

The following table represents the number of cars sold (in thousands) by four companies in three countries. The companies Toyo Ltd., Mercedes Ltd., BWM Ltd., and Form Ltd., are disguised as company A, company B, Company C and Company D in the table, in no particular order.

Countries	Company A	Company B	Company C	Company D
U.S.A.	196	328	320	220
U.K.	276	288	280	260
Japan	288	252	288	260

Further it is known that, BWM Ltd. was one of the companies that had the highest sales in Japan.
Total cars sold by Mercedes Ltd. in the three countries differs from that of Toyo Ltd. by 20,000.

1. What can be said regarding the following two statements?
Statement 1: Mercedes Ltd. had its lowest sales in Japan.
Statement 2: Toyo Ltd. had its lowest sales in U.K.

(A) If statement 2 is true then statement 1 is necessarily false.
(B) If statement 1 is false then statement 2 is necessarily true.
(C) If statement 1 is true then statement 2 is necessarily true.
(D) If statement 1 is false then statement 2 is necessarily true.

2. If Form Ltd. had its lowest sales in U.S.A., then which of the following is necessarily true?
(A) BWM Ltd. had its lowest sales in Japan.
(B) BWM Ltd. had its lowest sales in U.K.
(C) BWM Ltd. had its lowest sales in U.S.A.
(D) BWM Ltd. is company B.

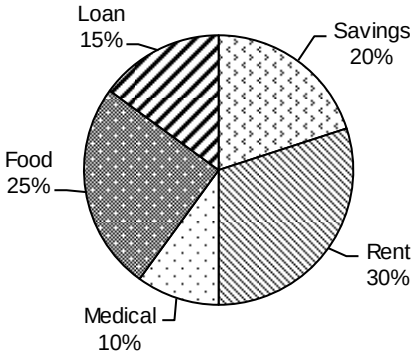
3. Which of the following additional information will help us to uniquely identify each of the four companies.
(a) BWM Ltd is company A.
(b) Toyo Ltd is company B.
(c) Form Ltd is company D.
(d) Mercedes Ltd is company C.
(A) Only a
(B) Only b
(C) Only d
(D) More than one of the above.

4. What can be said regarding the following two statements?
Statement 1: Toyo Ltd. had the highest sales in U.S.A.
Statement 2: Mercedes Ltd. had the highest sales in U.K.
(A) Both statements could be true.
(B) At least one of the statements must be true.
(C) At most one of the statements is true.
(D) Both statements are false.

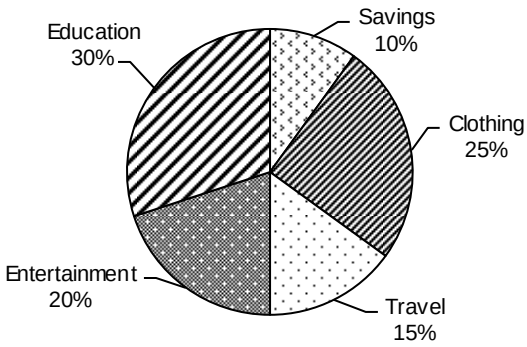
Directions for questions 5 to 8: Answer these questions on the basis of the information given below.

In the Sharma household, one of Mr. or Mrs. Sharma would take care of all expenses under a head, among the different head of expenses incurred by the family. The first two pie charts gives the percentage distribution of the expenses incurred by each of Mr. and Mrs. Sharma and their savings, out of their salaries. The third pie chart gives the percentage distribution of the investment of their combined savings.

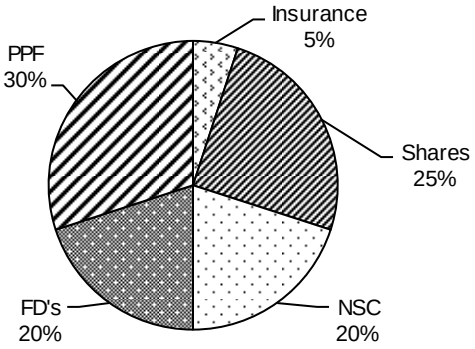
Mr. Sharma



Mrs. Sharma



Combined Savings



5. If the ratio of the expenses on rent and clothing is 3 : 1, then what is the ratio of the earnings of Mr. and Mrs. Sharma?
(A) 2 : 1 (B) 1 : 2
(C) 5 : 2 (D) 3 : 2

6. If the investment in shares form 33.33% of the rent paid, then what is the ratio of the incomes of Mr. and Mrs. Sharma?
(A) 2 : 1
(B) 1 : 2
(C) 3 : 2
(D) 2 : 3

7. If investments in PPF was ₹36,000 annually, then which of the following could be their average monthly expenses for entertainment, if one of them earned half as much as the other?
(A) ₹5000 (B) ₹6000
(C) ₹10000 (D) ₹12000

8. If expenses on education was equivalent to their investment in F.D's, then what percent of their total income was the medical expenses?
(A) 5 (B) 7.5
(C) 8.75 (D) None of these

Directions for questions 9 to 12: Answer these questions on the basis of the information given below.

The table gives the ratio of the number of boys to the number of girls in different schools, in different cities, for the years 2015 and 2016.

School	Jaipur		Mumbai		Pune		Hyderabad	
	2015	2016	2015	2016	2015	2016	2015	2016
DPS	3 : 2	4 : 3	2 : 3	2 : 3	7 : 4	7 : 5	7 : 5	3 : 2
FPS	4 : 3	4 : 3	3 : 4	3 : 5	3 : 2	3 : 4	7 : 6	4 : 3
LSP	5 : 2	5 : 3	5 : 4	4 : 5	1 : 2	4 : 5	6 : 5	5 : 2
LPS	7 : 2	7 : 4	7 : 3	7 : 5	3 : 5	7 : 5	8 : 3	7 : 2
PDS	1 : 1	1 : 1	1 : 1	1 : 1	5 : 3	5 : 4	9 : 7	1 : 1
LFS	1 : 2	2 : 3	1 : 2	1 : 2	3 : 4	4 : 5	3 : 2	1 : 2

For any given school, in any year, assume that the number of students in Jaipur was more than that in Mumbai, which, in turn, was more than that in Pune, which, in turn was more than that in Hyderabad.

Also, for any given city, in any year, the number of students followed this pattern n (DPS) > n (FPS) > n (LSP) > n(LPS) > n(PDS) > n (LFS) (where n(XYZ) denotes the number of students in the school XYZ in that year).

9. If in 2015, the difference between the number of boys and the number of girls in LSP was 120 and 90 in Jaipur and Pune respectively, then what was the difference between the number of boys and the number of girls in LSP in Mumbai in that year?
(A) 29 (B) 30
(C) 31 (D) 33

10. If '*boyage*' is defined as the percentage of boys in the total students, then for how many of the given 24 campuses is the value of *boyage* in 2016, more than that in 2015? (Consider each school in each city as a campus.)
(A) 4 (B) 6 (C) 8 (D) 10

11. If the number of girls in LSP in Pune in 2015 is the same as the number of boys in DPS in Mumbai in 2016, then the total number of students in DPS in Mumbai in 2016 is definitely more than the number of students in
(A) FPS in Hyderabad in 2015.
(B) DPS in Pune in 2015.
(C) LFS in Jaipur in 2016.
(D) LPS in Pune in 2015.

12. In 2015, if the number of boys in DPS in Hyderabad is 315, then what is the maximum possible number of girls in LFS in Hyderabad?
(A) 210 (B) 212 (C) 204 (D) 196

Directions for questions 13 to 16: Answer these questions on the basis of the information given below.

The table gives some information about the foreign exchange reserves of India for a period of ten years from 1990-91 to 1999-2000. Foreign exchange reserves comprise currency holdings and gold holdings. Currency holdings comprise reserves in three foreign currencies - US Dollar, Pound Sterling and Euro.

The following table gives the prices (in ₹) of the three currencies and the price (in ₹) of gold by considering the year 1990-91 as the base year, in which the price of each of the currencies and the price of gold are taken as 100. The prices of each of these in the following years are given relative to that in the base year.

Holdings	Price with respect to the base year (1990-91)									
	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
US Dollar	100	96	110	96	98	94	102	92	112	98
Pound Sterling	100	110	102	100	96	100	106	98	116	90
Euro	100	104	106	104	104	106	106	96	108	106
Gold	100	102	104	108	110	107	108	109	112	109

(i) Value (in ₹) of a Currency (or Gold) holding = Volume of the holding × Price (in ₹) of the holding.

(ii) Volume of a Currency (or Gold) holding = Number of units of that Currency (or Gold) held.

(iii) The quantity of each currency and that of gold with India remained constant throughout the given period and India had at least one unit of each of the three currencies and gold with it.

13. If the percentage increase in the total value of the foreign exchange reserves from 1990-91 to 1998-99 is *x*%, then *x* cannot be equal to
(A) 10 (B) 12.5 (C) 8 (D) 11

Directions for questions 14 to 16: Type in your answer in the input box provided below the question.

14. If the total value of the currency holdings during 1995-96 was more than that in 1990-91, what is the maximum possible number of years during which the total value of the currency holdings was less than that in 1990-91?

15. In how many of the given years was the total value of the currency holdings definitely less than that in the year 1992-93?

16. During which of the given years was the total value of the foreign exchange reserves the highest?

Directions for questions 17 to 20: Answer these questions on the basis of the information given below.

A study on population of eight cities was conducted by the human resources and social welfare department. These eight cities were ranked from 1 to 8 on the basis of social welfare and it was found that for any city X, the number of cities with a population less than it was exactly one less than the rank of city X on the basis of social welfare.
The following table gives the comparison of populations of the eight cities.

	Indore	Pune	Bhopal	Shillong	Agra	Cochin	Patna	Mysore
Indore	X	M	L					L
Pune		X			M			
Bhopal			X			L	L	L
Shillong				X				M
Agra					X			
Cochin						X	L	M
Patna							X	M
Mysore								X

M in the table denotes that the population of that city was more and L in the table denotes that the population of that city was less than the corresponding city. For example the table shows that the population of Indore was more than that of Pune and less than that of Bhopal. It was also known that Indore was 3rd and Shillong was not among the top 5 in the rakings on the basis of social welfare.

17. Which city was ranked first?
(A) Pune (B) Agra
(C) Bhopal (D) Mysore

18. How many cities have less population than Mysore?
(A) 3 (B) 2 (C) 4 (D) 7

19. What was the rank of Shillong on the basis of Social Welfare?
(A) 7 (B) 6
(C) 5 (D) Cannot be determined

20. The cities are ranked again based on population such that the city with the highest population is ranked 1st, that with the second highest population ranked 2nd and so on. Which city would have its rank and the number of cities with a population less than it, as equal?
(A) Shillong
(B) Mysore
(C) Bhopal
(D) Cochin

Practice Exercise – 11

Directions for questions 1 to 4: Answer these questions on the basis of the information given below.

The following table gives the composition of five different drinks - A, B, C, D, and E, each of which contains one or more of four minerals - P, Q, R, and S. The cost per litre of A, B, C, D, and E are respectively ₹50, ₹100, ₹150, ₹200 and ₹250.

Mineral / Drink	P	Q	R	S
A	30	20	40	10
B	20	50	20	10
C	10	30	30	30
D	0	40	30	30
E	40	30	0	30

1. What is the minimum quantity (in litres) of drink A required if we have to mix two drinks to get a 5 litre solution which contains at least 35% of mineral R?
(A) 1.5 (B) 2.0 (C) 2.5 (D) 3.0

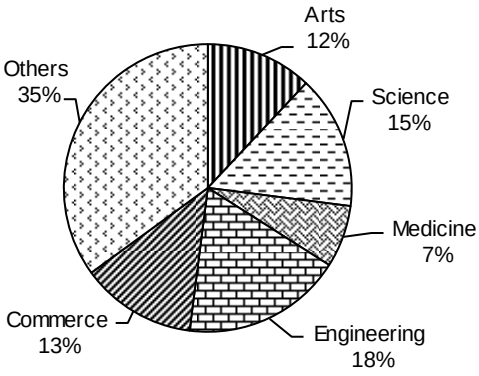
2. What is the least cost (in ₹) per litre of a solution which is produced by mixing two drinks and which contains at least 30% of mineral Q and at least 25% of mineral P?
(A) 100
(B) 90
(C) 80
(D) None of these

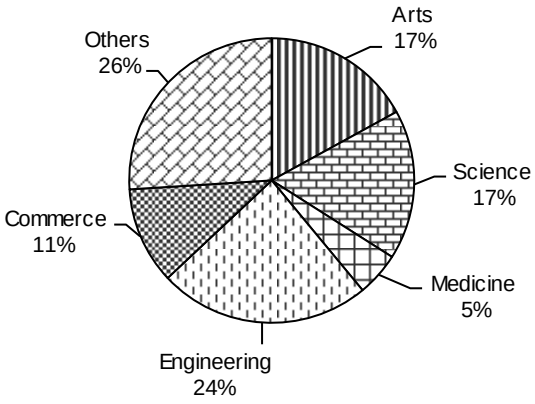
3. If a solution, which contains at least 20% each of minerals P, Q and S is to be made at the least cost per litre, then what is the ratio in which the drinks A, C and E are to be mixed?
(A) 1 : 1 : 1 (B) 2 : 1 : 1
(C) 1 : 2 : 1 (D) 1 : 1 : 2

4. If a solution, which contains at least 30% of mineral R and not more than 35% of mineral Q has to be made, then which of the following two drinks should be mixed in equal proportion for the solution to have the least cost per litre?
(A) A and B (B) A and C
(C) A and D (D) C and D

Directions for questions 5 to 8: Answer these questions on the basis of the information given below.

The first pie chart gives the break up of the total students doing graduation in a city according to their area of specialization. The second pie chat gives the break up of the boys doing graduation according to their area of specialization. The ratio of the number of boys to girls doing graduation is 2 : 5





5. If gender ratio = $\frac{\text{number of girls}}{\text{number of boys}}$, then what is the gender ratio of students doing medicine?
(A) 3.9
(B) 4.3
(C) 3.5
(D) Cannot be determined

6. For how many areas of specialization is the number of boys at least half of the number of girls?
(A) 1
(B) 2
(C) 3
(D) 4

7. If the number of girls doing medicine is 4056 then what is the total number of boys doing graduation?
(A) 12,400
(B) 18,600
(C) 20,800
(D) None of these

8. What is the ratio of the number of girls in the area of specialization for which the number of boys is the second highest and the number of boys in the area of specialization for which the number of girls is the highest?
(A) 2 : 5
(B) 2 : 3
(C) 3 : 2
(D) Cannot be determined

Directions for questions 9 to 12: Answer these questions on the basis of the information given below.

The table below gives partial information regarding the proportion of number of male employees and vegetarians among the employees in each of the four departments- Accounts, Administration, Marketing and Production of company XYZ. The total number of employees in the company is 1200 and the ratio of number of employees in Accounts, Administration, Marketing and Production departments was 2 : 3 : 4 : 3.

	Male	Vegetarians
Accounts		0.335
Administration	0.45	
Marketing	0.55	
Production	0.60	0.33
Total	0.55	0.325

Directions for questions 9 to 12: Type in your answer in the input box provided below the question.

9. What percentage of the employees in the accounts department are females?

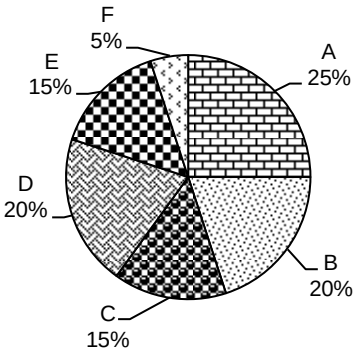
10. The total numbers of employees who are non-vegetarians is more than the total number of female employees by

11. If the percentage of employees who are vegetarians is the same in both the administration and the marketing departments, then the number of employees in marketing who are non vegetarians is

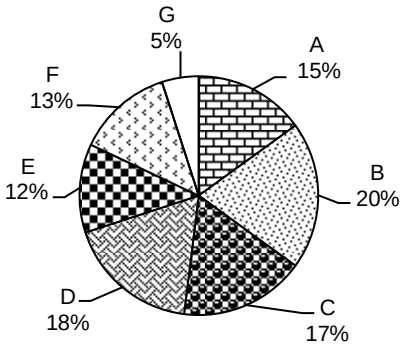
12. At most what percentage of the employees in the marketing department are vegetarians?

Directions for questions 13 to 16: Answer the following questions based on the information given below.

The following figures represent the export performance of XYZ Ltd in the year 2015-16. The first pie chart represents the product-wise break-up of the exports to Germany, the main market of XYZ Ltd in Europe and the second pie chart represents the product-wise exports to Europe, which is the only region to which the company exports. 'Rest of Europe' refers to all regions in Europe excluding Germany.



Total = 40 million dollars



Total = 110 million dollars

13. For which of the given products is the percentage share of exports to Germany, out of its total exports to Europe, the highest?
(A) A (B) B (C) D (D) E

14. If for product A, the value of exports to France accounted for 35% of that to 'rest of Europe', what was its value (in million dollars)?
(A) 1.975 (B) 2.125
(C) 2.275 (D) None of these

15. For how many of the given products was the value of its exports to Germany more than two thirds of that to the 'rest of Europe'?
(A) 4 (B) 3 (C) 2 (D) 1

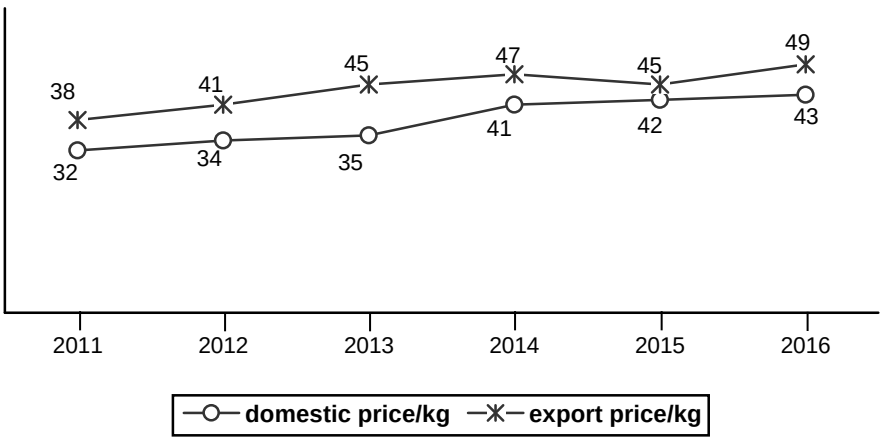
16. The exports of product B to the 'rest of Europe' is more than the exports of how many products to the whole of Europe?
(A) 0 (B) 1 (C) 2 (D) 3

Directions for questions 17 to 20: These questions are based on the following information.

The products of company XYZ are sold both domestically and in the international market. Every year, the exports take place immediately after the production and the remaining products are sent to the godowns. Some quantity is damaged during this process of storing while the others are completely sold off in the domestic market.

The table gives the details of production, export and quantity lost during the storage process while the line graph gives the export and domestic prices for the years 2011 to 2016 Assume that both domestic and export prices remain constant in a year.

Year	Production ('000 kg)	Exports ('000 kg)	Damage during storing ('000 kg)
2011	137	42	5.0
2012	134	52	6.5
2013	161	73	7.2
2014	186	67	4.7
2015	172	75	8.1
2016	197	82	7.8



Note: The damaged quantity is discarded and the company incurs a cost of ₹3/kg in disposing it off.
Total Revenue in a year = Amount obtained from sale of products – Cost incurred in disposing off the damaged products.
Domestic revenue = Quantity sold in the domestic market × domestic price/kg.

17. What was the percentage increase in the revenue of the company from 2012 to 2013?
(A) 28.3 (B) 29.1
(C) 30.2 (D) 31.4

18. What was the highest value of the revenue per kg of the quantity produced, in any of the given years?
(A) 46.2 (B) 45.1
(C) 43.6 (D) 41.5

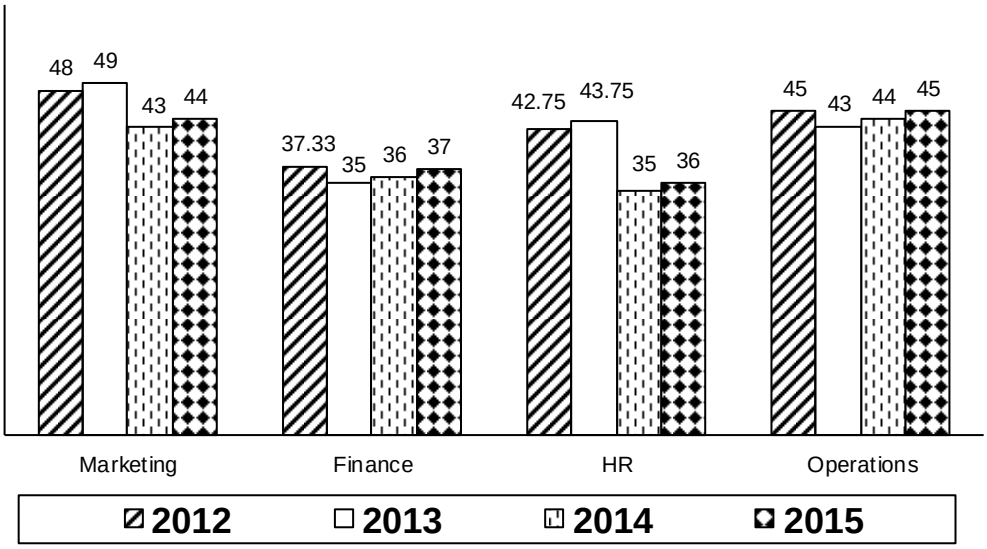
19. What was the highest percentage increase in domestic revenue when compared to the previous year?
(A) 65.7 (B) 58.4 (C) 59.4 (D) 60.2

20. The highest value of revenue from sales in the domestic market, as a percentage of the total revenue in that year, is
(A) 64% (B) 61% (C) 59% (D) 56%

Practice Exercise – 12

Directions for questions 1 to 4: Answer these questions on the basis of the information given below.

The four departments - Marketing, Finance, HR and Operations of company XYZ had 5, 3, 4 and 6 employees as on 1st April 2012. In the next four years, the company recruited one employee each in each of the four departments. All the new employees who joined the company joined on 1st April and were 25 years of age at that point of time. During these four years, two employees who were aged 60 years and 64 years retired from two departments of the company. The following graph gives the average age of the employees in the departments as on 1st of April 2012, 2013, 2014 and 2015.



1. From which department did the employee aged 64 years retire?
(A) Marketing (B) Finance
(C) HR (D) Operations

2. In which year did the new employee join the HR department?
(A) 2015 (B) 2014 (C) 2013 (D) 2012

3. From which department did the employee aged 60 years retire?
(A) Marketing (B) Finance
(C) HR (D) Operations

4. As on 1st April 2015 the age of the new employee who joined the operations department is _____ years.
(A) 28 (B) 26 (C) 25 (D) 27

Directions for questions 5 to 8: Answer these questions on the basis of the information given below.

A total of 1000 students in four schools A, B, C and D were surveyed on their food habits and the game they prefer to watch. The number of the students surveyed in the four schools are in the ratio 1 : 3 : 4 : 2 respectively.

The following table gives the proportion of the number of students preferring non vegetarian food and watching cricket.

School	Non vegetarian	Watching cricket
A	0.42	0.74
B	0.61	0.67
C	0.35	0.48
D	0.68	0.76

Assume that each student prefer exactly one of vegetarian or non-vegetarian food and prefer to watch exactly one of cricket or football.

5. What is the maximum number of students in school B who prefer both vegetarian food and watching cricket?
(A) 86 (B) 117
(C) 108 (D) None of these

6. What is the minimum number of students in school D who prefer both vegetarian food and watching football?
(A) 0 (B) 7
(C) 18 (D) None of these

7. What is the least number of students in school D who prefer non-vegetarian food and watching football or prefer vegetarian food and watching cricket?
(A) 112
(B) 20
(C) 16
(D) None of these

8. Which of the following cannot be the number of students in school C who prefer non-vegetarian food and do not prefer watching cricket?
(A) 112
(B) 156
(C) 194
(D) More than one of the above

Directions for questions 9 to 11: Answer these questions on the basis of the information given below.

The following table gives the projected returns from two investment schemes - X and Y, depending on whether the market conditions are very good, good or bad.

X		
Market Condition	**Probability**	**Returns**
Very good	0.2	60 %
Good	0.5	20 %
Bad	0.3	–25 %

Y		
Market condition	**Probability**	**Returns**
Very good	---	40%
Good	0.4	10%
Bad	---	–10%

9. What is the expected return from scheme X?
(A) 17.0% (B) 14.5%
(C) 12.6% (D) None of these

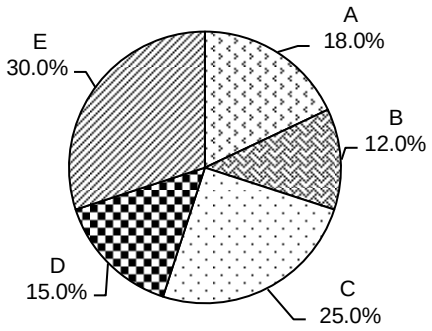
10. If the expected return from scheme Y is 15.5%, what is the probability of very good market conditions?
(A) 20% (B) 25% (C) 35% (D) 40%

11. If the investment in schemes X and Y are made in the ratio of 3 : 2, then what is the least possible return expected?
(A) 7.9%
(B) 8.6%
(C) 9.2%
(D) 6.2%

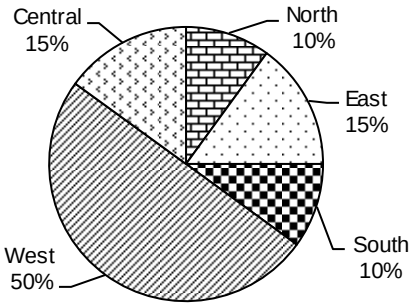
Directions for questions 12 to 16: Answer these questions on the basis of the information given below.

A company – XYZ Ltd. – which sells five different products – A, B, C, D and E – gave misleading information to the press regarding some of its sales. The company exaggerated the sales of its product D in the Western region, while stating sales of all other products in all other regions accurately.

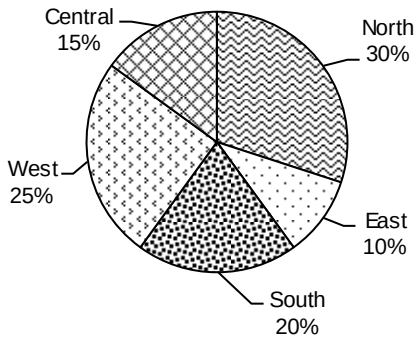
Product wise distribution of total sales of XYZ Ltd.



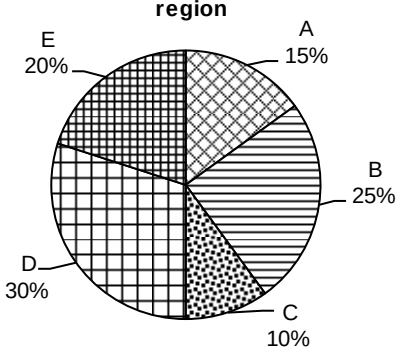
Region wise distribution of the sales of product D by XYZ Ltd.



Region wise distribution of the total sales of XYZ Ltd.



Product wise distribution of the sales of XYZ Ltd., in the Western region



Note: All the pie charts are in terms of value.
The above pie charts are drawn by Sunil, a business journalist, who is unaware of the above mentioned discrepancy. Another set of four similar pie charts, (not shown here), representing the distribution of the same quantities mentioned above, are drawn by Anand, an employee of the company XYZ Ltd., who is aware of all the figures accurately and has drawn them accordingly.

12. If it is known that XYZ Ltd., exaggerated the value of the sales of product D in the Western region by 25%, then considering the pie charts drawn by Anand, what is the ratio of the total sales of product C and that of product E?

(A) 5 : 6
(B) 57 : 50
(C) 2 : 3
(D) 3 : 5

13. According to Sunil, what percentage of the total sales in the Northern region are the sales of product D in that region?

(A) 5%
(B) $8^1/_3$%
(C) 12.5%
(D) 15%

14. According to the pie charts drawn by Anand, if the sales of product E in the Western region represent 25% of the total sales in the Western region, then what is the percentage share of the sales in the Northern region, in the total sales of the company?

(A) 28.8%
(B) 30.2%
(C) 34.8%
(D) None of these

15. If the actual total sales of the company are ₹14,000 crore and the actual sales of product B are ₹1800 crore, then by how many times are the sales of D in the Western region stated more than the actual?

(A) 7 times
(B) 6 times
(C) 8 times
(D) 9 times

16. If the actual sales of product A in the Western region are known, which of the following additional data (considered independently along with the above information) is necessary and sufficient to find the actual total sales of product D?

I. The actual sales of product D in the Southern region.
II. The actual total sales in the Northern region.
III. The sum of the actual sales of product E and product D in the Western region.
IV. Difference between the actual total sales in the Northern and the Western regions.

(A) Only I
(B) Only I or Only III
(C) Only I or Only IV
(D) Only III or Only IV

Directions for questions 17 to 20: These questions are based on the following information.

The twelve teams that took part in the World Hockey Championship were divided into two pools of six teams each. In each pool, each team plays exactly one match against each of the other teams in its pool. Two points are awarded for a win, one point for a draw and zero points for a loss. At the end of the pool stage the top two teams from each pool, in terms of the points scored, would advance to the semi-finals and the winner of the semi-finals play the finals, while the losers of the semi-finals play for the third place. Teams which finished third and fourth respectively in a pool would play with the teams ranked fourth and third respectively in the other pool. The winners of these matches would play to determine the fifth and sixth ranks, while the losers of these matches would play to determine the seventh and eighth ranks. Similarly teams that ranked fifth and sixth in each pool would play to determine the ranks from nine to twelve. In case two teams end up with the same number of points at the end of the pool stage, their rankings in the pool stage are determined by their net goal difference.

Note: Net goal difference = goals scored – goals conceded

Directions for questions 17 and 18: Type in your answer in the input box provided below the question.

17. What is the minimum number of points a team should aim for, at the start of the tournament, to guarantee itself a place in the semi finals?

18. What is the minimum number of points with which a team can reach the semi finals?

Directions for questions 19 and 20: Type in your answer in the input box provided in the question.

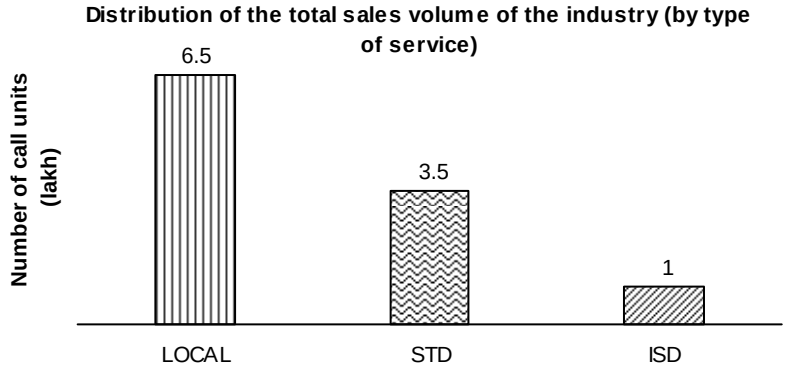
19. The total number of matches played in the tournament is .

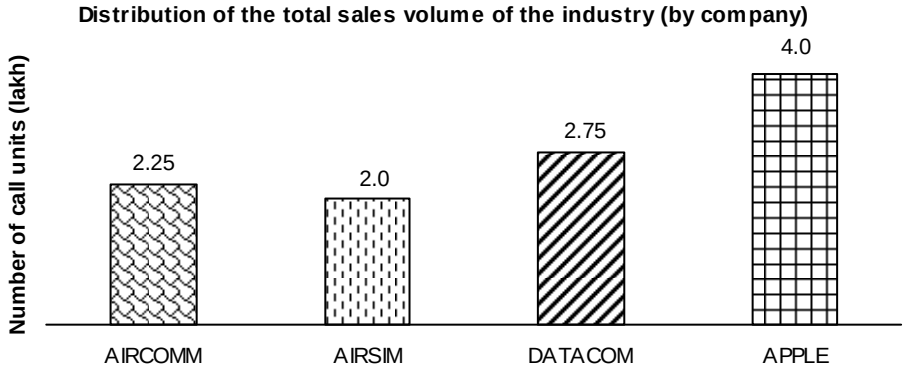
20. If there are no draws in the championship after the pool stage, the total number of matches won by the team that won the tournament is at least .

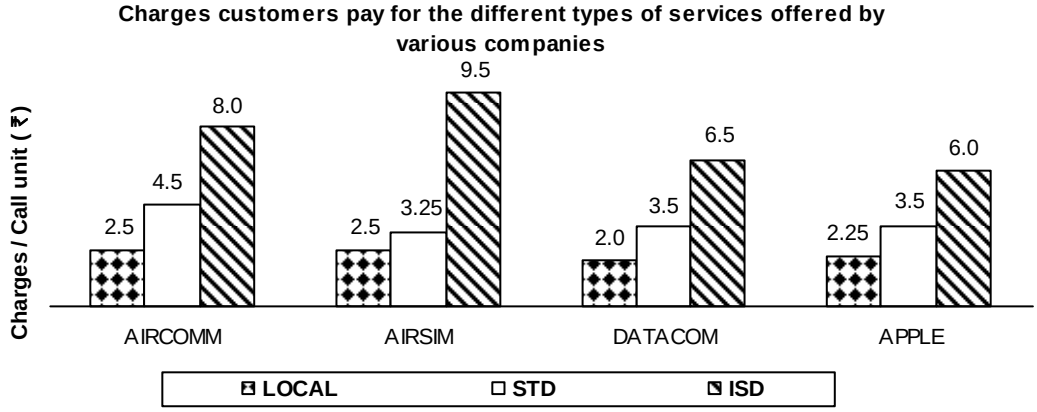
Practice Exercise – 13

Directions for questions 1 to 4: Answer these questions on the basis of the information given below.

The bar charts give the statistics regarding the telecommunications industry in a country. There are only three types of services – LOCAL, STD, and ISD – offered by the industry, and there are only four companies – AIRCOMM, AIRSIM, DATACOM and APPLE – in the industry. Sales in this industry are measured in terms of number of call units.



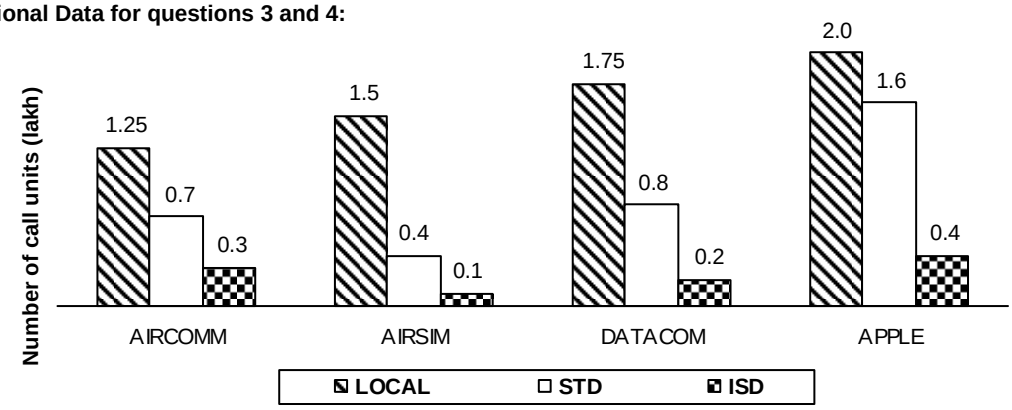




1. Given the above information, what could be the least possible amount spent by all the customers on all the LOCAL and STD calls put together? Assume that a customer can utilize the services of more than one company.
(A) ₹22 lakh
(B) ₹26.375 lakh
(C) ₹26 lakh
(D) ₹27.75 lakh

2. What would be the answer to the above question if the term STD is replaced with ISD?
(A) ₹18.875 lakh
(B) ₹20.125 lakh
(C) ₹22.175 lakh
(D) ₹22.875 lakh

Additional Data for questions 3 and 4:

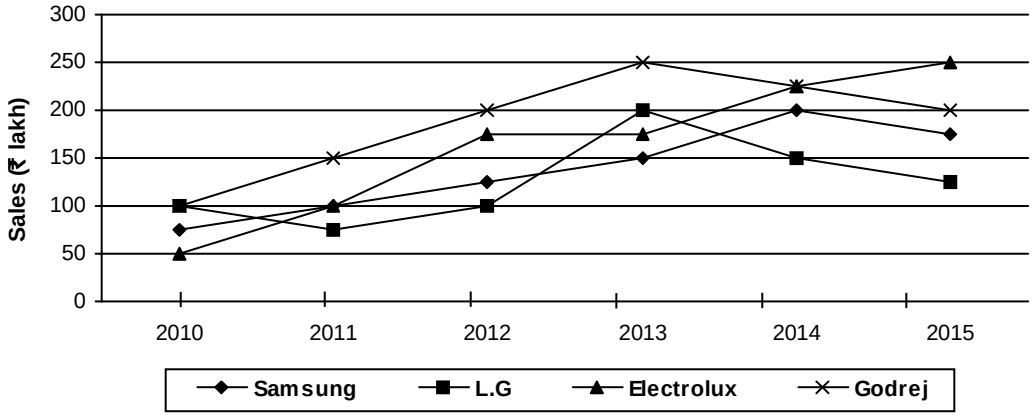


3. If each company reduced its STD charges per call unit by ₹1, but to exactly compensate for the subsequent revenue loss, it simultaneously, increased its ISD charges proportionately, then which company offers the second cheapest service for ISD calls? Assume that the total number as well as the distribution of call units remain the same.
(A) AIRCOMM (B) AIRSIM
(C) DATACOM (D) APPLE

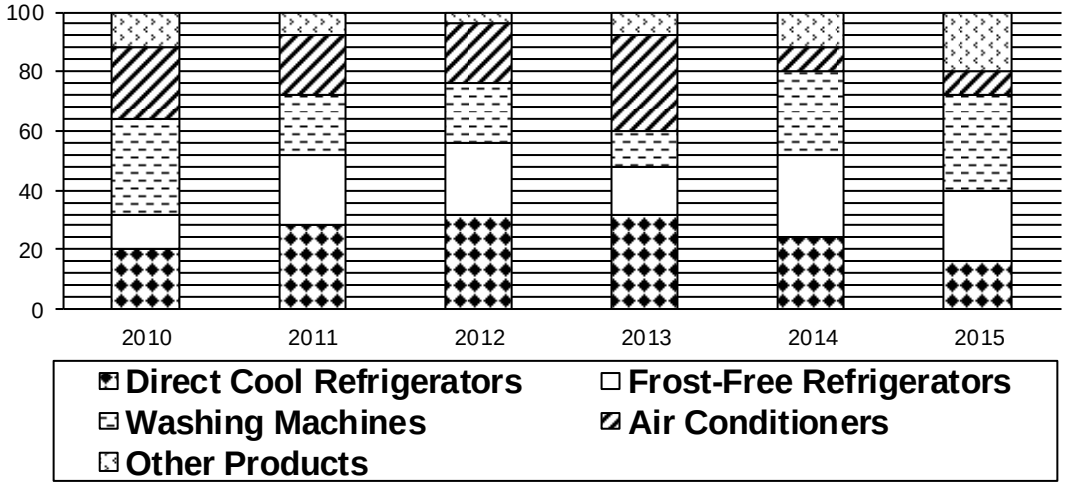
4. The company whose total sales revenue is the highest is
(A) AIRCOMM
(B) AIRSIM
(C) DATACOM
(D) APPLE

Directions for questions 5 to 8: Answer the following questions based on the information given below.

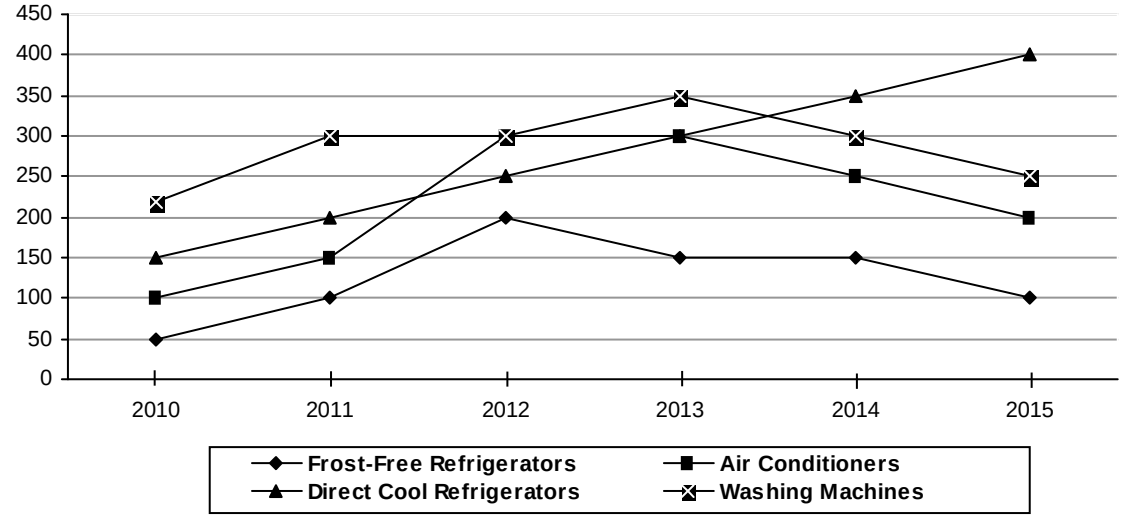
The brand-wise sales of a Consumer Electronics Dealer ABC Ltd. for the period from 2010 to 2015



Product wise split (by value) of the total annual sales of the products of Samsung sold by ABC Ltd. for the period from 2010 to 2015



The sales (in units) of the major products of Samsung sold by ABC Ltd. for the period from 2010 to 2015



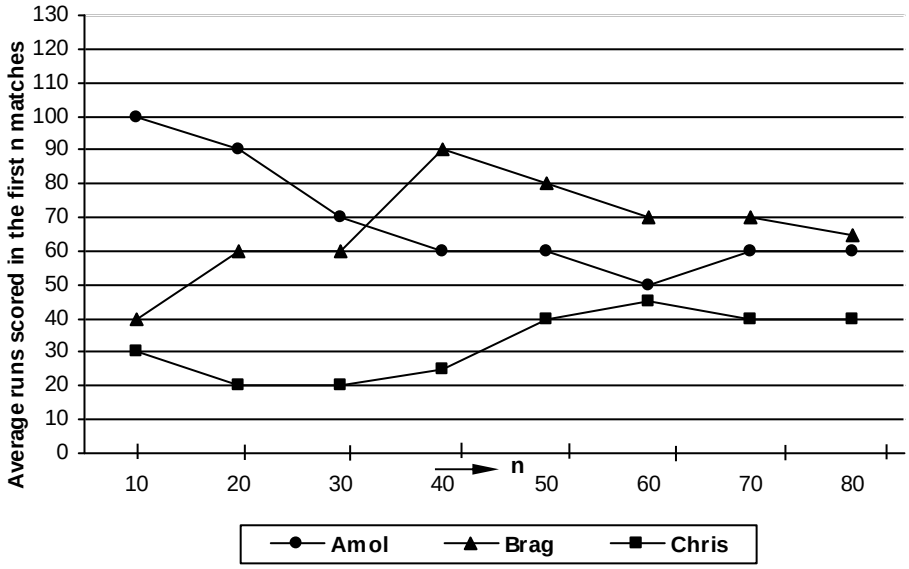
5. What were the total sales of Samsung Frost-Free Refrigerators in the period 2010 to 2012?
(A) ₹72 lakh (B) ₹81 lakh
(C) ₹69 lakh (D) ₹63 lakh

6. If in the year 2011, the ratio of the sales by value of Air Conditioners of the four brands is the same as the ratio of the total sales by value of the four brands, then find the sales (by value) of the Air Conditioners of L.G in 2011.
(A) ₹15 lakh
(B) ₹24 lakh
(C) ₹30 lakh
(D) ₹18 lakh

7. In which year did the sales revenue from Samsung Washing Machines increase by the greatest percentage over that in the previous year?
(A) 2013 (B) 2014
(C) 2012 (D) 2015

8. Which of the following is the correct descending order of the four brands according to the percentage change in their respective sales (by value) from the year 2010 to the year 2015?
(A) Electrolux, Godrej, Samsung, LG
(B) Samsung, Electrolux, LG, Godrej
(C) Electrolux, Samsung, Godrej, LG
(D) Samsung, Electrolux, Godrej, LG

Directions for questions 9 to 12: Answer these questions on the basis of the information given below.



The graph shown above represents the variation in the average runs scored by three leading cricket players - Amol, Brag and Chris. Assume that no player was "not out" in any of the matches he played. All the three players are from the same team. Each of them played in all the 80 matches played by the team. Also, the runs scored by any of the players in any match was always a non-negative number.
For example, average runs scored by Amol in the first 40 matches played is 60, while those scored by Brag in the first 60 matches played is 70.

9. In which of the following groups of ten matches, is the number of runs scored by Amol the same as that scored by Brag?
(A) 41st to 50th (B) 51st to 60th
(C) 61st to 70th (D) None of these

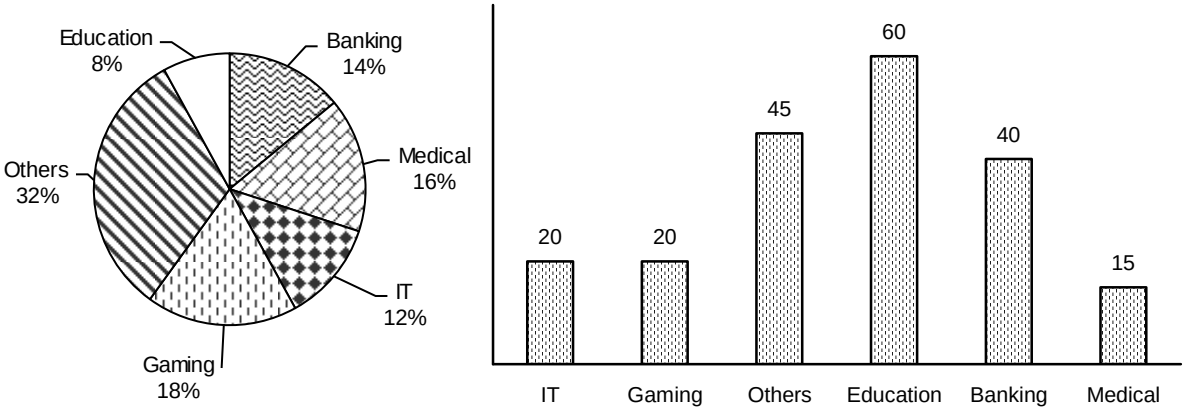
10. For which of the following groups of ten matches, is the average number of runs scored by Amol the highest?
(A) 21st to 30th (B) 31st to 40th
(C) 51st to 60th (D) 61st to 70th

11. If Brag did not score the same number of runs in any two matches, the highest score made by Brag in any of his first 60 matches is at least.
(A) 180 (B) 184 (C) 185 (D) 187

12. In which of the following groups of ten matches were the runs scored by Chris more than those scored by one of Amol and Brag, but less than the other?
(A) 11th to 20th (B) 31st to 40th
(C) 41st to 50th (D) 51st to 60th

Directions for questions 13 to 16: Answer these questions on the basis of the information given below.

The pie chart gives the break up of all engineers in a city on the basis of the industry they work for. The bar graph gives the percentage of females, among the engineers, for each sector.



13. What is the average number of female engineers per sector?
(A) 2861 (B) 4273
(C) 4402 (D) 4454

14. The number of male engineers in the banking sector is what percentage more than the number of female engineers in the IT sector?
(A) 350%
(B) 150%
(C) 250%
(D) None of these

15. Had the number of female engineers in the gaming sector been 4628 and the number of male and female engineers in all other sectors remain the same, then what would have been the percentage of females among the total engineers?
(A) 35.5% (B) 34.6%
(C) 34.2% (D) 33.5%

16. What is the maximum difference between the number of male and female engineers in any single industry?
(A) 8126
(B) 8694
(C) 9016
(D) None of these

Directions for questions 17 to 20: These questions are based on the following information.

ABC Corporation started in 2010 with 35 employees. The table below gives the number of employees who joined and left the company in the subsequent years as on 31st December of that year. Assume that no employee left the company in the year in which it was started. Any employee who joins the company has to sign a bond and cannot leave without completing one year.

Years	Employees joined	Employees Left
2010	35	
2011	12	17
2012	22	15
2013	26	18
2014	31	25
2015	23	12

Directions for questions 17 to 20: Type in your answer in the input box provided below the question.

17. What is the minimum number of employees who left the company without completing two years?

18. At most how many of the 35 employees who were with the company in the beginning were still with the company at the end of 2013?

19. What is the maximum number of employees who worked with the company for at least two years till December 31st 2015?

20. Any employee who completes three years with the company is given a promotion. What is the maximum number of employees who got a promotion till 31st December, 2015?

Practice Exercise – 14

Directions for questions 1 to 5: Answer these questions on the basis of the information given below.

XYZ Ltd, a manufacturing company, was testing a software developed by its quality-control (QC) department. The software was tested on 1000 products it manufactured. The software correctly identified 70% of the cases in which the products were defective but it also identified 10% of the non-defective products as defective. The company usually has a 30% defective rate and it expects the value to remain the same this year also.

If the company uses the software developed by its QC department, it would only dispatch products not identified as defective. The company incurs a total cost of ₹10,000 on each product dispatched and is planning to dispatch *one lakh* units this year. Assume that the company incurs a loss of ₹1,000 on any product which is manufactured and not dispatched due to it being identified defective. All defective products, which are not identified at the company level, is dispatched and is identified at the customer level.

1. If the company uses the software developed by its QC department, how many of the products dispatched are likely to be defective?
(A) 30,000 (B) 21,000
(C) 12,500 (D) 9,000

2. The company will earn a profit of ₹2,500 on each non-defective product and loses ₹5,000 on each defective product dispatched. Assuming all products dispatched are sold, how much will the company gain if it uses the software, as compared to the profit obtained when the products are dispatched without testing?
(A) ₹8.71cr (B) ₹9.24cr
(C) ₹9.89cr (D) ₹10.68cr

3. The company can either dispatch products to the market after testing them using the software developed by the QC department or can take up contract manufacturing where all the products can be sold to another company at a ₹1,000 profit per product. For product dispatched to the market after testing, the company gains ₹2,500 on each non-defective product and lose ₹5,000 on each defective product dispatched. How much will the company gain if it uses the software and dispatches product to the market rather than taking up contract manufacturing?
(A) ₹1.74cr (B) ₹1.87cr
(C) ₹1.96cr (D) ₹2.07cr

4. The company has the option of using a commercially available software which costs ₹200 lakhs per year. It correctly detects 90% of the defective products but also identifies 15% of the non-defective products as defective. For any product it dispatched, the company gets a profit of ₹2,000 if it is non-defective and loses ₹4,000 if the product is defective. Which software should the company choose?
(A) QC department software
(B) Commercially available software
(C) Both are equal
(D) Cannot be determined

5. In the previous question, what should be the minimum cost incurred by the company for each product that is not dispatched, if it is profitable to use the software developed by the QC department than the one which is available commercially?
(A) ₹820
(B) ₹981
(C) ₹1,139
(D) ₹1,241

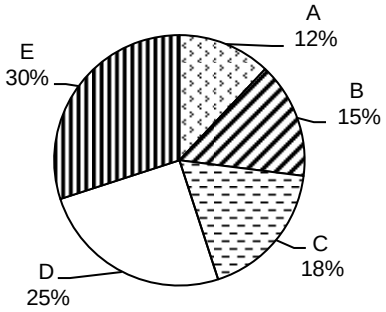
Directions for questions 6 to 10: Answer these questions on the basis of the information given below.

The pie charts give the breakup of gross income, taxes paid and expenses for five persons of a family – A, B, C, D and E as a percentage of the total of all the five persons in each case. The rate of tax on the gross income is as follows.

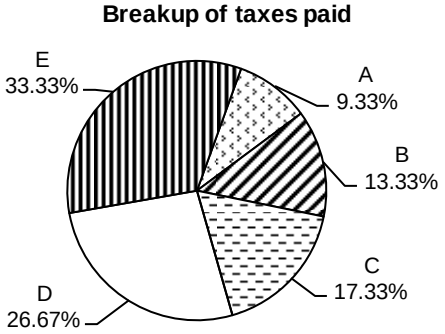
Upto ₹10,000 → 10%.

Above ₹10,000 → ₹1,000 + 20% of the amount exceeding ₹10,000.

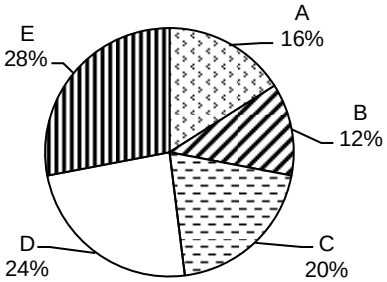
Breakup of gross income



Breakup of taxes paid



Breakup of expenses



Net Income = Gross Income – Taxes
Savings = Net Income – Expenses
The expenses of each person were lower than his net income.

6. What was the amount of tax paid by A?
(A) ₹800 (B) ₹1,000 (C) ₹1,200 (D) ₹1,400

7. The net income as a percentage of the gross income was the lowest for _____.
(A) A (B) E (C) D (D) C

8. The savings of C were at least _____.
(A) ₹2,150 (B) ₹2,650 (C) ₹1,800 (D) ₹1,650

9. How many of the given persons definitely had higher savings than C, if each person spent at least half of his net income?
(A) 2 (B) 3 (C) 4 (D) 1

10. For how many of the given persons was the net income more than 85% of one's gross income?
(A) 1 (B) 5 (C) 2 (D) 3

Directions for questions 11 to 15: Answer these questions on the basis of the information given below.

120 children had come to attend a camp where coaching was provided in three sports-cricket, football and basketball. The children had the option of attending coaching for one, two or all three of the sports. 92 children opted for coaching in exactly two sports.

The number of children who opted for coaching in exactly one sport is six times the number of children opting for all the three. The number of children who opted for only football and basketball is two times the number of children who opted for only cricket and football. The number of children who opted for only basketball is two more than those who opted for only cricket and two less than those who opted for only football. It is also known that the number of children who opted for basketball is 22 more than those who opted for cricket.
The following table gives the average fee paid by the children.

Taking coaching for	Avg. fee paid
Only 1 sport	10,000
Only 2 sports	15,000
3 sports	?
At least one sport	14,100

Directions for questions 11 to 15: Type in your answer in the input box provided below the question.

11. How many students opted for coaching in only football?

12. How many students opted for coaching in both football and basketball?

13. What percentage of the students who came to the camp attended coaching in cricket?

14. What is the fee paid by each of the children who opted for coaching in all the three sports?

15. Among children who opted for coaching in only one sport, the average fee paid by children who opted for cricket, football and basketball are in the ratio of 1 : 2 : 3. What is the average fee paid by children specializing in only football?

Directions for questions 16 to 20: Answer these questions on the basis of the information given below.

The table below gives the process of manufacture of four different products A, B, C and D, each of which has to pass through all the four machines 1, 2, 3 and 4.

Machine \ Product	A	B	C	D
1	(6, 1)	(4, 1)	(3, 1)	(6, 2)
2	(8, 2)	(5, 1)	(6, 2)	(4, 1)
3	(3, 1)	(4, 2)	(6, 1)	(5, 1)
4	(5, 1)	(4, 1)	(5, 1)	(6, 2)

Each product should pass through machines 1, 2, 3 and 4 in that order, before it is ready. For each machine the first figure in brackets indicates the quantity (in units) of the corresponding product made, while the second indicates the time taken to produce that quantity.

For example, machine 1 can produce 6 units of product D in 2 hours or 1 unit every 20 minutes.

Each day only one type of product can be made and each day the working time is from 9:30 a.m. to 5:30 p.m. All machines are operated in such a way that any unit that is started on a day is finished by the end of that day. The selling prices and the percentage profit on each of the products are as given below.

Product	A	B	C	D
Selling price	275	504	234	345
Profit percentage *	10	12	30	15

* as a percentage of cost price.
All machines can operate simultaneously.

16. The maximum number of units of any product that can be manufactured in a single day is _____.
(A) 19 (B) 20 (C) 21 (D) 22

17. If the maximum revenue is to be realised on a day, then which product should be manufactured on that day? (All the quantity that is manufactured is sold on the same day).
(A) A (B) B (C) C D) D

18. To get the maximum profit on a single day, which of the following should be produced?
(A) D (B) C (C) A (D) B

19. By what percentage does the cost of producing one unit of B exceed that of one unit of D?
(A) 30% B) 40% (C) 50% (D) 60%

20. Considering the day on which the maximum profit is earned, the total idle time of all the machines put together is (in mins) _____.
(A) 618 (B) 536 (C) 540 (D) 572