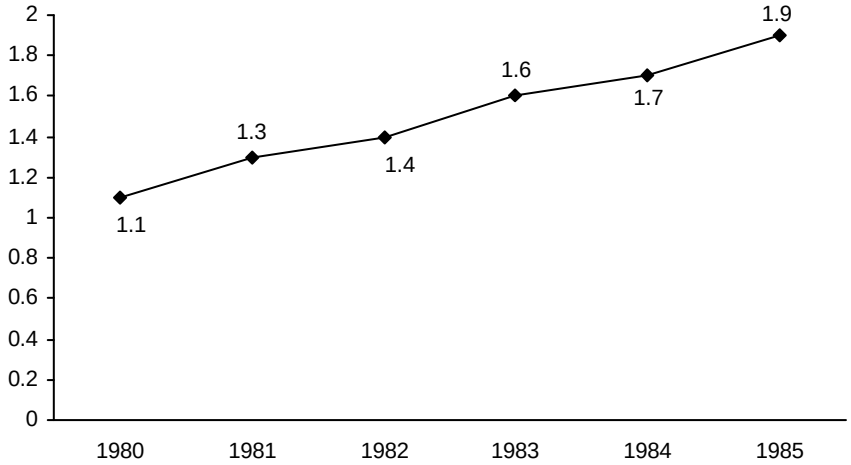
CHAPTER – 4
LINE GRAPHS

Worked out Examples:

The following line graph represents the population (in millions) of country X in each year from 1980 to 1985.



4.01: Find the percentage increase in the population of X from 1980 to 1985.
(A) 60 (B) $66^2/_3$
(C) 70% (D) None of these

Sol: Required percentage
$= \frac{1.9-1.1}{1.1}(100) = 72\frac{8}{11}\%$ Choice (D)

4.02: If in 1981, 60% of the population of X were men while in 1982 it was only 50%, find the percentage change in the male population from 1981 to 1982.
(A) 8% (B) 10%
(C) 12% (D) 13%

Sol: Number of men in 1981
$= \frac{60}{100}(1.3\,\text{million}) = 0{\cdot}78$ million

Number of men in 1982
$= \frac{50}{100}(1.4\,\text{million}) = 0{\cdot}7$ million
$\therefore$ The male population decreased
Required percentage $= \frac{0.78-0.7}{0.78}(100) \cong 10\%$
Choice (B)

4.03: If in the previous question, 60% of the female population in 1981 and 80% of those in 1982 were literate, then find the increase (in millions) in the number of literate women from 1981 to 1982.
(A) 0.16 (B) 0.192
(C) 0.213 (D) 0.248

Sol: Number of women in 1981
$= \frac{40}{100}(1.3\,\text{million}) = 0{\cdot}52$ million
Number of women who were literate
$= \frac{60}{100}(0.52\,\text{million}) = 0{\cdot}312$ million
Number of women in 1982
$= \frac{50}{100}(1.4\,\text{million}) = 0{\cdot}7$ million
Number of women who were literate
$= \frac{80}{100}(0.7\,\text{million}) = 0{\cdot}56$ million
The increase = 0.56 – 0.312 = 0.248 million
Choice (D)

4.04: In which of the given years, from 1981 to 1985, did the population increase by the highest percentage over the previous year?
(A) 1981 (B) 1982
(C) 1983 (D) 1984

Sol: As the maximum increase in population between any two years is 0.2 million (1981, 1983 and 1985) and as the increase in population in 1981 is on a lower base, the percentage increase in 1981 would be the highest. Choice (A)

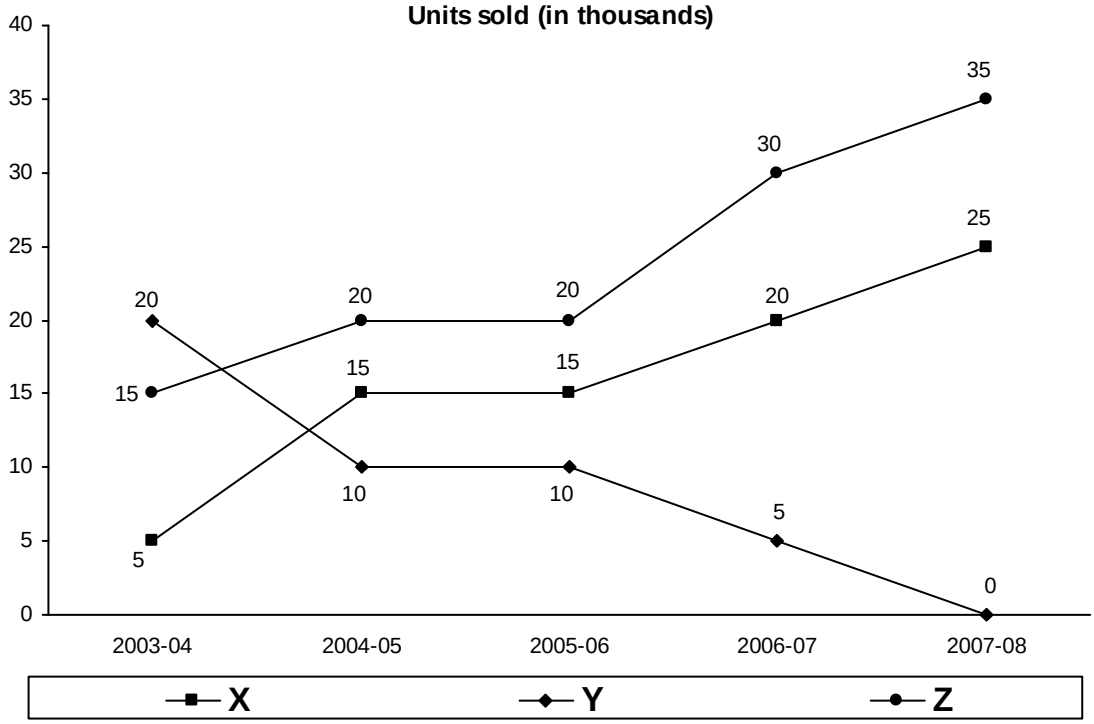
4.05: If the percentage of women in the population of country X in the years from 1980 to 1985 are 40, 45, 50, 55, 60 and 65 respectively, then in which of the given years when compared to its previous year, did the female population show the highest percentage increase?
(A) 1985 (B) 1981
(C) 1983 (D) 1982

Sol: As the percentage increase in total population, and the percentage increase in the share of female population in 1981 (40 – 45, i.e. 12.5%) is the highest, the percentage increase in female population would be the highest in that year. Choice (B)

Exercise – 4(a)

Directions for questions 1 to 5: These questions are based on the information given below.

The line graph represents the number of units sold by three companies X, Y and Z in the years from 2003-2004 to 2007-2008.



1. If in 2004-05, the manufacturing cost and selling price of each unit for all the companies is ₹25 and ₹40 respectively, then the total profit (in ₹) earned by all the three companies in that year, if all the manufactured goods are sold, is
(A) 6.75 million.
(B) 6 lakh 75 thousand.
(C) 0.225 million.
(D) 0.3 million.

2. Which company has the maximum revenue in the years 2004-05 and 2005-06 together, if the selling price (in rupees) of each unit, in both the years, for companies X, Y, Z are 12, 18 and 8 respectively?
(A) X (B) Y
(C) Z (D) Both X and Y

3. How are the revenues from 2003-04 to 2007-08 for company X and company Z related if the selling price of each unit sold in an year is the same for both the companies?
(A) Inverse relationship.
(B) Sum of their revenues is a constant.
(C) Direct relationship.
(D) Difference of their revenues is a constant.

4. What is the ratio of the profits generated by the companies X, Y and Z in 2003-04, if their average profit per unit is ₹15, ₹5 and ₹8 respectively?
(A) 15 : 20 : 24 (B) 5 : 7 : 8
(C) 6 : 6 : 8 (D) 6 : 5 : 8

5. Which company had the highest percentage growth in profits during the period from 2003-04 to 2006-07?
(A) X
(B) Y
(C) Z
(D) Cannot be determined

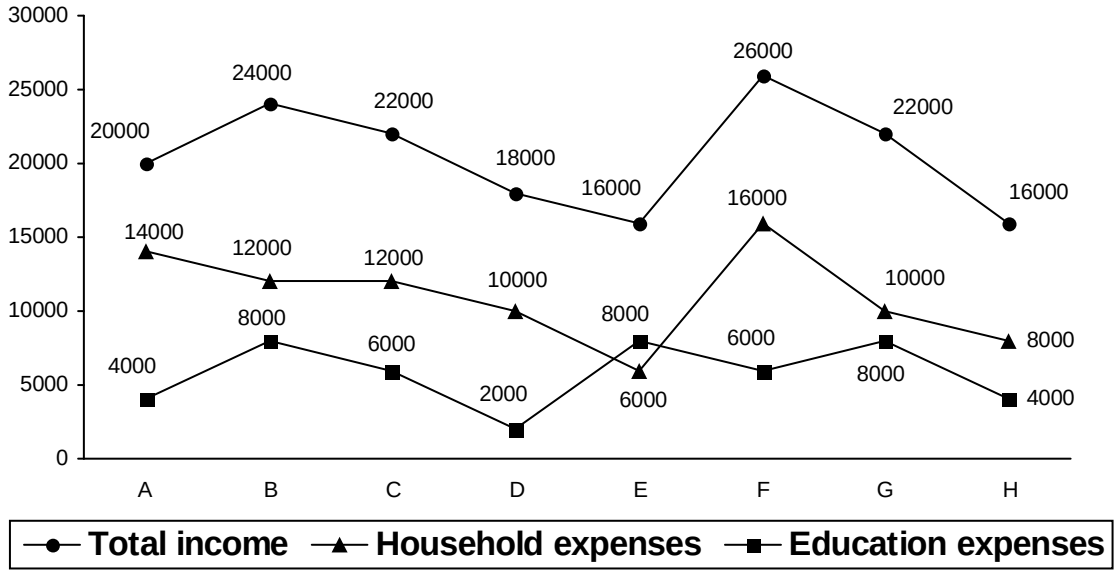
Directions for questions 6 to 10: These questions are based on the information given on the next page.

6. For how many families is the ratio of savings to educational expenses more than 0.6?
(A) 4 (B) 3
(C) 6 (D) 5

7. What is the percentage point difference between the percentage savings of B and H?
(A) 9.67%
(B) 12.87%
(C) 10.67%
(D) None of these

8. By what percentage are the savings of family D more than that of family A?
(A) 200%
(B) 160%
(C) 175%
(D) 100%

The line graph shows the total monthly income and monthly expenditure of eight families – A, B, C, D, E, F, G and H.



Savings = Total income – (Household expenses + Education expenses)

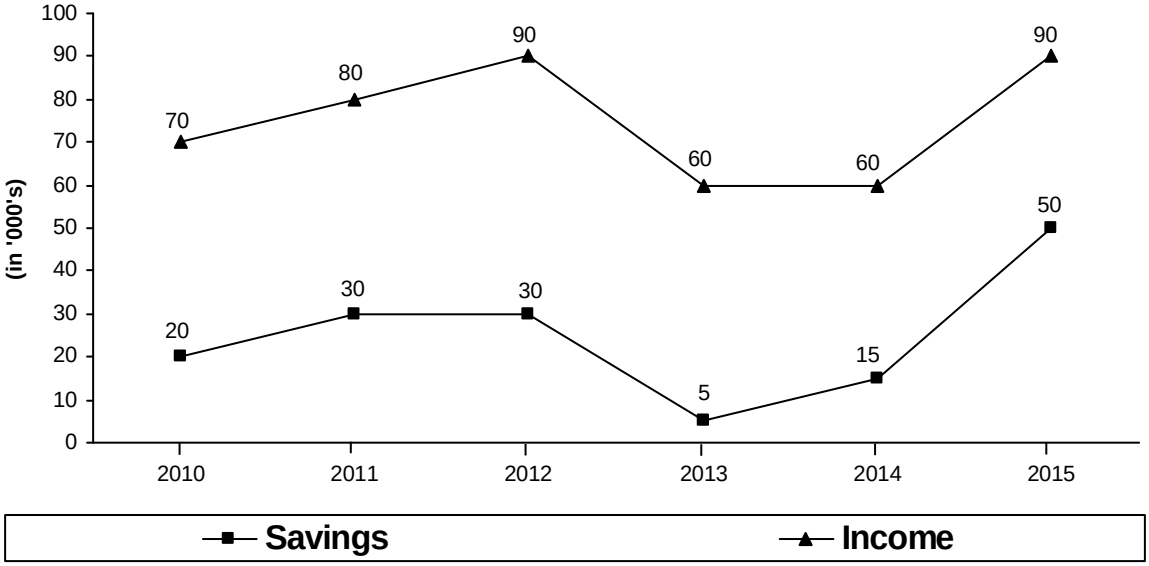
Percentage savings = $\frac{\text{Savings}}{\text{Total income}} \times 100$

9. For how many families are the household expenses more than 55% of the total income?
(A) 4 (B) 3 (C) 5 (D) 2

10. For which of the given families is the percentage savings the highest?
(A) G (B) H (C) D (D) E

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

The line graph gives the income and savings of a family in different years.



Savings = Income – Expenditure

11. During which year was the expenditure of the family the highest?
(A) 2010 (B) 2011 (C) 2012 (D) 2013

12. What is the least ratio of income and savings of the family in any of the given years?
(A) 1.5 (B) 1.8 (C) 2 (D) 2.4

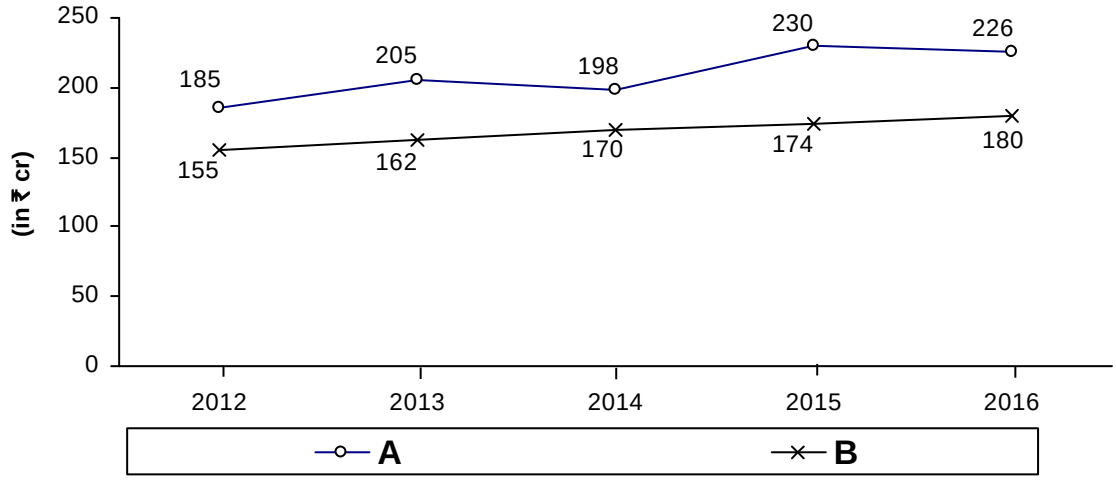
13. During which of the following years is the percentage decrease in expenditure, over the previous year, the highest?
(A) 2011 (B) 2013
(C) 2014 (D) 2015

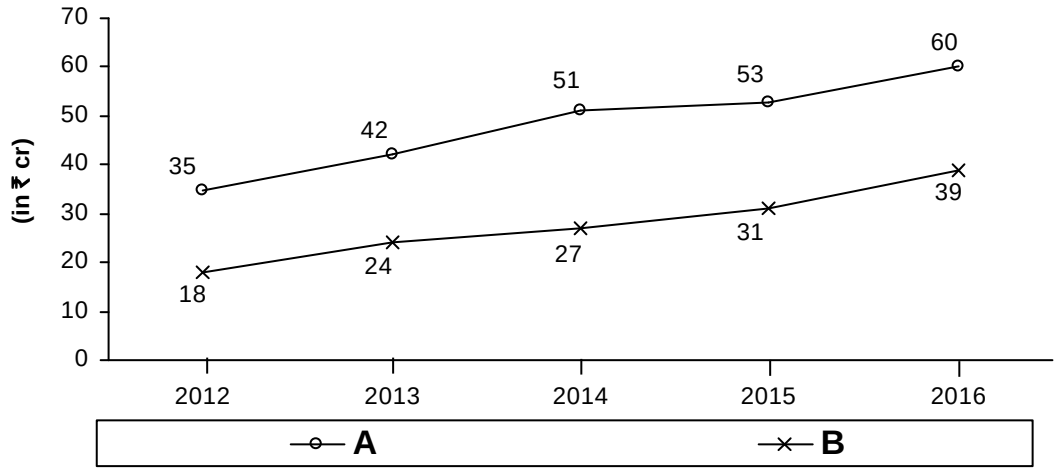
14. Which of the following pairs show the same trend (increase, remain constant or decrease) in at least three of the given years?
(A) Income and savings
(B) Income and expenses
(C) Expenses and savings
(D) All the above

15. What percentage of the total income in the given period did the family save?
(A) 20% (B) 25% (C) $33\frac{1}{3}\%$ (D) 40%

Directions for questions 16 to 20: These questions are based on the information given below.

The first line graph gives the sales of two companies A and B across five years. The second line graph gives the profits of the companies over the years.





Sales – Expenses = Profit

$\text{Profit\%} = \frac{\text{Profit}}{\text{Sales}}$

Directions for questions 16 to 20: Type in your answer in the input box provided below the question.

16. What were the expenses (in ₹ cr) of company B in 2013?

17. What was the profit percentage of company A in 2014?

18. In which of the given years was the profit percentage of company A, the highest?

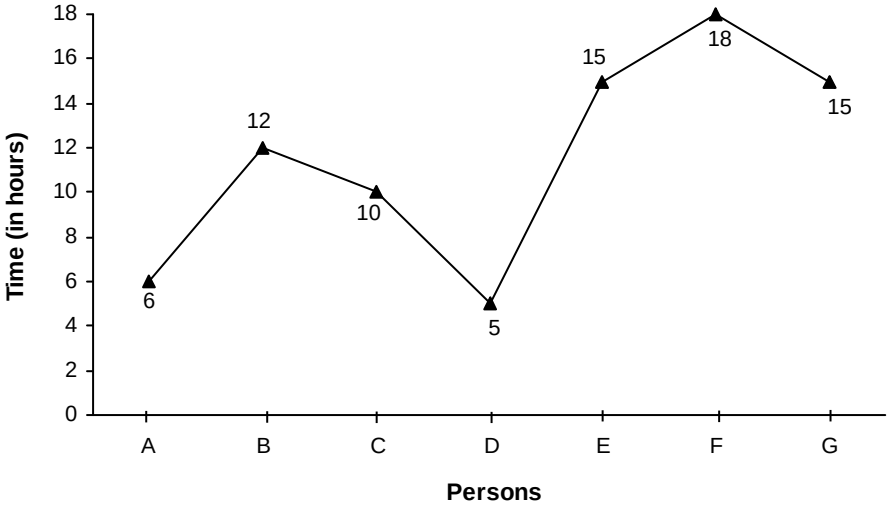
19. What were the total expenses (in ₹ cr) of company B in the five years together?

20. In which year were the expenses of companies A and B together, the lowest?

Exercise – 4(b)

Directions for questions 1 to 5: These questions are based on the information given below.

The line graph shows the time taken to complete a particular task by seven persons A to G.



1. In how much time can B and D together complete the task?

(A) $5\frac{7}{17}$ hours (B) $5\frac{9}{17}$ hours

(C) $3\frac{9}{17}$ hours (D) $3\frac{7}{17}$ hours

2. If C leaves 3 hours after A and C started the task, then how many more hours will A take to complete it?

(A) 1.2 hours (B) 2.4 hours

(C) 1.5 hours (D) 2.5 hours

3. F, E and G worked on the task for one hour and then E left. If F and G together complete the remaining work, then how many more hours did F and G take to finish the remaining work?

(A) $6\frac{9}{11}$ hours (B) $7\frac{7}{11}$ hours

(C) $5\frac{7}{11}$ hours (D) $6\frac{7}{11}$ hours

4. Approximately how long will it take for A, C, D and F together to complete the task?

(A) 1.5 hours (B) 1.7 hours

(C) 2.3 hours (D) 1.9 hours

5. A and E started the task together and E left after some time. A completed the remaining work in 2.5 hours. After how many hours from the start did E leave?

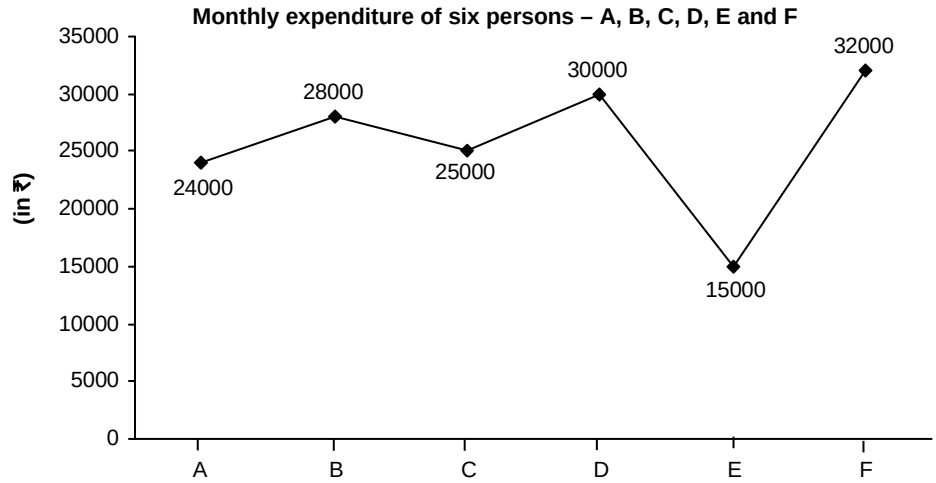
(A) 2.2 hours

(B) 2.5 hours

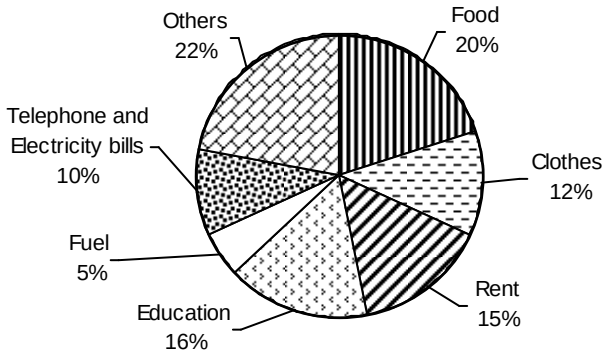
(C) 1.4 hours

(D) 1.8 hours

Directions for questions 6 to 10: These questions are based on the information given below.



Breakup of expenses of D



Directions for questions 6 to 10: Type in your answer in the input box provided below the question.

6. If the expenditure of D on food was 20% more than the average expenditure of all the six persons on food, then what is the average monthly expenditure on food for the given persons?

7. What is the total expenditure of D on Rent, Education and Telephone and Electricity bills?

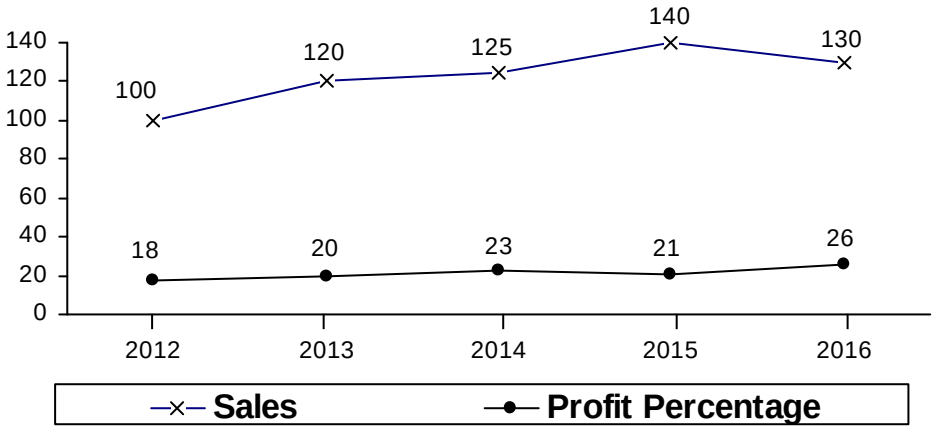
8. If B and F spent 10% and 15% respectively of their expenses on clothes, then by what percentage were the expenses of F on clothes more than that of B?

9. If the monthly expenses on fuel for all the six persons are the same, then for how many persons were the expenses on fuel more than 5% of their total monthly expenses?

10. If the expenditure on 'others' for A was 10% more than that for D, then what percentage of the monthly expenses of A was spent on 'others'?

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

The following line graph gives the sales and profit percentage of a company across five years starting from 2012. The value of sales in 2012 have been taken as 100. All values in the succeeding years are indexed to the value in 2012.



Profit percentage = $\frac{\text{Profit}}{\text{Expenses}}$

Sales = Expenses + Profit

11. If the sales in 2012 were ₹850 cr, then what were the expenses in 2013?
(A) ₹780 cr (B) ₹800 cr
(C) ₹850 cr (D) None of these

12. What was the percentage increase in expenses from 2013 to 2014?
(A) 1.05 (B) 1.62
(C) 2.18 (D) 2.65

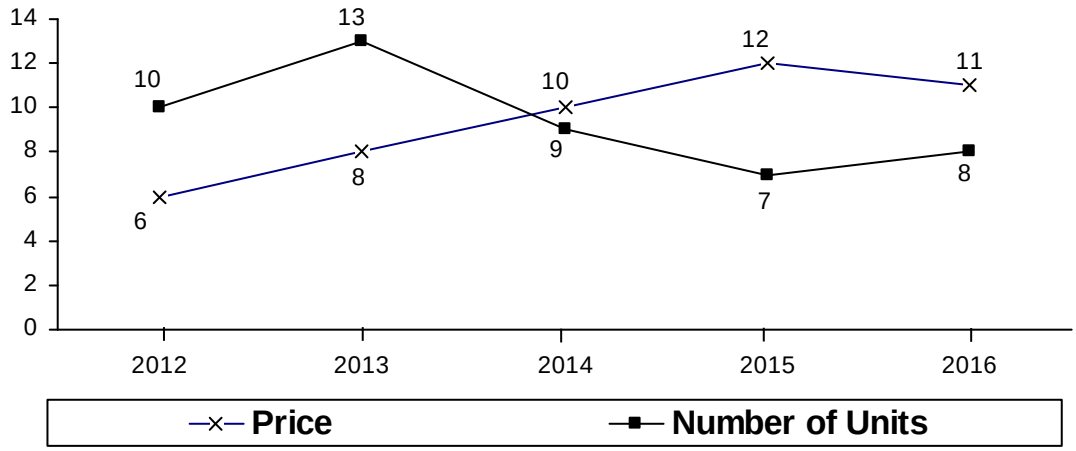
13. If the sales in 2013 were ₹1380 cr, then what was the profit in 2015?
(A) ₹280 cr (B) ₹260 cr (C) ₹320 cr (D) ₹338 cr

14. Which of the following years had the highest percentage increase in expenses, when compared to the previous year?
(A) 2013 (B) 2014 (C) 2015 (D) 2016

15. If the expenses in 2014 were ₹1,033 cr, then what were the sales in 2016?
(A) ₹12,246 cr (B) ₹1,189 cr
(C) ₹1,265 cr (D) ₹1,321 cr

Directions for questions 16 to 20: These questions are based on the information given below.

The line graph gives the percentage increase in the price of an item over a period of five years and the percentage increase in the number of units of the item sold.



Note: All the values are the increase over the previous year. In 2011, the price of the item was ₹160 and the number of units sold was 3500.
Sales (by value) = Price × number of units sold.

16. How many units of the product were sold in 2013?
(A) 4260 (B) 4350 (C) 4420 (D) 4490

17. In which year was the increase in the price of the item, the highest?
(A) 2013 (B) 2014 (C) 2015 (D) 2016

18. What were the approximate sales (by value) of the product in 2014?
(A) ₹8,68,320 (B) ₹9,08,460
(C) ₹9,55,510 (D) ₹9,96,470

19. What was the percentage increase in the sales (by value) of the product from 2015 to 2016?
(A) 20 (B) 17 (C) 15 (D) 22

20. What was the percentage increase in the price of the product from 2012 to 2016?
(A) 48 (B) 44 (C) 40 (D) 32

Key

Exercise – 4(a)

1. B	5. D	9. B	13. C	17. 25.75
2. D	6. A	10. C	14. A	18. 2016
3. C	7. D	11. C	15. C	19. 702
4. A	8. A	12. B	16. 138	20. 2012

Exercise – 4(b)

1. C	5. B	9. 4	13. A	17. D
2. A	6. 5000	10. 30.25	14. A	18. C
3. D	7. 12300	11. C	15. D	19. A
4. D	8. 71.4	12. B	16. B	20. A