Line Graph

Data Interpretation

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Line Graph DI Tricks & Tips

Let us look at a shortcut method to solve a certain type of line graph problems using an example. If we attempt to solve it with complete complicated calculations, we will end up wasting a lot of precious time. Remember that the examiners don't expect you to solve everything on paper. They want to see if you are capable of applying your logic to evaluate the graph, eliminate options, and arrive at the answer through estimation.

Once you master this technique, we will, in subsequent articles, deal with more complicated sets of line graphs.

Line Graphs

Line graph represents data in the form of straight lines that connect various data values. Both line graphs and bar graphs are used to convey same things and hence can be used inter-changeably. For example, a line graph can be generated by joining the tip of the bar graph.

| *Positives*	*Negatives*
1. Trends can be even better established in Line graphs than Bar graphs.	*1. It has a similar disadvantage as the Bar graph in terms of establishing the exact values*
2. Questions pertaining to percentage change and growth rates become easier to solve using line graphs.	*2. Line graphs can only indicate the value at the end of a certain period and not between any two values./td>*

Shortcuts to crack DI sets containing Line Graphs

1. Use the advantage of looking at slope of the line in questions pertaining to growth rates.

Let us have a look at this CAT example to drive home the point.

The length of an infant is one of the measures of his/her development in the early stages of his/her life. The figure below shows the growth chart of four infants in the first five months of life.
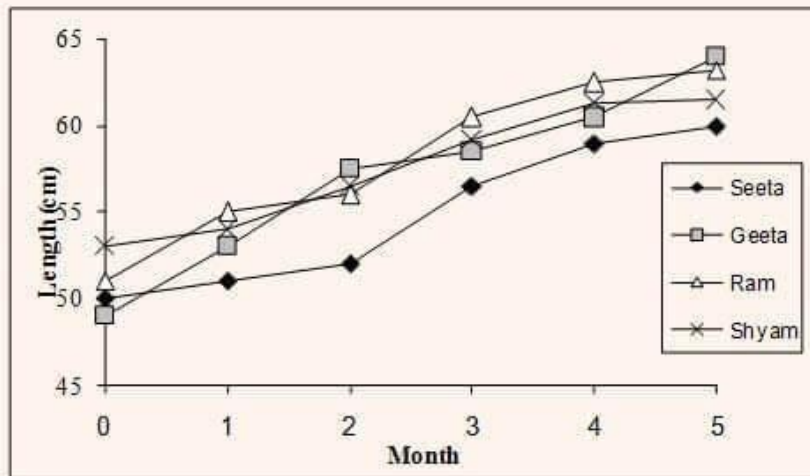
1. Who grew at the fastest rate in the first two months of life?

(1) Geeta   (2) Seeta   (3) Ram   (4) Shyam

2. Among the four infants, who grew at the least rate in the first five months of life?

(1) Geeta   (2) Seeta   (3) Ram   (4) Shyam

The growth rate or the decline rate is calculated as the growth or the decline as a percentage of the initial value. For this rate to be highest, the growth or the decline has to be the highest on a very small initial value. While for this rate to be the lowest, the growth or the decline has to be the lowest on a very high initial value.

For the first question, we need to compare the values pertaining to the '0th month' and the '2nd month'. Now looking at the slope (steepness) of the graph, it is clear that the answer is Geeta. For her the growth is the highest and that has happened on a very small initial value.

For the second question, we need to compare values pertaining to the '0th month' and the '5th month'. Again, it is very clear that the answer is Shyam. The growth is the least in his case and that too on a very high initial value.

2. Beware that in a Line graph you can only know value at the end of a certain time period and not the values in between two time periods.

Here is a CAT set to understand this.

Prices of Essential Commodities
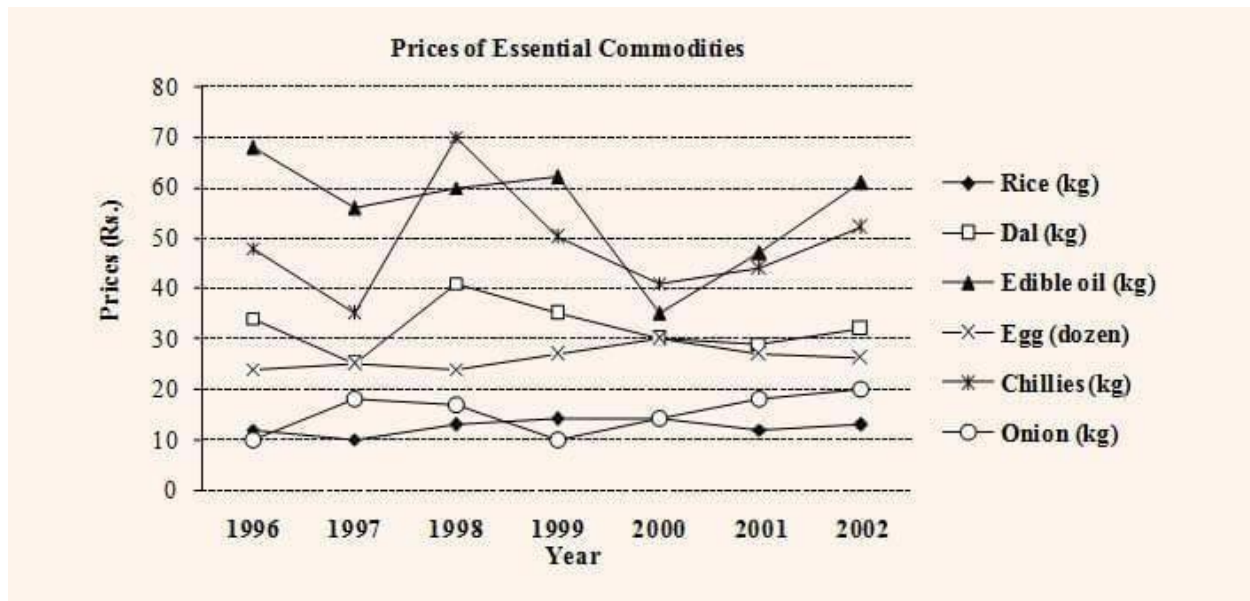
In the above graph, how many times during the given time period do you think was the price of Rice and Onion the same?

From the graph, it seems like 3, because the two graphs intersect thrice – once between 96 and 97, once between 98 and 99 and once at 2000. However, we can only be sure about the year 2000. What is important to know is that the line graph can only show the values at the end of a particular time period (in this case 'year'). We can never comment what happened in between two years. For example, at the end of 1996, the price of Rice was Rs.12/kg and at the end of 1997 it was Rs.10/kg. Similarly, the price of Onion was Rs.10/kg and Rs.18/kg between these two time periods. We had to join these two points by a straight line, and they intersect at a point (in this case at Rs.11/kg). This is no way indicates that the prices of these two commodities had been Rs.11/kg between 1996 and 1997.

Example of Line Graph Problems

Directions: *Study the following line graph carefully and give answers to questions that follow.*

Total number of males and females in five different companies
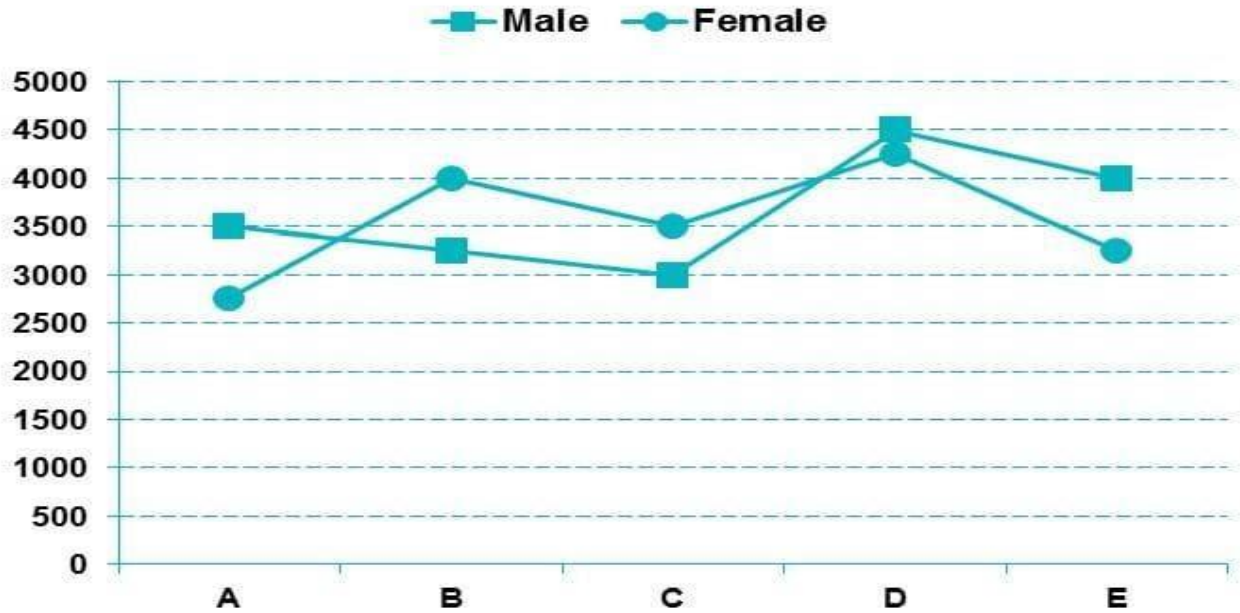
Ques: *The number of females from company A is approximately what percent of the total number of females in all the companies put together?*

1) 21

2) 17

3) 23

4) 19

5) 15

Ans: *5) 15*

Solution:

There are different approaches to find out the answer to this question.

First Approach:

*We can simply take all values and calculate the answer. i.e. we will have to find out **(females in A)/(Total females)**. This would be the long method. If we solve it at leisure, we could get an accurate answer. But given the time crunch we face during the exam, we are likely to commit errors.*

Second Approach:

This approach rests on the assumption of blocks. It simplifies our calculations significantly.

Total number of male and female in five different Companies

Here In this graph, we assume 1 block to be equivalent to 500 employees each. So with this assumption, we can see that females in Company A would be 5.5 blocks. Similarly females in in Company B would be 8 blocks and so on.

$$\therefore \% = \frac{5.5}{5.5 + 8 + 7 + 8.5 + 6.5} \times 100\% \approx 15\%$$

*We can use approximations as follows to arrive at the above:*

$$\% = \frac{5.5}{35.5} \times 100\% = \frac{55}{355} \times 100\% = \frac{11}{71} \times 100\%$$

$$\approx (but\ more\ than)\frac{10}{70} \times 100\% = (approx\ but\ more\ than)14.28\%$$

≈15%

Note that you could do these calculations quickly, if you know how to quickly convert fractions to percentages. We learnt this trick in the Time & Work article previously.

Third Approach:

Total number of male and female in five different Companies

■ Male　　● Female
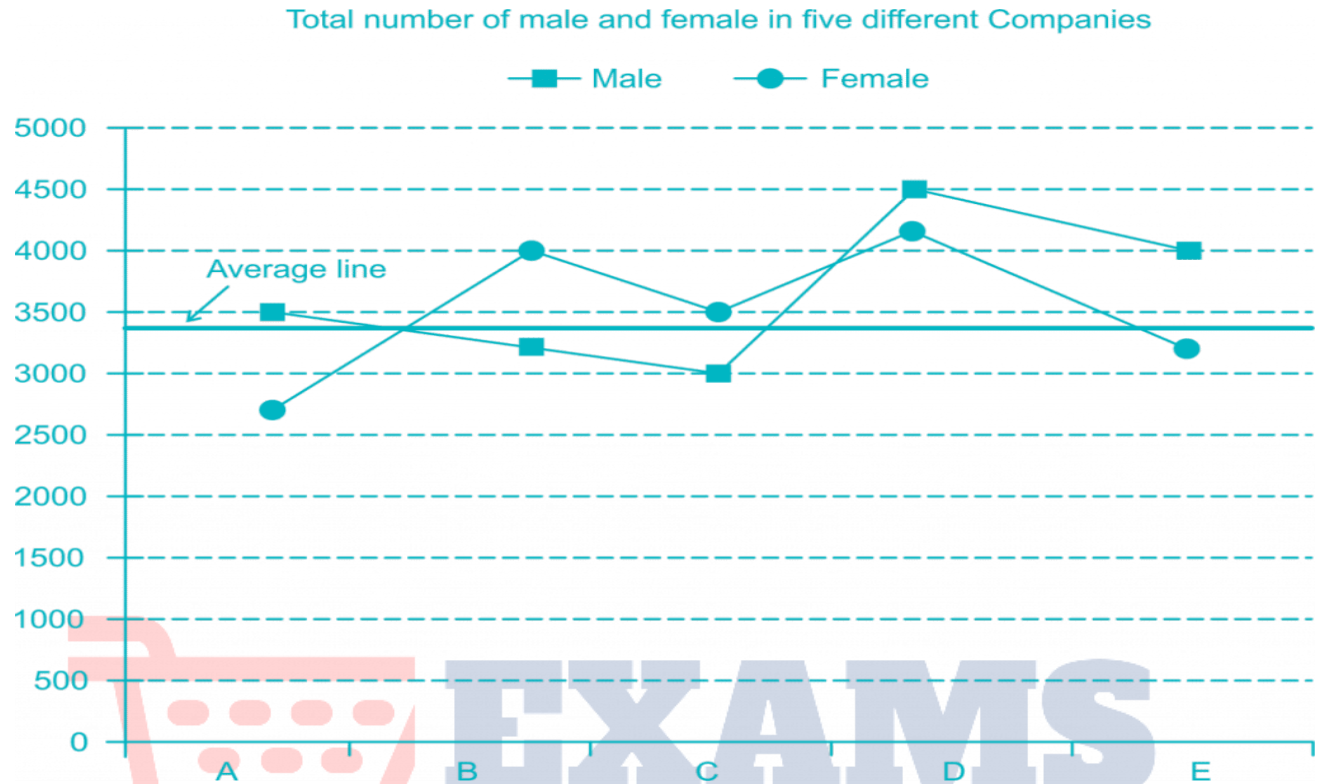
Let us assume the number of females in each company is equal. Assuming there are 10 females in each company, we can simply state the answer as

$$\frac{10}{10 \times 5} = \frac{1}{5} = 20\%.$$

Similarly, if there were 100 females then our answer would still remain 100/500 = 1/5 = 20%.

So, if we assume females are equal in each company then it does not depend on how many females there actually are, but on how many companies there are. So clearly, when the number of females in each company is equal, they become equal to the average.

In reality they are not equal but some deviation from the average.

We can solve this by estimating where the average line would lie on the graph. Plot the average line by drawing the best fit line – a line that passes through or close to as many relevant points in the graph so that there are as many points on side of this line as there are on the other, with all points being as close to the line as possible.

In the given problem, we have five companies and so our average is 20%. We can see from the graph that A is below the average line. So clearly, the number of females in the A would be less than 20%.

So, options 1 and 3 are ruled out.

We see that there is one other company with fewer female employees than the average i.e. company E. However E has females close to our assumed average i.e. 20%. Looking at E, we can see that it is closer to 19%.

Looking at E, we can say that A can therefore not be 19%.

Now the difference between E and A is significant, so we can eliminate A being 17% as well.

However, we can clearly estimate that A is 15%.

This method is not foolproof and won't work when we have several options that are very close to each other. The explanation for this method is also somewhat lengthy. However, when solving a problem with a good spread in options, this method will allow you to solve line graph problems in a matter of less than 10 seconds. This is because you need not solve anything, just estimate.

Important Concepts and Tips Solve Data Interpretation (Line Graph) Problems:

QUESTION:

Directions (1 – 5):*Study the following Graph carefully and answer the questions given below :*
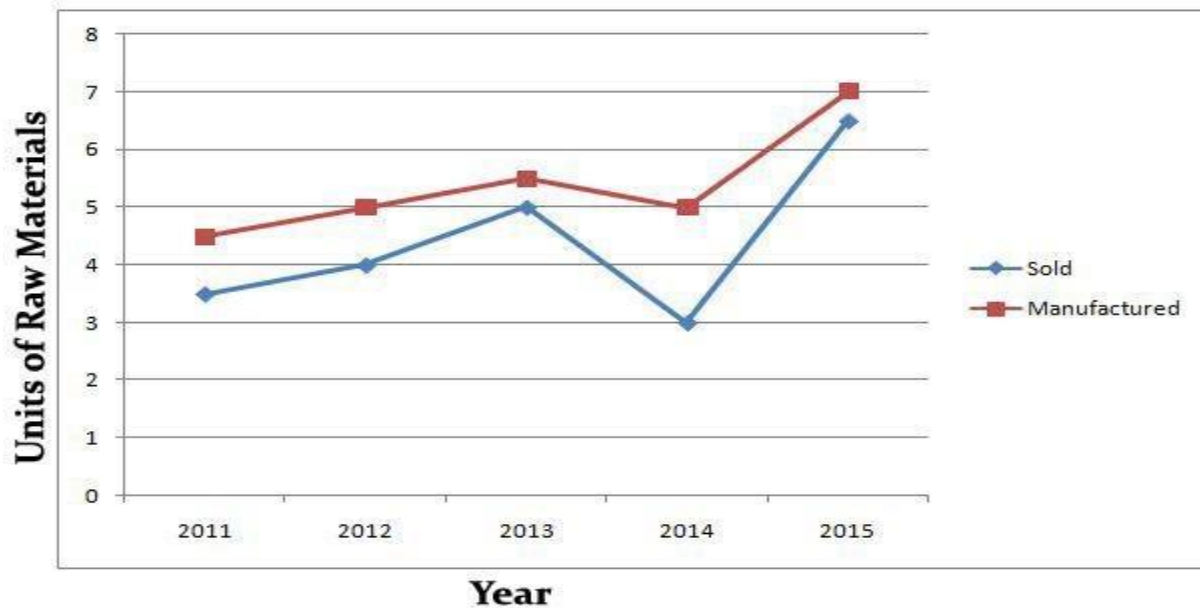
Units of Raw Material Manufactured and Sold by a Company Over the Years (Units in Crores)

- *What is the average number of units sold over the years ?*
- *a)440000000*
- *b)4400000*
- *c)440000*
- *d)44000000*

- *e)None of these*

- *What is the respective ratio of the difference between the number of units manufactured and sold in the year 2013 to the difference between the number of units manufactured and sold in the year 2014 ?*
- *a)2 : 3*
- *b)1 : 2*
- *c)1 : 4*
- *d)3 : 5*
- *e)None of these*

- *What is the respective ratio of the number of units manufactured in the year 2011 to the number of units manufactured in the year 2015 ?*
- *a)7 : 11*
- *b)9 : 14*
- *c)7 : 9*
- *d)9 : 11*
- *e)None of these*

- *What is the approximate percent increase in the number of units sold in the year 2015 from the previous year ?*
- *a)190*
- *b)70*
- *c)60*
- *d)95*
- *e)117*

- *What is the difference between the number of units manufactured and the number of units sold over the years?*
- *a)50000000*
- *b)5000000*
- *c)500000000*
- *d)500000*
- *e)None of these*

SOLUTION:

QUESTION 1: EXPLANATION

STEP 1: Average number of sold units = $\left(\dfrac{3.5 + 4 + 5 + 3 + 6.5}{5}\right)$ crores

= 22 / 5 crores

= 4.4 crore = > 44000000

Ans :(4) 44000000

QUESTION 2:EXPLANATION

STEP 1 : *Number of units manufactured and sold in the year 2013*

= (5.5 – 5) crore

= 0.5 crore

STEP 2 : *Number of units manufactured and sold in the year 2014*

= (5 – 3) crore

= 2 crore

Required ratio   =   0.5 : 2

=   5 : 20

=   1 : 4

Ans :(3) 1 : 4

QUESTION 3 : *EXPLANATION*

STEP 1 :Required ratio = 4.5 : 7

= 45 : 70

= 9 : 14

Ans :(2) 9 : 14

QUESTION 4 : *EXPLANATION*

STEP 1 : *Increase   =   6.5 – 3*

= 3.5 crore

STEP 2 : *Increase % = 35 / 3 x 100 = 117*

Ans : **(5) 117**

QUESTION 5 : *EXPLANATION*

STEP 1 : *Number of sold units = 22 crore*

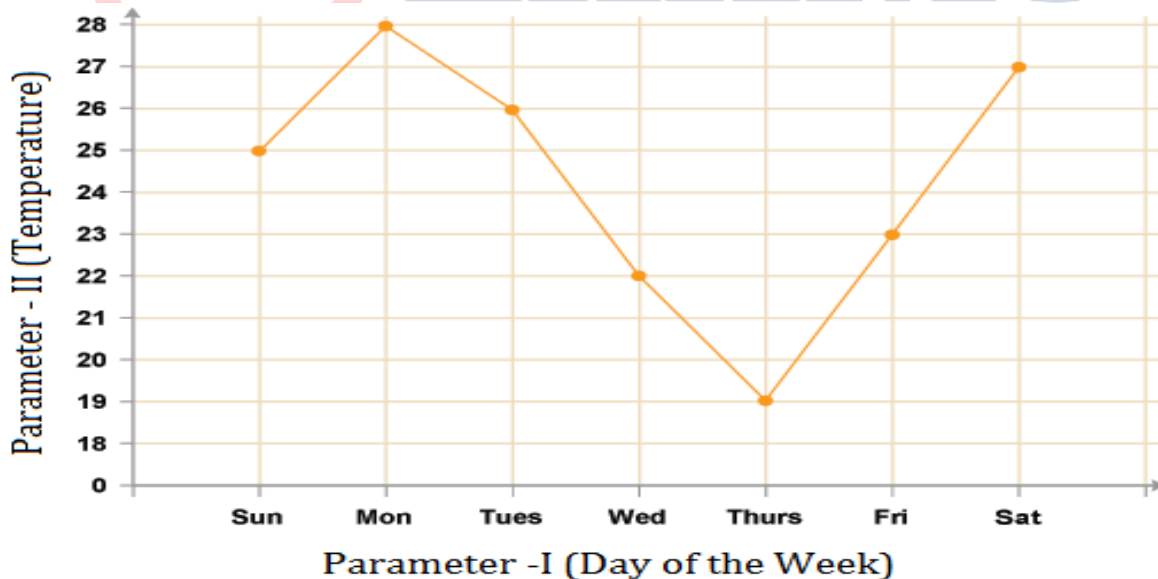**STEP 2 :** *Number of manufacturing units = (4.5 + 5 + 5.5 + 5 + 7) crore*

= 27 crore

STEP 3 : *Required Difference = (27 – 22) crore*

= 5 crore

= 50000000

Ans : **(1) 50000000**


Parameter -I (Day of the Week)

Important Points: *While solving the line chart questions, some points are very crucial to note these are as follows:*

- *Understanding the various headings of DI table/graph/chart is very important.*
- *Data Interpretation depends upon the type of questions asked.*
- *Some questions are solved via reasoning process.*
- *And solving some questions helps solving the other questions.*

Let's understand this with the help of few Examples:

Example 1

Following line graph shows the ratio of expenditure to income of three companies A, B and C during the period 2008–2013.
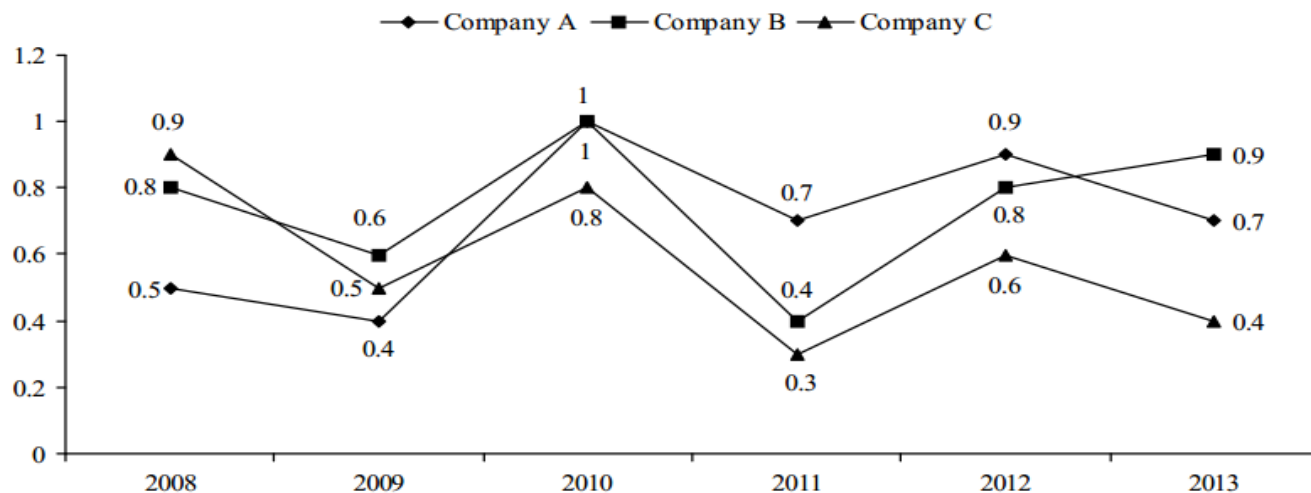
As mentioned above - Reading the headings are important otherwise you will not be able to understand what these lines are all about.

Please observe that *- Along Y-Axis are the ratios; Along X-Axis are the years; In between are the lines.*

Following Line Graph shows the ratio of expenditure to income of three companies A, B and C.

Learn a few things from the heading:

(1) For Company A in 2008, if Expenditure is Rs 0.9, then Income will be Rs 1, and so on.

*(2) It's **Expenditure to Income** Ratio expressed as **E:I** and not Income to Expenditure.*

(3) To have Profit, Expenditure is to be less than Income. Reverse is for Loss.

(4) Profit and Loss percentages are calculated using the formulas for the same.

- ***Profit*** *= Income – Expenditure*
- ***Profit Percentage*** *= [Profit/Expenditure]*100*
- ***Loss*** *= Expenditure – Income*
- ***Loss Percentage*** *= [Loss/Expenditure]*100*

(5) The lower is the E:I ratio, higher is the profit.

The questions of Expenditure and Income seem difficult to solve. But, let's apply the above mentioned points to solve the questions in no time!

Steps to Solve

Question 1: In which of the following years is the percentage loss/profit of Company C the maximum?

[1] 2008
[2] 2009
[3] 2010
[4] 2011
[5] 2012

*Hint: From point no. 5, we conclude that **profit is maximum when E:I is minimum** which is 0.3 in 2011.*
*Hence **answer is [4].***

Question 2: If the expenditure of Company A in 2008 and 2009 together is Rs 60 lakhs, then what is its income in 2008 and 2009 together?

[1] Rs 120 lakhs
[2] Rs 150 lakhs
[3] Rs 66.66 lakhs
[4] Data inadequate
[5] None of these

*Hint: E:I for Company A in 2008 and 2009 is 0.5 and 0.4. This means for Rs 0.5 Expenditure in 2008, Income is Rs 1 in 2008 and for Rs 0.4 Expenditure in 2009, Income is Rs 1 in 2009. But combined Expenditure of 60 lakhs is given. **So, ratios being different, it's not possible to calculate the Income from the combined expenditure. Answer is [4].***

Question 3: If the expenditure of Company B in 2008 and 2012 together is Rs 60 lakhs then what is its income in 2008 and 2012 together?

[1] Rs 66.66 lakhs
[2] Rs 75 lakhs
[3] Rs 48 lakhs
[4] 96 Rs lakhs
[5] Data inadequate

*Hint: E:I for 2008 and 2012 is 0.8 and 0.8. **Ratios being same, combined Income from the combined Expenditure can be calculated.** Income = E/0.8 = 60/0.8 = 75 lakhs.*
Answer is [2].

Question 4: In which of the years does Company C gain 100% profit?

[1] 2008
[2] 2009
[3] 2010

[4] 2011
[5] None of these

Hint: For 100% profit, E:I ratio must be 0.5 so that I = E/0.5 = 2E. It's in 2009.
Answer is [2]

Question 5: What is the percentage decrease in the percentage profit of Company C from 2009 to 2010?

[1] 75%
[2] 300%
[3] 62.5%
[4] 160%
[5] None of these

Hint: E:I of Company C in 2009 = 0.5:1
Profit = 1-0.5 = 0.5
*Percentage profit of profit of Company C in 2009 =[0.5/0.5]*100 = 100%*
E:I of Company C in 2010 = 0.8:1
Profit = 1-0.8 = 0.2
*Percentage profit of profit of Company C in 2009 =[0.2/0.8]*100 = 25%*
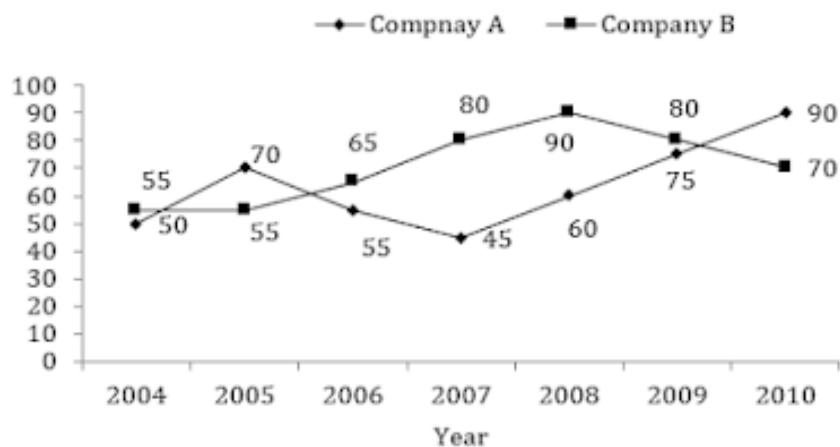*Percentage decrease = 75%.*
Answer is [1].

Directions (1-5): Study the following graph carefully to answer these question.

$$\% \text{ Profit} = \frac{\text{Profit Earned}}{\text{Total Investment}} \times 100$$

Profit Earned = Total income - Total Investment in the year

 Per cent profit earned by two companies producing electronic goods over the years

Q1. If the profit earned in 2006 by Company B was Rs. 8,12,500, what was the total income of the company in that year?

(a) Rs. 12,50,000

(b) Rs. 20,62,500

(c) Rs. 16,50,000

(d) Rs. 18,25,000

(e) None of these

S1. Ans.(b)
Sol. Profit earned by company B in 2006 is
65% of investment or 812500.
$\therefore$ Income $= \frac{812500}{65} \times 165 = 2062500$

Q2. If the amount invested by the two companies in 2005 was equal, what was the ratio of the total income of the company A to that of B in 2005?

(a) 31:33

(b) 33:31

(c) 34:31

(d) 14:11

(e) None of these

S2. Ans.(c)
Sol. Let, the amount invested by Companies A and B
in the year 2005 be Rs. x each
Income of A in 2005 = 1.70x
Income of B in 2005 = 1.55x
Ratio $= \frac{A}{B} = \frac{1.70x}{1.55x} = \frac{34}{31}$

Q3. If the amount of profit earned by Company A in 2006 was Rs. 10.15 Lakhs, what was the total investment?

(a) Rs. 13.8 Lakhs

(b) Rs. 14.9 Lakhs

(c) Rs. 15.4 Lakhs

(d) Rs. 14.2 Lakhs

(e) None of these

S3. Ans.(e)
Sol. Let, total investment be Rs. x
Now, 55% of x = 10.15×10^5
$\Rightarrow x = \frac{10.15 \times 10^5}{55} \times 100 = 1845454$

Q4. If the amount invested by Company B in 2004 is Rs. 12 Lakhs and the income of 2004 is equal to the investment in 2005, what is the amount of profit earned in 2005 by Company B?

(a) Rs. 6.6 Lakhs

(b) Rs. 18.6 Lakhs

(c) Rs. 10.23 Lakhs

(d) Rs. 9.6 Lakhs

(e) None of these

S4. Ans.(c)
Sol. Income of Company B in 2004
= $1.55 \times 12 \times 10^5$ = 18.6 Lakhs
Investment in 2005 = 18.6 Lakhs
Profit earned in 2005 = $\frac{55}{100} \times 18.6 \times 10^5$ = 10.23 Lakhs

Q5. If each of the companies A and B invested Rs. 25 Lakhs in 2010, what was the average profit earned by the two companies?

(a) Rs. 18 Lakhs

(b) Rs. 22.5 Lakhs
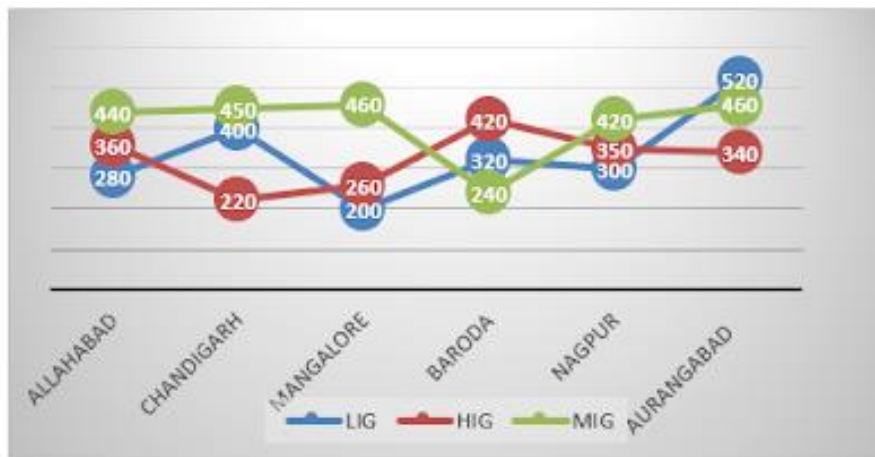
(c) Rs. 17.5 Lakhs

(d) Rs. 20 Lakhs

(e) None of these

S5. Ans.(d)

Sol. Required answer $= \dfrac{\frac{90}{100} \times 25 \times 10^5 + \frac{70}{100} \times 25 \times 10^5}{2}$

$= \dfrac{25 \times 10^5}{100} \left[\dfrac{90 + 70}{2} \right]$

$= 25 \times 10^3 \times 80 = 20$ Lakhs

Directions (6-10): Study the following graph carefully to answer the given questions.

Number of the flat booked in HIG, MIG and LIG categories from different cities in 2004.

Q6. If for Aurangabad the number of HIG flats booked in 2005 was more than that in 2004 by 15%, the number of MIG flats booked in 2005 was more than that in 2004 by 10% and the number of LIG flats booked in 2005 was more than that in 2004 by 20% then what was the total number of flats booked in Aurangabad in 2005?

(a) 1565

(b) 1521

(c) 1625

(d) 1642

(e) 1544

S6. Ans.(b)
Sol. Total number of flats booked in Aurangabad in 2005

$$= \frac{460 \times 110}{100} + \frac{520 \times 120}{100} + \frac{340 \times 115}{100}$$

$$= 506 + 624 + 391 = 1521$$

Q7. Out of the LIG flats booked from Chandigarh, 35% were by employees of Financial Institution and out of the remaining flats, those booked by officers from a software company and HRM department of Government of India were in the ratio of 6 : 7. What was the total number of LIG flats booked by officers from the software company?

(a) 130

(b) 120

(c) 160

(d) 140

(e) 150

S7. Ans.(b)
Sol. Total number of LIG flats booked in Chandigarh = 400
Number of flats booked by the financial institution

$$= \frac{400 \times 35}{100} = 140$$

∴ Remaining flats = 400 − 140 = 260
Now, number of LIG flats booked by officers from the software company $= \frac{260 \times 6}{13} = 120$

Q8. The total number of MIG flats booked in Mangalore, Baroda and Nagpur is by what per cent more than the total number of LIG flats booked from these three cities together? (Rounded off to the nearest integer)

(a) 37

(b) 35

(c) 39

(d) 32

(e) 34

S8. Ans.(a)
Sol. Total number of MIG flats in Mangalore, Baroda and Nagpur
= 460 + 240 + 420 = 1120
Total number of LIG flats booked in Mangalore, Baroda and Nagpur

= 200 + 320 + 300 = 820
∴ Required% $= \frac{1120 - 820}{820} \times 100 = \frac{300}{820} \times 100$
= 36.58 ≈ 37%

Q9. What is the difference between the total number of MIG flats booked in Allahabad, Mangalore, Nagpur and Aurangabad together and the total number of LIG flats booked in these four cities together?

(a) 420

(b) 480

(c) 460

(d) 360

(e) 260

S9. Ans.(b)
Sol. Total number of MIG flats booked in
Allahabad, Mangalore, Nagpur and Aurangabad
= 440 + 460 + 420 + 460 = 1780
Total number of LIG flats booked in
Allahabad, Mangalore, Nagpur and Aurangabad
= 280 + 200 + 300 + 520 = 1300
∴ Difference = 1780 − 1300 = 480

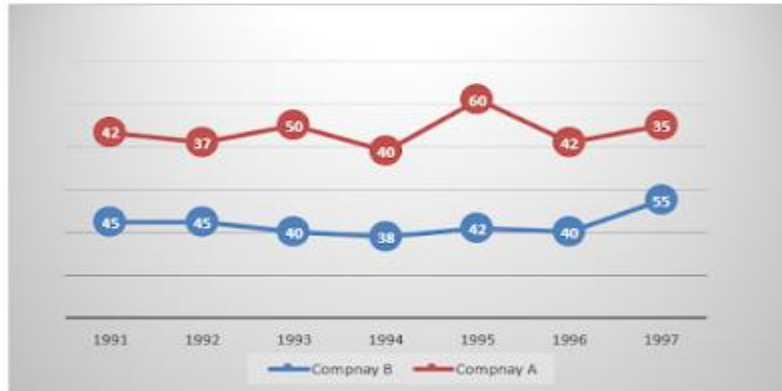**Q10. What is the ratio of the total number of flats (all three types) booked in Allahabad to that in Baroda?**

(a) 54:49

(b) 51:46

(c) 54:47

(d) 58:49

(e) 55:48

S10. Ans.(a)
Sol. Ratio = $\frac{440 + 360 + 280}{240 + 420 + 320} = \frac{1080}{980} = \frac{108}{98} = 54:49$

Directions (11-15): Study the following graph carefully and answer the questions given below:

Percentage net profit of two companies over the years

Q11. If the total income in 1992 for company B was 140 crores, what was the total expenditure in that year?

(a) 100 Crores

(b) 110 Crores

(c) 98 Crores

(d) Data inadequate

(e) None of these

S11. Ans.(e)

Sol. % profit $= \frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \times 100$

Or, $45 = \frac{140 - E}{E} \times 100$

Or, $\frac{140}{E} = \frac{45}{100} + 1 = \frac{9}{20} + 1 = \frac{29}{20}$

$\therefore E = 140 \left(\frac{20}{29}\right) = 96.6$ Crores

Q12. If the total expenditure of 1993 and 1994 together of Company B was Rs. 279 crore, what was the total income in these years?

(a) Rs. 12.15 Crores

(b) Rs. 135 Crores

(c) Rs. 140 Crores

(d) Data inadequate

(e) None of these

S12. Ans.(d)

Sol. $I_{93} = E_{94} = \left(\frac{100 + 50}{100}\right) = \frac{3}{2}E_{93}$

$I_{94} = E_{94}\left(\frac{100 + 50}{100}\right) = \frac{3}{2}E_{93}$

$I_{94} = E_{94}\left(\frac{100 + 40}{100}\right) = \frac{7}{5}E_{94}$

$E_{93} + E_{94} = 279$

But we cannot find $\frac{3}{2}E_{93} + \frac{7}{5}E_{94}$

Hence, we cannot solve it.

Q13. In how many of the given years the percentage of expenditure to the income of Company A was less than fifty?

(a) One

(b) Two

(c) Three

(d) Four

(e) None of these

S13. Ans.(e)

Sol. $E = I\left(\frac{100}{100 + P}\right)$

Or, $\frac{E}{I} = \frac{100}{100+P}$ ...(i)

We require $\frac{E}{I} \le 50\%$ or, $\le \frac{E}{I}\frac{1}{2}$

Now, from (i), $\frac{100}{100+P} \le \frac{1}{2}$

So, the value of P should be more than 100,

which is not correct for any of the given years.

Q14. If the total expenditure of company B in 1994 was Rs. 200 crore, what was the total income?

(a) Rs. 160 Crores

(b) Rs. 280 Crores

(c) Rs. 260 Crores

(d) Data inadequate

(e) None of these

S14. Ans.(b)

Sol. $I = E\left[\dfrac{100 + \%Profit}{100}\right]$

$= 200\left(\dfrac{100 + 40}{100}\right)$ crores = 280 crores

Q15. In which of the following years was the total income more than double the total expenditure in that year for Company B?

(a) 1995

(b) 1993

(c) 1997
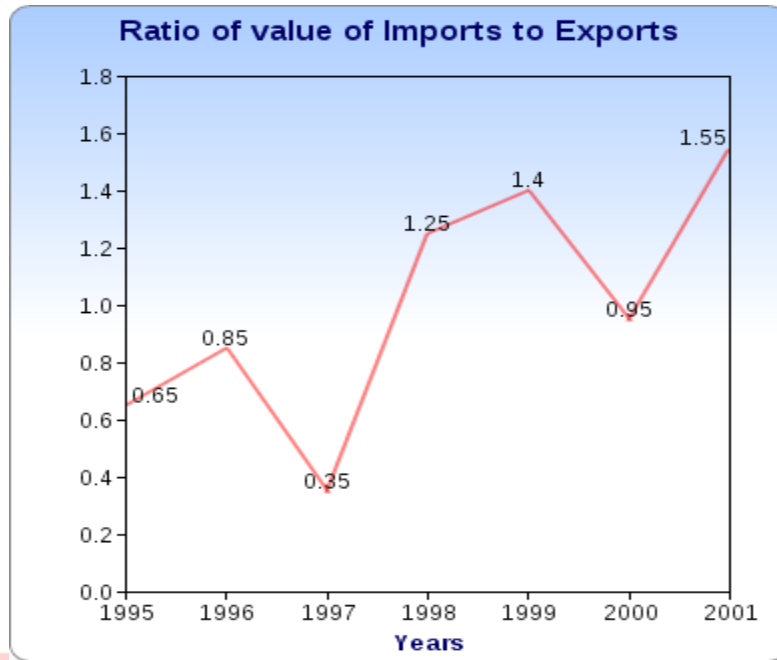
(d) 1992

(e) None of these

S15. Ans.(e)

Sol. $I > 2E$

$\Rightarrow$ Profit % is more than 100, which is not correct for any of the given years.

Line Chart Questions Answers

The following Line chart gives the ratio of the amounts of imports by a Company to the amount of exports from that Company over the period from 1995 to 2001. Answer the following questions based on following Line graph.

- **1. In how many of the given years were the exports more than imports ?**
    1. *1*
    2. *2*
    3. *3*
    4. *4*

Answer :
*Option **D***

Explanation:

Clearly the exports are more than the imports implies that the ratio of value of imports to exports in less than 1.
So years are 1995, 1996, 1997 and 2000. So these are four years

- **2. The imports were minimum proportionate to the exports of the Company in the year :**
    1. *1997*
    2. *1995*
    3. *1996*
    4. *2000*

Answer :
*Option **A***

Explanation:

Clearly from the line graph we can judge it is minimum in year 1997.

- **3. If the imports of a company in 1996 was Rs. 272 crores, the exports from the company in 1996 was:**
    1. *Rs 120 Crores*
    2. *Rs 220 Crores*
    3. *Rs 320 Crores*
    4. *Rs 420 Crores*

Answer :
*Option **C***

Explanation:

We are given with the ratio of imports and exports in the line graph.
Let the exports from the company in 1996 was x
then,
272/x = 0.85
=> x = 272/0.85
=> x = 320

Note: Please not that we are given the ratio of imports to exports, so export will in denominator .

- **4. What was the percentage increase in imports from 1997 to 1998 ?**
    1. *70*
    2. *72*
    3. *74*
    4. *Data Inadequate*

Answer :
*Option **D***

Explanation:

For calculating the percentage we will need value of exports, imports etc. We are only given with the ratio. So data in Inadequate.

Note: Please note in charts questions, most probably it includes 1 or more than 1 questions which are percentage based. So please clear percentage questions before preparing it. Because this is very scoring section.

- **5. If the imports in 1998 was Rs. 250 crores and the total exports in years 1998 and 1999 together was Rs 500 crores, then the imports in 1999 was :**
    1. *320 Crore*
    2. *420 Crore*
    3. *520 Crore*
    4. *620 Crore*

Answer :
*Option **B***

Explanation:

The Ratio of imports to exports for the years 1998 and 1999 are 1.25 and 1.40 respectively.
Let the exports in the year 1998 = Rs. x crores
Then,the exports in the year 1999 = (500-x) crores

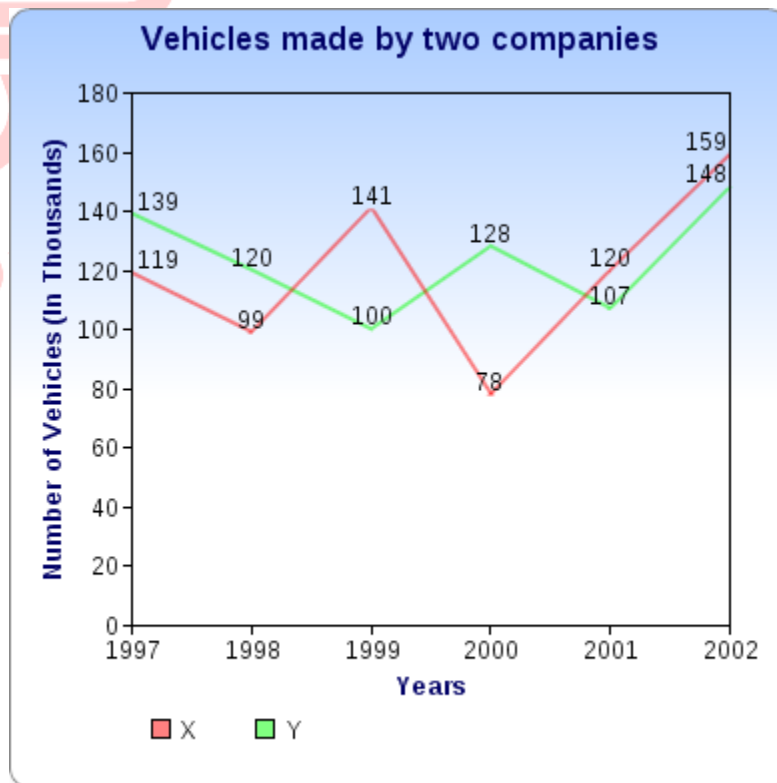*=> 1.25 = 250/x [because 1.25 is 1998 ratio]*

=> x = 250/1.25 = 200 crore

Thus the exports in the year 1999 were 500 - 200
= 300 crore

Let the imports in the year 1999 = Rs y crore
Then 1.40 = y/300
*=> y = 1.40*300 = 420 crore*

Study the following line graph and answer the questions based on it.

- 1. **What is the difference between the two companies in the given years ?**
    1. *16000*

2. *26000*
3. *28000*
4. *30000*

Answer :
*Option **B***

Explanation:

Please note that line graph values are given in thousands.

Total production of Company X from 1997 to 2002 = 119000+99000+141000+78000+120000+159000 = 716000

Total production of Company Y from 1997 to 2002 = 139000+120000+100000+128000+107000+148000 = 742000

Difference = 742000 - 716000
= 26000

- **2. What is the difference between the numbers of vehicles manufactured by Company Y in 2000 and 2001 ?**
    1. *21000*
    2. *22000*
    3. *23000*
    4. *24000*

Answer :
*Option **A***

Explanation:

Required Difference = 128000-107000 = 21000

- **3. What is the average number of vehicles manufactured by Company X over the given period ?**
    1. *119133*
    2. *119233*
    3. *119333*
    4. *119433*

Answer :
*Option **C***

Explanation:

Average number of vehicles manufactured by Company X
= 1\6(119000+99000+141000+78000+120000+159000)
= 119333

- **4. In which of the following years, the difference between the productions of Companies X and Y was the maximum among the given years ?**
    1. *1800*
    2. *1875*
    3. *1900*
    4. *2000*

Answer :
*Option **D***

Explanation:

Although if we have deep look on line chart the nwe can judge that it was in year 2000
Lets also solve it,

For 1997 = (139000 - 119000) = 20000
For 1998 = (120000 - 99000) = 21000
For 1999 = (141000 - 100000) = 41000
For 2000 = (128000 - 78000) = 50000
For 2001 = (120000 - 107000) = 13000
For 2002 = (159000 - 148000) = 11000

Clearly the difference was maximum in year 2000.

- **5. The production of Company Y in 2000 was approximately what percent of the production of Company X in same year ?**
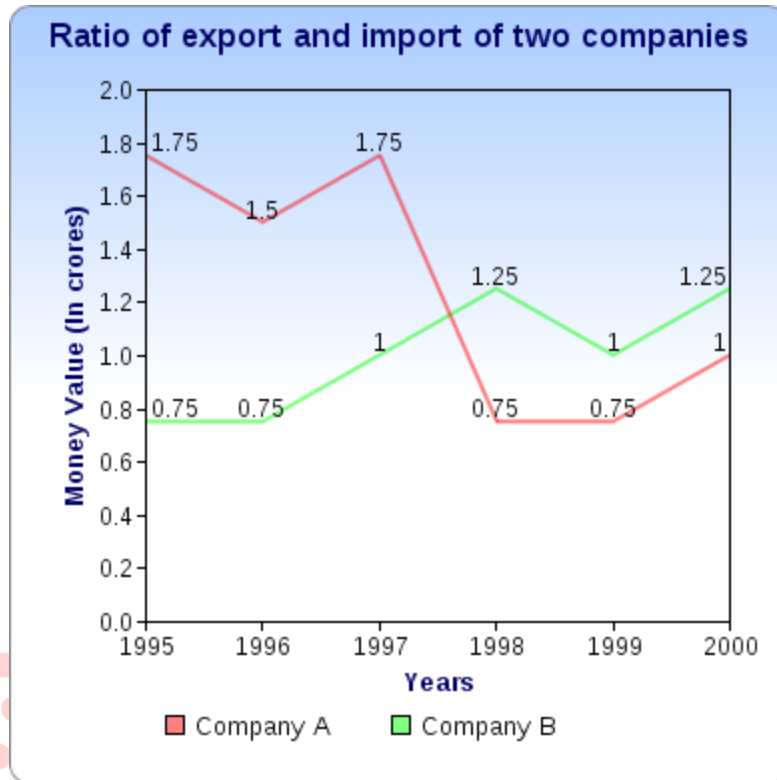   1. *163%*
    2. *164%*
    3. *165%*
    4. *166%*

Answer :
*Option **B***

Explanation:

Required Percentage =(12800078000∗100)%=164.1%Required Percentage =(12800078000∗100)%=164.1%

Which is approximately 164%

Answer the questions based on line graph given below.

- **1. In how many of the given years were the exports more than the imports for Company A ?**
    1. 1
    2. 2
    3. 3
    4. 4

Answer :
*Option **C***

Explanation:

If ratio of export to import is greater than 1, it means the export was more than the import.
So For company A, in years 1995, 1996 and 1997 ratio was more than 1, so there are 3 such years.

- **2. In which year was the difference between the imports and exports was the maximum for company B?**
    1. 1996
    2. 1997
    3. 1998
    4. Can not be determined

Answer :
*Option **D***

- **3. If the exports of company A in 1998 were Rs 237 crores, what was the amount of imports in that Year ?**
    1. *216 crores*
    2. *316 crores*
    3. *416 crores*
    4. *516 crores*

Answer :
*Option **B***

Explanation:

We are having the ratio of exports to imports.
Exports are given for 1998 for company A
So as per line chart in 1998 for company A,

237/x = 0.75
=> x = 237/0.75 = 316 crores

- **4. If the imports of Company A in 1997 were increased by 40 percent, what would be the ratio of exports to the increased imports ?**
    1. *0.25*
    2. *1.15*
    3. *1.25*
    4. *1.35*

Answer :
*Option **C***

Explanation:

In 1997 for company A, we have
let export be E and Import be I

EI=1.75=>E=1.75INew Imports Inew=40%=1.4INew ratio
=EInew=1.75I1.4I=1.25ofIEI=1.75=>E=1.75INew Imports Inew=40%ofI=1.4INew ratio
=EInew=1.75I1.4I=1.25

- **5. In 1995, the export of the company A was double that of company B. If the imports of Company A during the year was Rs 180 crores, what was the approximate amount of imports of Company B during that year ?**
    1. *110 crores*
    2. *210 crores*

3. 310 crores
4. 410 crores

Answer :
*Option **B***

Explanation:

In 1995 for Company A we have $\frac{E_A}{I_A} = 1.75$ *In 1995 for Company B*

we have $\frac{E_B}{I_B} = 0.75$ *Also, we have* $E_A = 2E_B$ $I_A = 180$ *crores from*

(i) $E_A = 180 * 1.75 = 315$ *crores from*

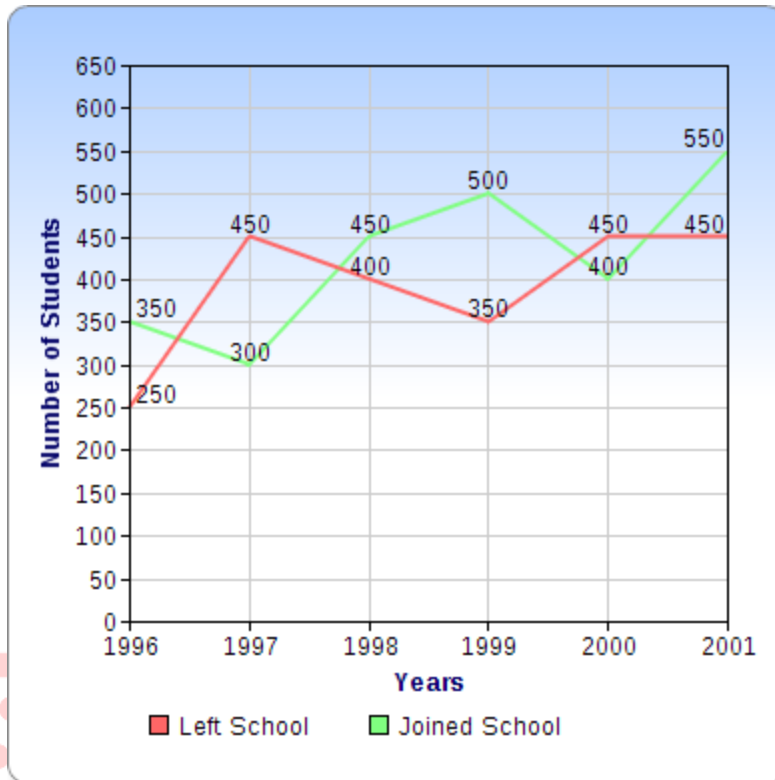*(iii)* $E_B = \frac{E_A}{2} = \frac{315}{2}$ *crores from*

(ii) $I_B = \frac{E_B}{0.75} = \frac{315}{2} * 0.75 = 210$ *crores*

Study the following line graph which gives the number of students who joined and left the school in the beginning of the year for six years from 1996 to 2001.
Initial strength of the school in 1995 was 3000
Answer questions based on the line graph given below.

- **1. The strength of the school increased from 1997 to 1998 by what percent ?**
    1. *1.7%*
    2. *1.8%*
    3. *1.9%*
    4. *2%*

Answer :
*Option **A***

Explanation:

Let analyse the graph before answering question.
Number of students in 1995 = 3000 [given]
Number of students in 1996 = 3000-250+350 = 3100
Number of students in 1997 = 3100-450+300 = 2950
Number of students in 1998 = 2950-400+450 = 3000
Number of students in 1999 = 3000-350+500 = 3150
Number of students in 2000 = 3150-450+400 = 3100
Number of students in 2001 = 3100-450+550 = 3200

Above analysis will help us solving problems for this line graph.

Lets be back on question now,
Percentage increase in strength of the school from 1997 to 1998 will be,
((3000âˆ'2950)2950âˆ—100)%=1.69%

((3000−2950)2950∗100)%=1.69%((3000−2950)2950∗100)%=1.69%

So this is approx equal to 1.7%

- **2. The number of students studying in the school during 1999 was :**
     1. *3100*
     2. *3000*
     3. *3150*
     4. *3250*

Answer :
*Option **C***

Explanation:

Number of students in 1995 = 3000 [given]
Number of students in 1996 = 3000-250+350 = 3100
Number of students in 1997 = 3100-450+300 = 2950
Number of students in 1998 = 2950-400+450 = 3000
Number of students in 1999 = 3000-350+500 = 3150

- **3. During which of the following pairs of years, the strength of the school was same ?**
     1. *1997 and 1998*
     2. *1998 and 2000*
     3. *1999 and 2001*
     4. *1996 and 2000*

Answer :
*Option **D***

Explanation:

Number of students in 1995 = 3000 [given]
Number of students in 1996 = 3000-250+350 = 3100
Number of students in 1997 = 3100-450+300 = 2950
Number of students in 1998 = 2950-400+450 = 3000
Number of students in 1999 = 3000-350+500 = 3150
Number of students in 2000 = 3150-450+400 = 3100
Number of students in 2001 = 3100-450+550 = 3200

From from above options we find in 1996 and 2000 number of students was same i.e.
3100

- **4. The number of students studying in the school in 1998 was what percent of the number of students studying in the school in 2001 ?**
  1. *90.75%*
  2. *91.75%*
  3. *92.75%*
  4. *93.75%*

Answer :

*Option **D***

Explanation:

Number of students in 1995 = 3000 [given]
Number of students in 1996 = 3000-250+350 = 3100
Number of students in 1997 = 3100-450+300 = 2950
Number of students in 1998 = 2950-400+450 = 3000
Number of students in 1999 = 3000-350+500 = 3150
Number of students in 2000 = 3150-450+400 = 3100
Number of students in 2001 = 3100-450+550 = 3200

In 2001 students = 3200
In 1998 students = 3000

Required Percentage =(30003200∗100)%=93.75%Required Percentage =(30003200∗100)%=93.75%

- **5. Among the given years the largest number of students joined in which year ?**
  1. *1999*
  2. *2000*
  3. *2001*
  4. *1998*

Answer :

*Option **C***

Explanation:

Clearly from the line graph we can judge it was in year 2001.

- **6. For which year, the percentage rise/fall in the number of students who left the school compared to previous years is maximum ?**
  1. *1997*
  2. *1998*
  3. *1999*
  4. *2000*

Answer :
*Option **A***

Explanation:

Please note we are calculating the percentage rise/fall of number of students left.

for 1997=[(450−250)250∗100]%=80%(rise)for 1998=[(450−400)450∗100]%

=11.11%(fall)for 1999=[(400−350)350∗100]%

=28.57%(rise)for 2000=[(450−350)350∗100]%

=28.57%(rise)for 1997=[(450−250)250∗100]%

=80%(rise)for 1998=[(450−400)450∗100]%

=11.11%(fall)for 1999=[(400−350)350∗100]%

=28.57%(rise)for 2000=[(450−350)350∗100]%

=28.57%(rise)

So it was maximum in 1997

- **7. The ratio of the least number of students who joined the school to the maximum number of students who left the school in any of the years during the given period is:**
    1. 1:2
    2. 2:3
    3. 3:5
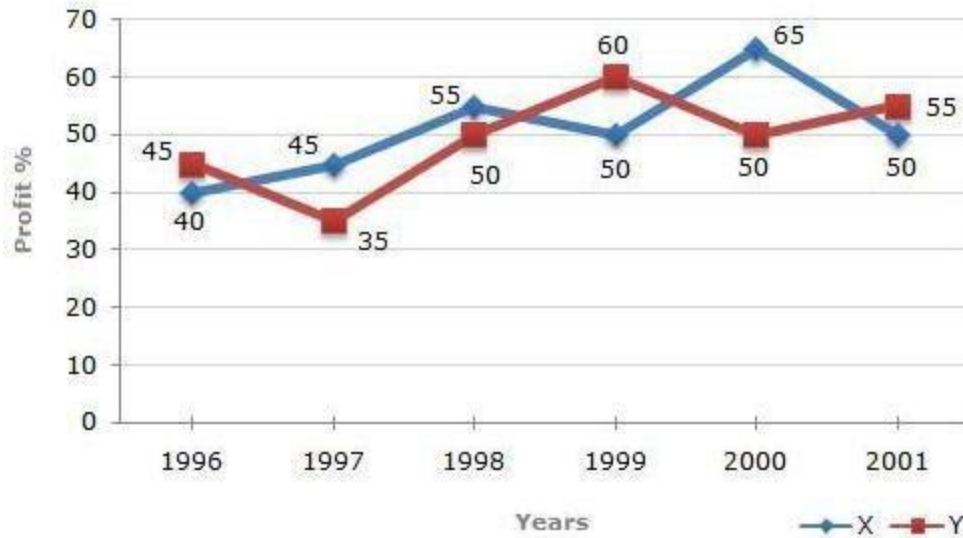   4. 3:7

Answer :
*Option **B***

Explanation:

Required Ratio =300450=23=2:3

Exercise Question

The following line graph gives the percent profit earned by two Companies X and Y during the period 1996 - 2001.

Percentage profit earned by Two Companies X and Y over the Given Years,
*%Profit = (Income - Expenditure)/Expenditure * 100*

1. The incomes of two Companies X and Y in 2000 were in the ratio of 3:4 respectively. What was the respective ratio of their expenditures in 2000 ?

a. 7 : 22
b. 14.19
c. 15:22
d. 27:35

2. If the expenditure of Company Y in 1997 was Rs. 220 crores, what was its income in 1997?

a. Rs.312 crores
b. Rs.297 crores
c. Rs.283 crores
d. Rs.275 crores

3. If the expenditures of Company X and Y in 1996 were equal and the total income of the two Companies in 1996 was Rs. 342 crores, what was the total profit of the two Companies together in 1996 ? (Profit = Income - Expenditure)

a. Rs.240 crores
b. Rs.171 crores
c. Rs.120 crores
d. Rs.102 crores

4. The expenditure of Company X in the year 1998 was Rs.200 crores and the income of company X in 1998 was the same as its expenditure in 2001. The income of Company X in 2001 was ?

a. Rs.465 crores
b. Rs.385 crores
c. Rs.335 crores
d. Rs.295 crores

5. If the incomes of two Companies were equal in 1999, then what was the ratio of expenditure of Company X to that of Company Y in 1999 ?

a. 6:5
b. 5:6
c. 11:6
d. 16:15

Study the following line graph and answer the questions based on it.
Number of Vehicles Manufactured by Two companies over the Years (Number in Thousands)
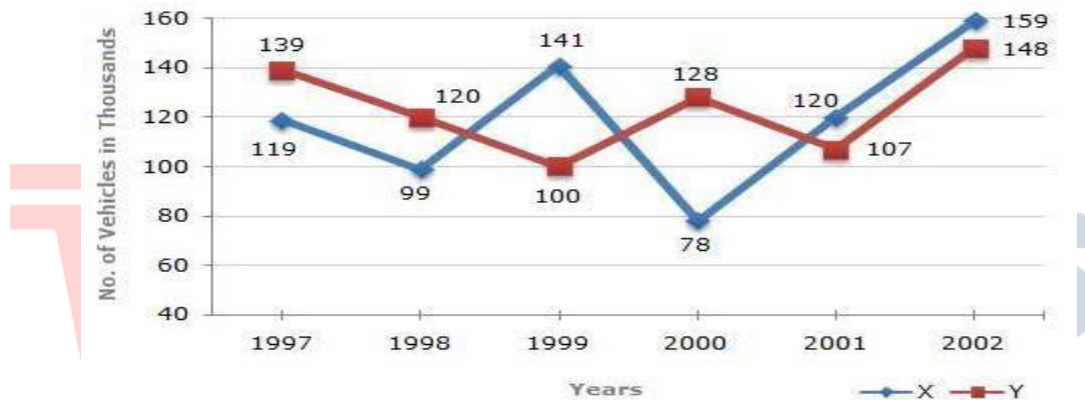
6. What is the difference between the number of vehicles manufactured by Company Y in 2000 and 2001 ?

a. 50000
b. 42000
c. 33000
d. 21000

7. What is the difference between the total productions of the two Companies in the given years ?

a. 19000
b. 22000
c. 26000
d. 28000

8. What is the average numbers of vehicles manufactured by Company X over the given period ? (rounded off to nearest integer)

a. 119333
b. 113666
c. 112778
d. 111223

9. In which of the following years, the difference between the productions of Companies X and Y was the maximum among the given years ?
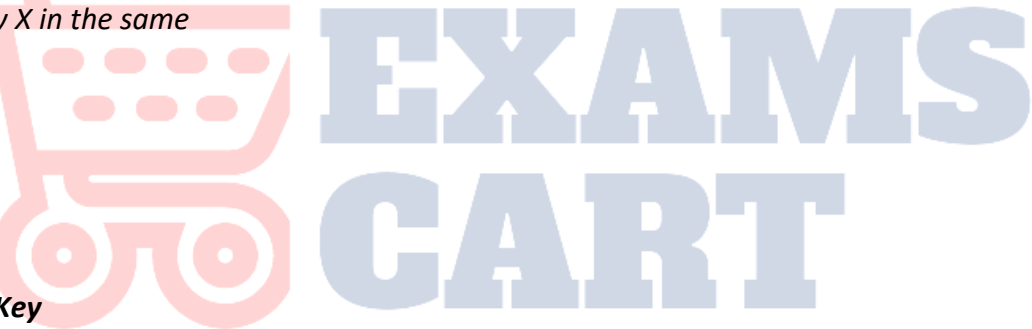
a. 1997
b. 1998
c. 1999
d. 2000

10. The production of Company Y in 2000 was approximately what percent of the production of Company X in the same
year ?

a. 173
b. 164
c. 132
d. 97

Answer Key

1.c; 2.b; 3.d; 4.a; 5.d; 6.d; 7.c; 8.a; 9.d; 10.b