01

Percentage

How to change % into fraction

$20\% = \frac{20}{100} = \frac{1}{5}$

$25\% = \frac{25}{100} = \frac{1}{4}$

$40\% = \frac{40}{100} = \frac{2}{5}$

$70\% = \frac{70}{100} = \frac{7}{10}$

$16\frac{2}{3}\% = \frac{50}{3}\% = \frac{1}{6}$

$14\frac{2}{7}\% = \frac{100}{7}\% = \frac{1}{7}$

How to change the fraction into %

$\frac{1}{5} \Rightarrow \frac{1}{5} \times 100 = 20\%$

$\frac{1}{4} \Rightarrow \frac{1}{4} \times 100 = 25\%$

$\frac{1}{6} \Rightarrow \frac{1}{6} \times 100 = \frac{50}{3} = 16\frac{2}{3}\%$

$\frac{1}{9} \Rightarrow \frac{1}{9} \times 100 = \frac{100}{9}\% = 11\frac{1}{9}\%$

The following fractions are generally used in exams. So, I recommend you to remember these fractions. These fractions are very useful to solve the lengthy questions with in time.

$\frac{1}{2}=50\%$ $\frac{1}{11}=9\frac{1}{11}\%$ $\frac{1}{40}=2\frac{1}{2}\%$

$\frac{1}{3}=33\frac{1}{3}\%$ $\frac{1}{12}=8\frac{1}{3}\%$ $\frac{1}{50}=2\%$

$\frac{1}{4}=25\%$ $\frac{1}{13}=7\frac{9}{13}\%$ $\frac{3}{8}=37\frac{1}{2}\%$

$\frac{1}{5}=20\%$ $\frac{1}{14}=7\frac{1}{7}\%$ $\frac{5}{8}=62\frac{1}{2}\%$

$\frac{1}{6}=16\frac{2}{3}\%$ $\frac{1}{15}=6\frac{2}{3}\%$ $\frac{4}{7}=57\frac{1}{7}\%$

$\frac{1}{7}=14\frac{2}{7}\%$ $\frac{1}{16}=6\frac{1}{4}\%$ $\frac{5}{7}=71\frac{3}{7}\%$

$\frac{1}{8}=12\frac{1}{2}\%$ $\frac{1}{20}=5\%$ $\frac{1}{9}=11\frac{1}{9}\%$

$\frac{1}{24}=4\frac{1}{6}\%$ $\frac{1}{10}=10\%$ $\frac{1}{25}=4\%$

These are Basic Fraction.

(i) If I want to know the % value of $\frac{5}{9}$ then go to $\frac{1}{9}$

$\frac{1}{9} = 11\frac{1}{9}\% = 11 + \frac{1}{9}\%$

$\frac{5}{9} = 55\frac{5}{9}\%$

(ii) Find the % value of $\frac{3}{8}$

$\frac{1}{8} = 12\frac{1}{2}\% = 12 + \frac{1}{2}\%$

$\frac{3}{8} = 36 + \frac{3}{2} = 36 + 1\frac{1}{2} = 37\frac{1}{2}\%$

(iii) Find the % value of $\frac{5}{6}$

$\frac{1}{6} = 16\frac{2}{3}\% = 16 + \frac{2}{3}$

$\frac{5}{6} = 80 + \frac{10}{3}$

$= 80 + 3\frac{1}{3}\% = 83\frac{1}{3}\%$

(iv) Find the % value of $\frac{2}{3}$

$\frac{1}{3} = 33\frac{1}{3}\% = 33 + \frac{1}{3}\%$

$\frac{2}{3} = 66 + \frac{2}{3} = 66\frac{2}{3}\%$

(v) Find the % value of $\frac{5}{8}$

$\frac{1}{8} = 12\frac{1}{2}\% = 12 + \frac{1}{2}$

$\frac{5}{8}=60 + \frac{5}{2} = 60 + 2\frac{1}{2} = 62\frac{1}{2}\%$

(vi) Find the % value of $\frac{4}{7}$

$\frac{1}{7} = 14\frac{2}{7}\% = 14 + \frac{2}{7}\%$

$\frac{4}{7} = 56 + \frac{8}{7}\% = 56 + 1\frac{1}{7} = 57\frac{1}{7}\%$

(vii) Find the % value of $\frac{7}{12}$

$\frac{1}{12} = 8\frac{1}{3}\% = 8 + \frac{1}{3}\%$

$\frac{7}{12} = 56 + \frac{7}{3} = 56 + 2\frac{1}{3} = 58\frac{1}{3}\%$

(viii) Find the % value of $\frac{11}{15}$

$\frac{1}{15} = 6\frac{2}{3}\% = 6 + \frac{2}{3}\%$

$\frac{11}{15} = 66 + \frac{22}{3}\%$

$= 66 + 7\frac{1}{3}\% = 73\frac{1}{3}\%$

(ix) Find the % value of $\frac{9}{16}$

$\frac{1}{16} = 6\frac{1}{4}\% = 6 + \frac{1}{4}\%$

$\frac{9}{16} = 54 + \frac{9}{4} = 54 + 2\frac{1}{4}\%$

$= 56\frac{1}{4}\%$

(x) Find the % value of $\frac{7}{40}$

$\frac{1}{40} = 2\frac{1}{2}\% = 2 + \frac{1}{2}\%$

$\frac{7}{40} = \text{æ}14 + \frac{7\ddot{o}}{2\div\emptyset}\% = 17\frac{1}{2}\%$

How to change the fraction whose % value is more than 100%

(i) Find the % value of $\frac{7}{5}$

$\frac{7}{5} \Rightarrow \frac{5}{5} + \frac{2}{5}$

$\Rightarrow 100\% + 40\%$

$\Rightarrow 140\%$

(ii) Find the % value of $\frac{35}{8}$

$\frac{35}{8} = \frac{32}{8} + \frac{3}{8}$

$= 400\% + 37\frac{1}{2}\% = 437\frac{1}{2}\%$

(iii) Find the % value of $\frac{33}{7}$

$\frac{33}{7} = \frac{28}{7} + \frac{5}{7}$

$= 400\ \% + 71\frac{3}{7}\% = 471\frac{3}{7}\%$

(iv) Find the % value of $\frac{23}{12}$

$\frac{23}{12} = \frac{12}{12} + \frac{11}{12}$

$= 100\% + 91\frac{2}{3}\% = 191\frac{2}{3}\%$

Alternatively:

$\frac{23}{12} = \frac{24}{12} - \frac{1}{12}$

$= 200\% - 8\frac{1}{3}\% = 191\frac{2}{3}\%$

(v) Find the % value of $\frac{41}{6}$

$\frac{41}{6} = \frac{42}{6} - \frac{1}{6}$

$= 700\% - 16\frac{2}{3}\% = 683\frac{1}{3}\%$

How to change % into fraction whose % value is more than 100%

(i) Find the fraction value of $157\frac{1}{7}\%$

$157\frac{1}{7}\% = 100\% + 57\frac{1}{7}\%$

$= 1 + \frac{4}{7} = \frac{11}{7}$

(ii) Find the fraction value of $616\frac{2}{3}\%$

$616\frac{2}{3}\% = 600\% + 16\frac{2}{3}\%$

$= 6 + \frac{1}{6} = \frac{37}{6}$

(iii) Find the fraction value of $366\frac{2}{3}\%$

$366\frac{2}{3}\% = 300\% + 66\frac{2}{3}\%$

$= 3 + \frac{2}{3} = \frac{11}{3}$

(iv) Find the fraction value of $208\frac{1}{3}\%$

$208\frac{1}{3}\% = 200\% + 8\frac{1}{3}\%$

$= 2 + \frac{1}{12} = \frac{25}{12}$

How to understand the actual meaning of fraction.

$16\frac{2}{3}\% = \frac{1}{6}$ → 1 represents its % result; → 6 represent original number/value

$\rightarrow 14\frac{2}{7}\% = \frac{1}{7}$

means $7 \times 14\frac{2}{7}\% = 1$

$\rightarrow 62\frac{1}{2}\% = \frac{5}{8}$

means $8 \times 62\frac{1}{2}\% = 5$

$\rightarrow 37\frac{1}{2}\% = \frac{3}{8}$

means $8 \times 37\frac{1}{2}\% = 3$

QUESTIONS BASED ON FRACTION

1. If $37\frac{1}{2}\%$ of a number is added with itself then result becomes 1320. Find the original number.

Detailed Method :

Let the original number be x

According to the question,

$x + x \times 37\frac{1}{2}\% = 1320$

$x + x \times \frac{3}{8} = 1320$

$\frac{8x + 3x}{8} = 1320$

$\frac{11x}{8} = 1320$

$x = 1320 \times \frac{8}{11} = 960$

Fraction Method:

$37\frac{1}{2}\% = \frac{3}{8}$ ⇒ % result; ⇒ Orignal Number

Original number = 8 unit

Result formed = 8 unit + 3 unit

$\left[8 \times 37\frac{1}{2}\% = 3\right]$

11 unit → 1320

1 unit → 120

So, the original number = 8 × 120 = 960

2. If $62\frac{1}{2}\%$ of a number is subtracted from itself then result becomes 6321. Find the original number.

Detailed Solution,

Let the original number = x

A.T.Q,

$$x - x \times 62\frac{1}{2}\% = 6321$$

$$x - x \times \frac{5}{8} = 6321$$

$$\frac{3x}{8} = 6321$$

$$x = 16856$$

Fraction method :

$$62\frac{1}{2}\% = \frac{5}{8}$$

$$\left[8 \times 62\frac{1}{2}\% = 5\right]$$

Original number = 8 unit

Result formed = 8 unit – 5 unit

3 units $\rightarrow$ 6321

1 unit $\rightarrow$ 2107

So, original number

= 8 × 2107 = 16,856

3. If $16\frac{2}{3}\%$ of a number is added with itself then result becomes 4956. Find the original number.

Sol. Let the original no. = x

According to the question

$$x + x \times 16\frac{2}{3}\% = 4956$$

$$x + \frac{x}{6} = 4956$$

$$\frac{7x}{6} = 4956$$

x = 708 × 6 = 4248

Alternate:

$16\frac{2}{3}\% = \frac{1}{6}$ → % result

→ Original number

Now,

New No = 6 + 1 = 7 unit = 4956

1unit = 708

Original no. = 6 unit = 6 × 708

= 4248

4. If $6\frac{2}{3}\%$ of a number is subtracted from itself then result becomes 5670. Find the original number.

Sol.

$-6\frac{2}{3}\% = \frac{1}{15}$ → Substract value

→ Original number

New Value = 15 – 1 = 14 unit

= 5670

1 unit = 405

Original value = 405 × 16

= 6480

5. If $11\frac{1}{9}\%$ of a number is added with itself then result becomes 900 find the original number.

Sol. $+11\frac{1}{9}\% = \frac{1}{9}$ → Added value

→ Original number

New value = 9 + 1 = 10 unit

= 900

1 unit = 90

Original no. = 90 × 9 = 810

6. What is 20% of 50% of 75% of 70?

Sol. Value = $70 \times \frac{1}{5} \times \frac{1}{2} \times \frac{3}{4}$

$$= \frac{21}{4} = 5.25$$

7. If 20% of (P + Q) = 40% of (P – Q) then find P : Q

Sol. $\frac{20}{100}$ (P + Q) = $\frac{40}{100}$ (P – Q)

P + Q = 2P – 2Q

P – Q = 4P – Q

3Q = 1P

P : Q = 3 : 1

8. What is 20% of 25% of 300 ?

Sol. $300 \times \frac{20}{100} \times \frac{25}{100} = 15$

9. 25% of what number is 36 ?

Sol. Let the number be x

then $x \times \frac{25}{100} = 36$

$x = 36 \times 4 = 144$

10. If 240 is 20% of a number, then 120% of that numbe will be ?

sol. Let the number be = x

20% of x = 240

$x \times \frac{1}{5} = 240$

x = 1200

Now,

$1200 \times 120\% = 1200 \times \frac{120}{100}$

= 1440

11. If we express $41\frac{3}{17}\%$ as a fraction, then it is equal to :

Sol. $41\frac{3}{17}\% = \frac{700}{17} \times \frac{1}{100} = \frac{7}{17}$

12. If 125% of x is 100, then x is:

Sol. $x \times \frac{125}{100} = 100$

$x = \frac{100 \times 100}{125} = 80$

13. If 50% of (x - y) = 30% of (x + y) then what percent is y of x ?

Sol. $\frac{50}{100}$ (x - y) = $\frac{30}{100}$ (x + y)

50x – 50y = 30x + 30y

50x – 30x = 30 y + 50 y

20x = 80 y

x = 4

y = 1

So, y is $\frac{1}{4}$ = 25%

14. If 64 is added in a number then number becomes $157\frac{1}{7}\%$ of itself. Find the number.

Sol. $157\frac{1}{7}\% = \frac{11}{7}$

$$\left[7 \times 157\frac{1}{7}\% = 11\right]$$

7 unit 11 unit

4 unit → 64

1 unit → 16

So, the original number = 7 × 16 = 112

15. If 930 is added in a number then number becomes $444\frac{4}{9}\%$ of itself. Find the original number.

Sol. $444\frac{4}{9}\% = \frac{40}{9}$

$$444\frac{4}{9} = 400\% + 44\frac{4}{9}\%$$
$$= 4 + \frac{4}{9} = \frac{40}{9}$$
$$\text{and } 9 \times 444\frac{4}{9}\% = 40$$

Original number 9 unit → Formed number 40 unit

+ 31unit → 930

1 unit → 30

So, the original number = 9 × 30 = 270

16. The price of a commodity rise from ` 6 per kg to ` 7.50 per kg. If the expenditure cannot increase the percentage of reduction in consumption is

Sol. Percentage increase

$$= \frac{7.50 - 6}{6} \times 100 = 25\%$$

$100 \xrightarrow{+25\%} 125$, $125 \xrightarrow{-25} 100$

\ Percentage decrease in consumption

$$= \frac{25}{125}' 100 = 20\%$$

17. If the length of a rectangle is increased by $37\frac{1}{2}\%$ and its breadth is decreased by 20%. Find the % change in the area.

Sol.

Length	×	Breadth	=	Area	
8	×	5	=	40	+4
11	×	4	=	44	

$\left[37\frac{1}{2}\% = \frac{3}{8}\right]$ $\left[20\% = \frac{1}{5}\right]$

% change in Area = $\frac{4}{40} \times 100$

= 10%

18. If the sides of a square is increased by 40%. Find the % change in its area.

Sol.

Side	Area $(\text{Side})^2$	
5	25	+24
7	49	

$\left[40\% = \frac{2}{5}\right]$

% change in Area = $\frac{24}{25} \times 100 = 96\%$

19. The price of sugar is increased by $16\frac{2}{3}\%$ and; the consumption of a family is decreased by 20%. Find the % change in his expenditure.

Sol.

	Price		Consumption		Expenditure	
$\left[16\frac{2}{3}\% = \frac{1}{6}\right]$	6	×	5	=	30	−2
	7	×	4	=	28	

% change in his expenditure

$$= \frac{2}{30} \times 100 = 6\frac{2}{3}\%$$

20. The sale of a cinema ticket is increased by $57\frac{1}{7}\%$ and the price of ticket is increased by $16\frac{2}{3}\%$. Find the % change in his revenue.

Sol.

Sale		Price			
7	×	6	=	42	+35
11	×	7	=	77	

$57\frac{1}{7}\% = \frac{4}{7}$, $16\frac{2}{3}\% = \frac{1}{6}$

% Change in his revenue

$$\Rightarrow \frac{35}{42} \times 100 \Rightarrow 83\frac{1}{3}\%$$

21. If one of the sides of a rectangle is increased by 20% and the other is increased by 5%. Find the percent value by which the area changes.

Sol. Area of rectangle = Length × Breadth

Length +20% = $\frac{1}{5}$

Breadth +5% = $\frac{1}{20}$

L		B		Area	
5	×	20	=	100	26
6	×	21	=	126	

Required%= $\frac{26}{100} \times 100$

= 26%↑ (Increase)

22. If one of the sides of rectangle increased by $37\frac{1}{2}\%$ and the other is decreased by 20% find the percent value by which area changes.

Sol. Area = Length × Breadth

Length = $+37\frac{1}{2}\% = \frac{3}{8}$

Breadth = $-20\% = \frac{1}{5}$

L		B		Area	
8	×	5	=	40	4
11	×	4	=	44	

Required % = $\frac{4}{40} \times 100 = 10\%$↑ (Increase)

23. A number is first reduced by 20% and then it is increased by 80%. What was the net effect?

Sol. $-20\% = \frac{-1}{5}$, 5 4

$+80\% = \frac{+4}{5}$, $\frac{5}{25}$ $\frac{9}{36}$, +11

Required % = $\frac{11}{25} \times 100$

= 44% (Increase)

24. The tax imposed on an article

is increased by 10% and its consumption decreased by 10%. Find the percentage change in revenue from it.

Sol. I $+10\% = \frac{1}{10}$, 10 11

II $-10\% = \frac{1}{10}$, $\frac{10}{100}$ $\frac{9}{99}$

-1

Required % = $\frac{1}{100} \times 100$

= 1% (decrease)

25. Two numbers are respectively 20% and 50% more than a third. Now what percentage is the first of the second?

Sol. Let the third number be = 100

I	II	III
120	150	100

Then, $\frac{120}{150} \times 100 = 80\%$

Exercise

1. Student A scores 20 marks in an examination out of 30 while another student B scores 40 marks out of 70. Who has performed better ?
   (a) A (b) B
   (c) A = B
   (d) Can't be determined
2. Company A increases its sales by 1 crore rupees while company B increases its sales by 10 crore rupees. Which company has more percentage growth?
   (a) A (b) B
   (c) Both have same growth rate
   (d) Can't be determined
3. The population of a city grew from 20 lakh to 22 lakh. Find the percentage change based on the final value of population.
   (a) $9\frac{1}{11}\%$ (b) 8%
   (c) 9% (d) 10%
4. A sells his goods 30% cheaper than B and 30% dearer than C. By what percentage is the cost of C's goods cheaper than B's goods.
   (a) 46.15% (b) 47.15%
   (c) 67% (d) 67.15%
5. The length and the breadth of a rectangle are changed by + 20% and by –10% respectively. What is the percentage change in the area of the rectangle.
   (a) 8% increase
   (b) 8% decrease
   (c) 10% increase
   (d) None of these
6. Due to a 25% price high in the price of rice, a person is able to purchase 20 kg less of rice for Rs. 400. Find the initial price.
   (a) 4 Rs/kg (b) 5 Rs/kg
   (c) 8 Rs/kg (d) None of these
7. A's salary is 20% lower than B's salary, which is 15% lower than C's salary. By how much percent is C's salary more than A's salary?
   (a) $47\frac{1}{7}\%$ (b) $48\frac{1}{7}\%$
   (c) $47\frac{2}{7}\%$ (d) None of these
8. The cost of manufacture of an article is made up of four components A, B, C and D which have a ratio of 3 : 4 : 5 : 6 respectively. If there are respective changes in the cost of +10%, –20%, –30%, and +40%, then what would be the percentage change in the cost.
   (a) $2\frac{2}{9}\%$ (b) $3\frac{2}{9}\%$
   (c) 4% (d) $1\frac{2}{9}\%$
9. Rakesh Yadav receives an inheritance of a certain amount from his grandfather. Of this he loses 32.5% in his effort to produce a film. From the balance, a taxi driver stole the sum of Rs. 1,00,000 that he used to keep in his pocket. Of the rest, he donated 20% to a charity. Further he purchases a flat in Ganga Apartment for Rs. 7.5 lakh. He then realises that he is left with only Rs. 2.5 lakh cash of his inheritance. What was the value of his inheritance ?
   (a) 25 lakh (b) 22.5 lakh
   (c) 20 lakh (d) 18 lakh
10. What is 20% of 50% of 75% of 70?
    (a) 5.25 (b) 6.75
    (c) 7.25 (d) 5.5
11. If we express $41\frac{3}{17}\%$ as a fraction, then it is equal to
    (a) $\frac{17}{7}$ (b) $\frac{7}{17}$
    (c) $\frac{12}{17}$ (d) $\frac{3}{17}$
12. Mr. Rakesh Yadav is worried about the balance of his monthly budget. The price of petrol has increased by 40%. By what percent should he reduce the consumption of petrol so that he is able to balance his budget?
    (a) 33.33 (b) 28.56
    (c) 25 (d) 14.28
13. In Question 12, if Rakesh Yadav wanted to limit the increase in his expenditure to 5% on his basic expenditure on petrol, then what should be the corresponding decrease in consumption.
    (a) 33.33 (b) 28.56
    (c) 25 (d) 20

14. Ram sells his goods 25% cheaper than Shyam and 25% dearer than Balram. How much percentage is Balram's goods cheaper than Shyam's ?
(a) 33.33% (b) 50%
(c) 66.66% (d) 40%

15. In an election between 2 candidates, Rakesh Yadav gets 65% of the total valid votes. If the total votes were 6000, what is the number of valid votes that the other candidate Bhuvnesh gets, if 25% of the total votes were declared invalid ?
(a) 1625 (b) 1575
(c) 1675 (d) 1525

16. In a medical certificate, by mistake a candidate gave his height as 25% more than normal. In the interview pannel, he clarified that his height was 5 feet 5 inches. Find the percentage correction made by the candidate from his stated height to his actual height.
(a) 20% (b) 28.56%
(c) 25% (d) 16.66%

17. Arjit Sharma generally wears his father's coat. Unfortunately, his cousin Shaurya poked him one day that he was wearing a coat of length more than his height by 15%. If the length of Arjit's father's coat is 120 cm then what should be the actual length of the his coat.
(a) 105 (b) 108
(c) 104.34 (d) 102.72

18. A number is mistakenly divided by 5 instead of being multiplied by 5. Find the percentage change in the result due to this mistake.
(a) 96% (b) 95%
(c) 2400% (d) 200%

19. The price of an item is increased by 20 % and then decreased by 20 %. The final price as compared to original price is:
(a) 20 % less (b) 20 % more
(c) 4 % more (d) 4 % less

20. 50% of a% of b is equal to 75% of b% of c. Which of the following is c?
(a) 1.5a (b) 0.667a
(c) 0.5a (d) 1.25a

21. The length, breadth and height of a room in the shape of a cuboid are increased by 10%, 20% and 50% respectively. Find the percentage change in the volume of the cuboid.
(a) 77% (b) 75%
(c) 88% (d) 98%

22. The price of sugar is reduced by 25% but inspite of the decrease, Aayush ends up increasing his expenditure on sugar by 20%. What is the percentage change in his monthly consumption of sugar ?
(a) +60% (b) –10%
(c) +33.33% (d) 50%

23. When 60% of number A is added to another number B, B becomes 175% of its previous value. Then which of the following is true regarding the values of A and B ?
(a) A > B (b) B > A
(c) B ≥ A
(d) either (a) or (b) can true depending upon the values of A and B

24. In an election, the candidate who got 56% of the votes cast won by 144 votes. Find the total number of voters in the voting list if 80% people cast their vote and there were no invalid votes.
(a) 360 (b) 720
(c) 1800 (d) 1500

25. The population of a village is 1,00,000. The rate of increase is 10% per annum. Find the population at the start of the third year.
(a) 1,33,100 (b) 1,21,000
(c) 1,18,800 (d) 1,20,000

26. The population of the Mukherjee Nagar is 10,000 at this moment. It increases by 10% in the first year. However, in the second year, due to immigration, the population drops by 5%. Find the population at the end of the third year if in the third year the population increases by 20%.
(a) 12,340 (b) 12,540
(c) 1,27,540 (d) 12,340

27. Rakesh Yadav invests Rs. 10,000 in some shares in the ratio 2 : 3 : 5 which pay dividends of 10%, 25% and 20% (on his investment) for that year respectively. Find his dividend income.
(a) 1900 (b) 2000
(c) 2050 (d) 1950

28. In an examination, Rakesh Yadav obtained 20% more than Bhuvnesh but 10% less than Pawan. If the marks obtained by Bhuvnesh is 1080. find the percentage marks obtained by Pawan if the full marks is 2000.
(a) 86.66% (b) 72%
(c) 78.33% (d) 77.77%

29. In a class, 25% of the students were absent for an exam. 30% failed by 20 marks and 10% just passed because of grace marks of 5. Find the average score of the class if the remaining students scored an average of 60 marks and the pass marks are 33 (conunting the final scores of the candidates).
(a) 37.266 (b) 37.6
(c) 37.8 (d) 36.93

30. Rakesh Yadav spends 20% of his monthly income on his houshold expenditure, 15% of the rest on books, 30% of the rest on clothes and saves the rest. On counting, he comes to know that he has finally saved Rs. 9520. Find his monthly income.
(a) 10000 (b) 15000
(c) 20000 (d) 12000

31. Rakesh Yadav and Bhuvnesh have salaries that jointly amount to Rs. 10,000 per month. They spend the same

amount monthly and then it is found that the ratio of their savings is 6 : 1. Which of the following can be Rakesh Yadav's salary ?

(a) Rs 6000 (b) Rs 5000

(c) Rs 4000 (d) Rs 3000

32. The population of a village is 5500. If the number of males increase by 11% and the number of females increases by 20% then the population becomes 6330. Find the population of females in the town.

(a) 2500 (b) 3000

(c) 2000 (d) 3500

33. Bhuvnesh's salary is 75% more than Saurabh's. Bhuvnesh got a raise of 40% on his salary while Saurabh got a raise of 25% on his salary. By what percent is Bhuvnesh's salary more than Saurabh's ?

(a) 96% (b) 51.1%

(c) 90% (d) 52.1%

34. Last year, the Indian cricket team played 40 one day cricket matches out of which they managed to win only 40%. This year, so far it has played some matches, which has made it mandatory for it to win 80% of the remaining matches to maintain its existing winning percentage. Find the number of mathes played by India so far this year.

(a) 30 (b) 25

(c) 28

(d) Insufficient Information

35. In the recent, climate conference in New York, out of 700 men, 500 women, 800 children present inside the building premises, 20% of the men, 40% of the women and 10% of the children were Indians. Find the percentage of people who were not Indian.

(a) 73% (b) 77%

(c) 79% (d) 83%

36. A cow and a calf cost Rs. 2000 and Rs. 1400 respectively. If the price of the cow and that of the calf is increased by 20% and 30% respectively then the price of 1 dozen cows and 2 dozen calves is:

(a) 72,480 (b) 71,360

(c) 74,340 (d) None of these

37. During winters, an athlete can run 'x' meters on one bottle of Glucose. But in the summer, he can only run $0.5x$ meters on one bottle of Glucose. How many bottles of Glucose are required to run 400 meters during summer ?

(a) $800/x$ (b) $890/x$

(c) 96 (d) $454/x$

38. Out of the total production of iron from hemetite, an ore of iron, 20% of the ore gets wasted, and out of the remaining ore, only 25% is pure iron. If the pure iron obtained in a year from a mine of hematite was 80,000 kg, then the quantity of hematite mined from that mine in the year is

(a) 5,00,000 kg

(b) 4,00,000 kg

(c) 4,50,000 kg

(d) None of these

39. A man buys a truck for Rs. 2,50,000. The annual repair cost comes to 2.0% of the price of purchase. Besides, he has to pay an annual tax of Rs. 2000. At what monthly rent must he rent out the truck to get a return of 15% on his net investment of the first year ?

(a) Rs 3350 (b) Rs 2500

(c) Rs 4000 (d) Rs 3212.50

40. Recently, while shopping in Mukherjee Nagar, Delhi, I came across two new shirts selling at a discount. I decided to buy one of them for my little boy Sherry. The shopkeeper offered me the first shirt for Rs. 42 and said that it usually sold for 8/7 of that price. He then offered me the other shirt for Rs. 36 and said that it usually sold for 7/6th of that price. Of the two shirts which one do you think is a better bargain and what is the percentage discount on it ?

(a) First shirt, 12.5%

(b) second shirt, 14.28%

(c) Both are same

(d) None of these

41. 4/5th of the voters in Delhi promised to vote for Rakesh Yadav and the rest promised to vote for Bhuvnesh. Of these voters, 10% of the voters who had promised to vote for Rakesh Yadav did not vote on the election day, while 20% of the voters who had promised to vote for Bhuvnesh did not vote on the election day. What is the total number of votes polled if Rakesh Yadav got 216 votes ?

(a) 200 (b) 300

(c) 264 (d) 100

42. In an examination, 80% students passed in Physics, 70% in Chemistry while 15% failed in both the subjects. If 325 students passed in both the subjects. Find the total number of students who apperared in the examination.

(a) 500 (b) 400

(c) 300 (d) 600

43. Rakesh Yadav spends 30% of his salary on house rent, 30% of the rest he spends on his children's education and 24% of the total salary he spends on clothes. After his expenditure, he is left with Rs. 2500. What is Rakesh Yadav's salary ?

(a) Rs 11,494.25

(b) Rs. 20,000

(c) Rs 10,000

(d) Rs.15,000

44. The entrance ticket at the Batra cinema in Delhi is worth Rs. 250. When the price of the ticket was lowered, the sale of tickets increased by 50% while the collection recorded a decrease of 17.5%. Find the deduction in the ticket price
(a) Rs 150 (b) Rs. 112.5
(c) Rs 105 (d) Rs. 120

45. Rakesh Yadav's monthly salary is A rupees. Of this , he spends X rupees. The next month he has an increase of C% in this salary and D% in his expenditure. The new amount saved is:
(a) A(1+C/100) – X (1+D/100)
(b) (A/100) (C – (D) X (1+D/100)
(c) X(C – (D)/100
(d) X(C + D)/100

46. In the year 2000, the luxury car industry had two car manufactures – Maruti and Honda with market shares of 25% and 75% respectively. In 2001, the overall market for the product increased by 50% and a new player BMW also entered the market and captured 15% of the market share. If we know that the market share of Maruti increased to 50% in the second year, the share of Honda in that year was:
(a) 50% (b) 45%
(c) 40% (d) 60%

47. Ambani, a very clever businessman, started off a business with very little capital, In the first year, he earned a profit of 50% and donated 50% of the total capital (initial capital + profit) to a charitable organisation. The same course was followed in the 2nd and 3rd years also. If at the end of three years, he is left with Rs. 16,875, then find the amount donated by him at the end of the 2nd year.
(a) Rs 45,000 (b) Rs 12,500
(c) Rs 22,500 (d) Rs 20,000

48. In an examination, 48% students failed in Hindi and 32% students in History, 20% students failed in both the subjects. If the number of students who passed the examination was 880, how many students appeared in the examination if the examination consisted only of these two subjects ?
(a) 2000 (b) 2200
(c) 2500 (d) 1800

49. At IIM Bangalore, 60% of the students are boys and the rest are girls. Further 15% of the boys and 7.5% of the girls are getting a fee waiver. if the number of those getting a fee waiver is 90, find the total number of students getting 50% concession if it is given that 50% of those not getting a fee waiver are eligible to get half fee concession?
(a) 360 (b) 280
(c) 320 (d) 330

50. A machine depreciates in value each year at the rate of 10% of its previous value. However, every second year there is some maintenance work so that in that particular year, depreciation is only 5% of its previous value. If at the end of the fourth year, the value of the machine stands at Rs. 1,46,205, then find the value of machine at the start of the first year.
(a) Rs 1,90,000
(b) Rs 2,00,000
(c) Rs 1,95,000
(d) Rs 2,10,000

Solution

1. (a) % Marks score by the student A

$= \frac{20}{30} \times 100 = 66\frac{2}{3}\%$

% Marks score by the student B

$= \frac{40}{70} \times 100 = 57\frac{1}{7}\%$

Now it is clear that the performance of A is better.

Alternatively → (a)

	Marks Score	Out of
A →	$20_{\times 7}$	30 — 7 — 210
B →	$40_{\times 3}$	70 — 3 — 210

Note:- Equal the out of marks then we can directly analyse the performance.

Marks	Score	Out of
A →	140	210
B →	120	210

Now we can say performance of A is better.

2. (d) Apparently, the answer to the question seems to be company B. The question can not be answered since we don't know the previous year's sales figure.

3. (d) Percentage change based on the final value

$= \frac{2}{20} \times 100 = \frac{100}{10}\% = 10\%$

4. (a) Let the price of B = Rs. 100

Now According to the question :-

A	:	B	:	C
70	:	100	:	$\frac{700}{13}$

Note:- Make the ratios in such a way that can not generate fractions:

∴ Multiply 13 in all ratios.

A	:	B	:	C
910	:	1300	:	700

The percentage by which C's price is cheaper than B's price $= \frac{(1300 - 700)}{1300} \times 100$

$= \frac{600}{13} = 46.15\%$

5. (a) Let

	Length	×	Width	= Area
Old	10		10	= 100
	+20%		–10%	
New	12		9	= 108

Increased in Area = 108 – 100 = 8

% increased $= \frac{8}{100} \times 100 = 8\%$ Ans.

Alternatively →

Note:- In such type of questions we can use the below given formula.

$\left[X + Y + \frac{XY}{100}\right]$ $\quad$ $\begin{bmatrix} + \text{ Shows increase} \\ - \text{ Shows decrease} \end{bmatrix}$

Change in area = $20 - 10 - \frac{20 \times 10}{100} = 8\%$

Sign is +ve so increase in area = <u>8%</u>

6. (a) According to the question :-

Rise in the price = 25%

% Reduction in consumption = $\frac{25}{125} \times 100 = 20\%$

But actual reduction in consumption = 20kg

∴ 20% = 20 kg

$1\% = \frac{20}{20}$ kg

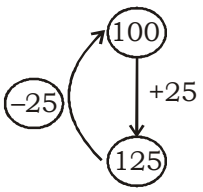
original consumption (100%) $= \frac{20}{20} \times 100$

$=$ <u>100 kg</u>

Money spent = 400 Rs (Given)

Original price = $\frac{400}{100}$ = <u>Rs 4/kg</u>

Alternatively:- Let the expenditure = 100 Rs



$\Rightarrow \frac{25}{125} = \frac{1}{5} = \frac{4 \rightarrow \text{New}}{5 \rightarrow \text{Original}}$

1 unit → 20 kg

Original consumption = 20 × 5 = 100 kg
New consumption = 4 × 20 = 80 kg

Original price of the rice = $\frac{400}{100}$ = Rs 4/kg

7. (a) **Note :-** In such type of question try to make ratio between all the given variables.

	A	:	B	B	:	C	
Ratio of Salary →	4	:	5	17	:	20	–20% = $\frac{1}{5}$, 15% = $\frac{3}{20}$

Combine the ratio of salary :-

A : B ⇒ 4 : 5
B : C ⇒ 17 : 20
A : B : C
Ratio → 68 : 85 : 100

C's salary more than A = $\frac{(100-68)}{68}\times 100$

= $\frac{32}{68}\times 100$ = $\frac{8}{17}\times 100$ = $\frac{800}{17}$ = $47\frac{\mathbf{1}}{\mathbf{17}}\%$

8. (a) **Note :-** In such type of questions assume any value but ratio should not be changed.

	A	:	B	:	C	:	D
Old cost →	300	:	400	:	500	:	600
	↓ +10%		↓ –20%		↓ –30%		↓ +40%
New cost →	330		320		350		840

Total old cost = (300+400+500+600) = 1800 Rs.
Total New cost = (330+320+350+840) = 1840 Rs.

% Change = $\frac{(1840-1800)}{1800}\times 100$ = $\frac{40}{18}$ = $2\frac{\mathbf{2}}{\mathbf{9}}\%$

9. (c) Let the inheritance value Recieved by Rakesh Yadav = x

According to the question:-

$\left[x\times\frac{(100-32.5)}{100}-100000\right]\times\frac{80}{100}$

= (750000 + 250000)

$\left[x\times\frac{67.5}{100}-100000\right]\times\frac{80}{100}$ = 1000000

x = 2000000, x = 20 Lakh

Alternatively-

Note:- These type of problems should either be solved through the reverse process or through options.

Option (c):- Total value of inheritance = 20 lakh
According to the question:-

20 lakh $\xrightarrow{-32.5\%}$ 13.5 Lakh $\xrightarrow{-1\text{ Lakh}}$ 12.5 Lakh
2.5 Lakh ← $\xleftarrow{-7.5\text{ Lakh}}$ 10 Lakh ← –20%

Same as mention in question.
So option (c) is correct.

10. (a) Value = $70\times\frac{1}{5}\times\frac{1}{2}\times\frac{3}{4}$ = $\frac{21}{4}$ = 5.25

11. (b) $41\frac{3}{17}\%$ = $\left(\frac{697+3}{17}\right)\frac{1}{100}$ = $\frac{700}{17\times 100}$

= $\left[\frac{\mathbf{7}}{\mathbf{17}}\right]$

12. (b) Note → (1) If the price of a commodity increases by r %, then the reduction in consumption so as not to increase the expenditure is

= $\left[\frac{r}{(100+r)}\times 100\right]\%$

(2) If the price of a commodity decreases by r% then increase in consumption, so as not to decrease expenditure on this item is

= $\left[\frac{r}{(100-r)}\times 100\right]\%$

Use above these two methods to save your valuable time.

% Reduction in consumption = $\frac{40}{(100+40)}$

= $\frac{40}{140}\times 100$ = $\frac{400}{14}$ = $\frac{200}{7}$ = 28.57%

13. (c) Let the expenditure = 100 Rs.
After increase of 40% = 140 Rs.
According to the question,
Increase in expenditure should be only 5%= 105

% Reduction = $\frac{(140-105)}{140}\times 100$

% Reduction = $\frac{35}{140}\times 100$ = 25%

14. (d)

	Ram	:	Shayam	Ram	:	Bram
$\therefore\left[25\% = \frac{1}{4}\right]$	3	:	4	5	:	4

Note :- The price of Ram's goods should be equal in both cases. So equal the prices.

Ram	:	Shyam	:	Bram
15	:	20	:	12

% Bram's goods cheaper than Shyam's

$= \frac{(20-12)}{20}\times 100 = 40\ \%$

15. (b) Let the total number of valid votes get by Bhuvnesh = x

According to the question:-

$x = 6000\times\frac{75}{100}\times\frac{100-65}{100} = 6000\times\frac{75}{100}\times\frac{35}{100}$

x = 1575

16. (a) **Note :-** We can assume any value as the height of the candidate to save your valuable time.

Let height = $4x$ feet

After increament = $4x\times\frac{125}{100} = 5x$ feet

% reduction in height to get original value

$= \frac{(5x-4x)}{5x}\times 100$ = 20 %

17. (c) Actual length of Arjit's coat = $\frac{120}{115}\times 100$

= 104.34 cm

18. (a) Let the number = 5

According to the question:-

Case (I):- On dividing

New number (N_1) = $\frac{5}{5}$ = 1

Case (II):- On multiplication

New number (N_2) = 5×5 = 25

% change in result = $\frac{(25-1)}{25}\times 100$ = 96%

19. (d) Let original price = 100

$\therefore$ First new price = 120

& Final price = 80 % of 120 = 96

$\therefore$ Final price is 4 % less than the original price.

20. (b) $\frac{1}{2}\times\frac{a}{100}\times b = \frac{3}{4}\times\frac{b}{100}\times c$

$\frac{a}{2} = \frac{3}{4}c \Rightarrow a = \frac{3}{2}c$

$c = \frac{2}{3}a = 0.667a$

21. (d)

	Old	New
Length →	10	11
Breadth→	5	6
Height →	2	3
Volume →	100	198

+98

% Change in volume = $\frac{98}{100}\times 100$ = 98%

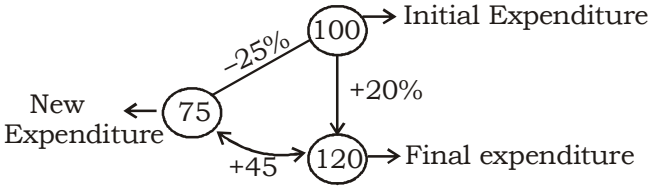
Alternatively : -

Let initial volume = 100

New volume = $100\times\frac{110}{100}\times\frac{120}{100}\times\frac{150}{100}$

%change = 98%

22. (a) Let the initial expenditure = 100



% change in consumption = $\frac{(120-75)}{75}\times 100$

= $\frac{45}{75}\times 100$ = 60%

23. (d) According to the question :-

60% A + B = 175% B

$\frac{3}{5}$ A + B = $\frac{7}{4}$ B

$\frac{3}{5}$ A = $\frac{3B}{4}$

$\frac{A}{5} = \frac{B}{4}$

A : B = 5 : 4

Apparently it seems that A is bigger, but if you consider A and B to be negative the opposite would be true.

Hence option (d) is correct.

24. (d) Let the total number of votes = x

According to the question :-

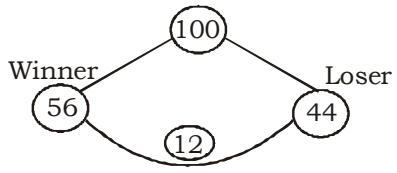
$x\times\frac{80}{100}\times\frac{12}{100} = 144$

$x = \frac{144 \times 100 \times 100}{80 \times 12} = 1500$

Total votes = 1500

Alternatively :-

(d) Let the cast votes = 100



12 units = 144

1 unit = 12

Total cast votes = 12×100 = 1200

According to the question :-

Total number of votes = $\frac{1200}{80} \times 100 = 1500$

25. (b) 10% = $\frac{1}{10}$

	Old population	New population
Ist year	10	11
IInd Year	$\frac{10}{100}$	$\frac{11}{121}$

According to the question:-

100 units = 100,000

1 unit = 1000

121 units = 121 × 1000 = 121,000

Alternatively:-

(b) Let the population at the start of the third year = x

$x = 100{,}000 \times \frac{110}{100} \times \frac{110}{100}$

$x = 121{,}000$

26. (b) The population of Mukherjee Nagar = 10,000

New population = $10{,}000 \times \frac{110}{100} \times \frac{95}{100} \times \frac{120}{100}$

= 12,540

Alternatively :- (b)

		Old	New
(+10%)	Ist year	10	11
(–5%)	IInd year	20	19
(20%)	IIIrd year	$\frac{5}{1000}$	$\frac{6}{1254}$

According to the question :-

1000 units = 10000

1 unit = 10

Total New population = 1254×10 = 12540

27. (d) Ratio of shares = $2x : 3x : 5x$

According to the question,

$(2x + 3x + 5x) = 10{,}000$

$10x = 10{,}000$

$x = 1000$

Ist share = 2×1000 = 2000 Rs.

IInd share = 3×1000 = 3000 Rs.

IIIrd share = 5×1000 = 5000 Rs.

Divident income

$= \frac{2000 \times 10}{100} + \frac{3000 \times 25}{100} + \frac{5000 \times 20}{100}$

= 200 + 750 + 1000 = 1950

28. (b) 20% = $\frac{1}{5}$, 10% = $\frac{1}{10}$

According to the question :-

	Rakesh Yadav : Bhuvnesh	Rakesh Yadav : Pawan
Marks →	6 : 5	9 : 10

Marks of Rakesh Yadav will be equal in both cases.

	Rakesh Yadav : Bhuvnesh : Pawan
Ratio of marks:-	18 : 15 : 20
	↓ × 72
	1080

Marks obtained by Pawan = 20×72 = 1440

% marks = $\frac{1440}{2000} \times 100 = 72\%$

29. (b) Passing marks = 33 [Given]

Let the total number of Students = 100

According to the question:-

avg. = $\frac{30 \times (33 - 20) + 10 \times 33 + 35 \times 60}{100}$

avg. = $\frac{30 \times 13 + 330 + 2100}{75}$

$= \frac{390 + 330 + 2100}{75} = 37.6$

30. (c) Let the monthly income of Rakesh Yadav = Rs x.

According to the question :-

$x \times \frac{80}{100} \times \frac{85}{100} \times \frac{70}{100} = 9520$

x = 20,000

Monthly income of Rakesh Yadav = Rs. 20,000

31. (a) The only logic for this question is that Rakesh Yadav's salary would be more than Bhuvnesh' salary. Thus, only option (a) is possible for Rakesh Yadav's salary.

32. (a) population of the village = 5500

After increament new population of the village = 6330

$$\% \text{ increment} = \frac{(6330-5500)}{5500}\times 100$$

$$= \frac{830}{55} = \frac{166}{11}\%$$

Male% : Female%

11% 20 %

$\frac{166}{11}\%$

Ratio of Male & Female $\rightarrow \left(\frac{166}{11}-11\right) : \left(20-\frac{166}{11}\right)$

6 : 5 = 11

According to the question:-

11 units = 5500

1 unit = 500

Number of females = 500×5 = 2500

33. (a) **Bhuvnesh : Saurabh**

Ratio of salary = 700 : 400

$$\left[75\% = \frac{3}{4}\right]$$

Note :- Assume any value of salaries which can not make fractions but remember one thing ratio should not be changed.

According to the question:-

	Bhuvnesh	:	Saurabh
Old salary →	700	:	400
	↓ +40%		↓ +25%
New salary →	980		500
	+480		

Percent of Bhuvnesh's salary more than Saurabh's salary = $\frac{480}{500}\times 100 = \frac{480}{5} = 96\%$

34. (d) The data is in-sufficient since the number of matches to be played by India this year is not given. (You can not assume that they will play 40 Matches).

35. (c)

	men	:	**women**	:	**children**
	700	:	500	:	800
	↓ 80%		↓ 60%		↓ 90%
Not Indian →	560		300		720

Total people inside the premises

= (700+500+800) = 2000

Total people who were not Indian = 560 + 300+720 = 1580

% people who were not Indian = $\frac{1580}{2000}\times 100 = 79\%$

36. (a)

	1 Cow:	1 Calf
Old Cost →	2000 :	1400
	↓ +20%	↓ +30%
New Cost →	2400	1820

According to the question :-

Price of 1 dozen cows = 2400×12 = 28800

Price of 2 dozen calves = 1820×24 = 43680

Total cost = 28800+43680 = Rs. 72,480

37. (a) According to the question :-

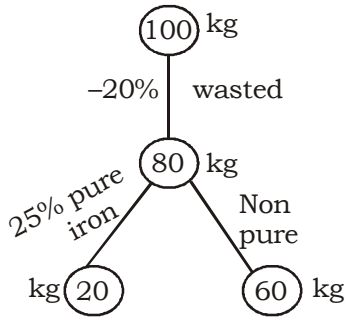
$0.5x$ metres = 1 bottle

1 metre = $\frac{1}{0.5x}$ bottle

400 metres = $\frac{1}{0.5x}\times 400 = \frac{800}{x}$ bottles

38. (b) Let the total quantity of hematite mined =100 kg.

According to the question:-



∴ 20 units = 80,000 kg

1 unit = 4,000 kg

Total hematite = 100 × 4000 = 4,00,000 kg

39. (d) The total cost of truck for a year =

$$2{,}50{,}000 + \frac{250{,}000\times 2}{100} + 2000 = \text{Rs.}257000$$

To get a return of 15% he must earn annualy

$$= \frac{257000\times 15}{100} = \text{Rs. } 38550$$

Hence, monthly rent = $\frac{38550}{12}$ = Rs. 3212.50

40. (b) Note :- In such type of question no need to calculate actual Market price and selling price. We can simply calculate the ratio on the basis of given

fractions to save our valuable time.

According to the question:-

Condition (I) :- Let Market price = 8 Rs.

$\therefore$ Selling price = $8 \times \frac{7}{8}$ = 7 Rs

% Discount = $\frac{(8-7)}{8} \times 100 = 12\frac{1}{2}\%$

Condition (II) :- Similarly

Selling price : Market Price

6 : 7

% Discount = $\frac{1}{7} \times 100 = 14\frac{2}{7}\%$

Hence, the second shirt is a better bargain.

41. (c) Let the total number of voters = 500

Voters who vote for Rakesh Yadav = $500 \times \frac{4}{5}$

= 400

Voters who vote for Bhuvnesh = (500 – 400) = 100

Rakesh Yadav	:	**Bhuvnesh**
400	:	100
↓ 10%		↓ 20%
[40]		[20]

Remaining Voters who voted = (500 – 60) = 440

Vote got by Rakesh Yadav = (400 – 40) = 360

According to the question:-

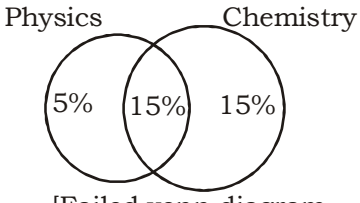
360 units = 216

1 unit = $\frac{216}{360}$

440 units = $\frac{216}{360} \times 440 = 264$

$\therefore$ Total votes polled = 264

42. (a)



[Failed venn diagram of students]

Total failed students = 5+15+15 = 35%

$\therefore$ Total passed students = (100 – 35) = 65%

According to the question,

65% = 325

1 % = $\frac{325}{65}$

Total students (100%) = $\frac{325}{65} \times 100 = 500$

Total number of students appeared in the examination = 500

43. (c) Let the total salary of Rakesh Yadav =100 units

Salary spent on house rent

= $\frac{100 \times 30}{100}$ = 30 units

Remaining salary = (100 – 30) = 70 units

Salary spent on children's education

= $\frac{70 \times 30}{100}$ = 21 units

Salary spent on clothes = $100 \times \frac{24}{100}$ = 24 units

Remaining salary = (100) – (30+21+24) = 25 units

According to the question :-

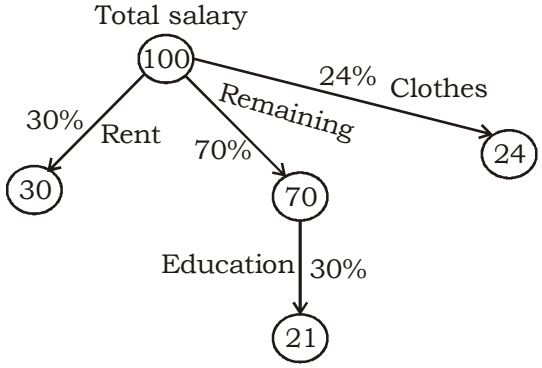
25 units = 2500 Rs

1 unit = $\frac{2500}{25}$ = 100 Rs

100 units = 100×100 = 10000 Rs.

Total salary of Rakesh Yadav = 10000 Rs.

Alternatively :-



Total spend money = 30+21+24 = 75

Remaining salary = (100 – 75) = 25

According to the question :-

25 $\rightarrow$ 2500

1 $\rightarrow$ $\frac{2500}{25}$

Total salary = $100 \times \frac{2500}{25}$ = 10,000 Rs.

44. (b) Ticket price × no. of people = total collection

$$\begin{matrix} 100 & \times 100 & = & 10000 \text{ Rs.} \\ & \overset{+50\%}{\searrow} & & \overset{-17.5\%}{\searrow} \\ x & \times 150 & = & 8250 \text{ Rs.} \end{matrix}$$

$$x = \frac{8250}{150} = 55 \text{Rs.}$$

% difference of ticket's price

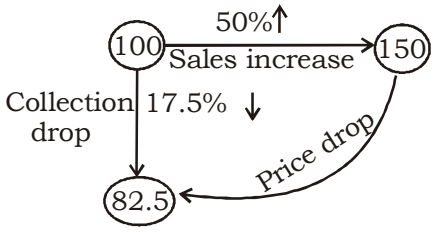
$$= \frac{100 - 55}{100}, \ 100 = 45\%$$

Now actual lowed price = $250 \times \frac{45}{100} = 112.5$

Alternate:-

According to the question :-

Final sales figure :-



Required price drop = $\frac{(150 - 82.5)}{150} = \frac{67.5}{100} = 45\%$

Required value = $250 \times \frac{45}{100}$ = Rs.112.5

45. (a) Rakesh Yadav's monthly salary = A Rs.

Expenditure = X Rs.

Note :- [Savings = Income – expenditure]

According to the question :-

New salary after increment = $\frac{A(100+C)}{100}$

New expenditure after increament

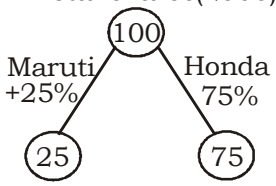
$$= \frac{X(100+D)}{100}$$

Savings = $\frac{A(100+C)}{100} - \frac{X(100+D)}{100}$

$$= A\left(1+\frac{C}{100}\right) - X\left(1+\frac{D}{100}\right)$$

46. (d) Let the total Market shares in 2000 = 100

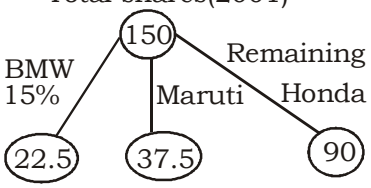
Total shares(2000)



According to the question:-

New market share in 2001 = $100 \times \frac{150}{100} = 150$

Total shares(2001)



Maruti Shares = $25 \times \frac{150}{100}$ = 37.5

% share of Honda = $\frac{90}{150} \times 100$ = 60 %

47. (c) Let the initial capital of the businesman = Rs.100

Profit = $100 \times \frac{50}{100}$ = Rs.50

Total capital = (100 + 50) = Rs. 150

Donation given = $150 \times \frac{50}{100}$ = Rs. 75

Remaining Capital after Donation = (150 – 75)

= Rs. 75

	Initial Capital	:	Donation
	100	:	75
First year →	4	:	3
II[nd] year →	4	:	3
III[rd] year →	4	:	3
	64		27
	↓ ×625		↓ ×625
	[40,000]		[16875]

Capital for second year = 4 × 4 = 16

Donation for second year = 3 × 3 = 9

∴ 16 units = Rs.40,000

1 unit = 2500

Total donation = 2500×9 = Rs. 22500

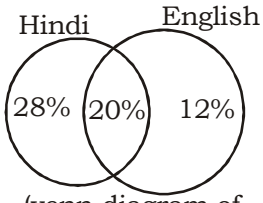
Alternatively :-

Let the capital = x

$$x \underbrace{\left(\frac{150}{100} \times \frac{50}{100}\right)}_{I^{st} \text{ year}} \underbrace{\left(\frac{150}{100} \times \frac{50}{100}\right)}_{II^{nd} \text{ year}} \underbrace{\left(\frac{150}{100} \times \frac{50}{100}\right)}_{III^{rd} \text{ year}} = 16{,}875$$

$$x \underbrace{\left(\frac{150}{100}\times\frac{50}{100}\right)}_{I^{st}\text{ year}} \underbrace{\left(\frac{150}{100}\times\frac{50}{100}\right)}_{II^{nd}\text{ year}} = 22{,}500$$

48. (b) Students failed in Hindi = 48%
Students failed in History = 32%



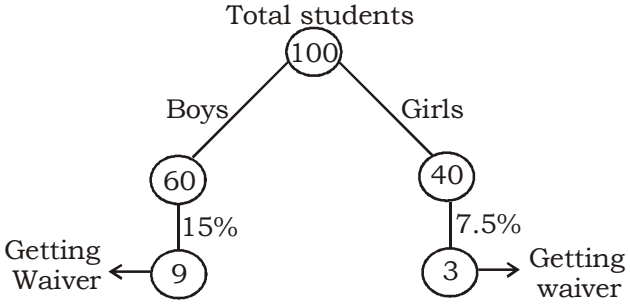
(venn diagram of failed students)

Number of students passed in the examination
= (100 – 60) = 40%
According to the question,
40 % = 880

$$1\ \% = \frac{880}{40}$$

$$\text{Total students} = \frac{880}{40}\times 100 = 2200$$

49. (d) Let the total number of students = 100



According to the question :-
(9 + 3) units = 90

$$1 \text{ unit} = \frac{90}{12}$$

The number students who are not getting waiver
= (100 –12) = 88 units
Total number of students getting 50% concession

$$= 88 \times \frac{90}{12}\times\frac{1}{2} \Rightarrow 330$$

50. (b) Let the initial value of machine = x
According to the question,

$$x \times \frac{90}{100}\times\frac{95}{100}\times\frac{90}{100}\times\frac{95}{100} = 146205$$

x = 2,00,000 Rs.
Initial value of machine = Rs. 2,00,000

Alternatively :-

	Old value	**New value**
I^{st} year →	10	9
II^{nd} year →	20	19
III^{rd} year →	10	9
IV^{th} year →	20	19
	40000	29241
	↓ ×5	↓ ×5
	2,00,000	146205

Value of machine = Rs. 2,00,000