Percentage 5

INTRODUCTION

The term *percent* means per hundred or for every hundred. It is the abbreviation of the Latin phrase *percentum*.

Scoring 60 per cent marks means out of every 100 marks the candidate scored 60 marks.

The term percent is sometimes abbreviated as p.c. The symbol % is often used for the term percent.

Thus, 40 percent will be written as 40%.

A fraction whose denominator is 100 is called a *percentage* and the numerator of the fraction is called *rate percent*, e.g., $\frac{5}{100}$ and 5 percent means the same thing, i.e., 5 parts out of every hundred parts.

SOME BASIC FORMULAE

1. To convert a fraction into a percent:

To convert any fraction $\frac{l}{m}$ to rate percent, multiply it by 100 and put % sign, i.e., $\frac{l}{m} \times 100\%$

Illustration 1: What percentage is equivalent to $\frac{3}{5}$?

Solution: $\frac{3}{5} \times 100 = 60\%$.

2. To convert a per cent into a fraction:

To convert a percent into a fraction, drop the percent sign and divide the number by 100.

Illustration 2: What fraction is $16\frac{2}{3}\%$?

Solution: $16\frac{2}{3}\% = \frac{\left(\frac{50}{3}\right)}{100} = \left(\frac{50}{3} \times \frac{1}{100}\right) = \frac{1}{6}$.

3. To find a percentage of a given number:

x% of given number (N) = $\frac{x}{100} \times$ N.

Illustration 3: 75% of 400 = ?

Solution: 75% of 400 = $\frac{75}{100} \times 400 = 300$.

Illustration 4: Find a number whose 4% is 72.

Solution: Let the required number be x.

Then, 4% of $x = 72$

$\Rightarrow \quad \frac{4}{100} \times x = 72 \Rightarrow x = \frac{100}{4} \times 72 = 1800.$

Illustration 5: What per cent of 25 Kg is 3.5 Kg?

Solution: Let x% of 25 Kg be 3.5 Kg.

Then, x% of 25 Kg = 3.5 Kg

$\Rightarrow \quad \frac{x}{100} \times 25 = 3{\cdot}5 \Rightarrow x = \frac{3{\cdot}5 \times 100}{25} = 14.$

Hence, 3.5 Kg is 14% of 25 Kg.

SOME USEFUL SHORTCUT METHODS

1. (a) If A is x% more than that of B, then B is less than that of A by

$$\left[\frac{x}{100+x} \times 100\right]\%$$

(b) If A is x% less than that of B, then B is more than that of A by

$$\left[\frac{x}{100-x} \times 100\right]\%$$

Explanation

Given: $A = B + \frac{x}{100}B = \frac{100+x}{100}B$

$\therefore \quad A - B = \frac{100+x}{100}B - B$

$= \left(\frac{100+x}{100} - 1\right)B = \frac{x}{100}B.$

So, $\frac{A-B}{A} = \frac{\frac{x}{100}B}{\frac{100+x}{100}B} = \frac{x}{100+x}$

$\Rightarrow \quad A - B = \left(\frac{x}{100+x} \times 100\right)\%$ of A.

Therefore, B is less than that of A by

$$\left(\frac{x}{100+x} \times 100\right)\%$$

Similarly, (b) can be proved.

Illustration 6: If Mohan's salary is 10% more than that of Sohan, then how much per cent is Sohan's salary less than that of Mohan?

Solution: Here, $x = 10$.

$\therefore$ Required answer $= \left(\frac{x}{100+x} \times 100\right)\%$

$= \left(\frac{x}{100+x} \times 100\right)\%$

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

Illustration 7: If A's income is 40% less than B's income, then how much per cent is B's income more than A's income?

Solution: Here, $x = 40$.

$\therefore$ Required answer $= \left(\frac{x}{100-x} \times 100\right)\%$

$= \left(\frac{40}{100-40} \times 100\right)\%$

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

2. If A is x% of C and B is y% of C, then

$$A = \frac{x}{y} \times 100\% \text{ of } B.$$

Explanation

Given: $A = \frac{x}{100}C \Rightarrow C = 100\frac{A}{x}$

and, $B = \frac{y}{100}C \Rightarrow C = 100\frac{B}{y}$

$\therefore \quad C = 100\frac{A}{x} = 100\frac{B}{y} \Rightarrow A = \frac{x}{y}B$

or, $\frac{x}{y} \times 100\%$ of B.

Illustration 8: If A is 20% of C and B is 25% of C, then what percentage is A of B?

Solution: Here, $x = 20$ and $y = 25$.

$A = \frac{x}{y} \times 100\%$ of B

$= \frac{20}{25} \times 100\%$ of B, i.e., 80% of B.

3. (a) If two numbers are respectively x% and y% more than a third number, then the first number is $\left(\frac{100+x}{100+y} \times 100\right)\%$ of the second and the second number is $\left(\frac{100+y}{100+x} \times 100\right)$ % of the first.

(b) If two numbers are, respectively, x% and y% less than a third number, then the first number is $\left(\frac{100-x}{100-y} \times 100\right)\%$ of the second and the second number is $\left(\frac{100-y}{100-x} \times 100\right)$ % of the first number.

Explanation

Let A, B and C be the three numbers.

Given:

$$A = C + \frac{x}{100}C = \left(\frac{100+x}{100}\right)C \Rightarrow C = A\left(\frac{100}{100+x}\right)$$

and, $B = C + \frac{y}{100}C = \left(\frac{100+y}{100}\right)C \Rightarrow C = B\left(\frac{100}{100+y}\right)$

$\therefore \quad A\left(\frac{100}{100+x}\right) = B\left(\frac{100}{100+y}\right)$

$\Rightarrow \quad A = \left(\frac{100+x}{100+y}\right)B$ or $\left(\frac{100+x}{100+y}\right) \times 100\%$ of B

and, $B = \left(\frac{100+y}{100+x}\right)A$ or $\left(\frac{100+y}{100+x}\right) \times 100\%$ of A.

Similarly, (b) can be proved.

Illustration 9: Two numbers are respectively 20% and 50% more than a third number. What per cent is the first of the second?

Solution: Here, $x = 20$ and $y = 50$.

$$\therefore \quad \text{First number} = \left(\frac{100+x}{100+y}\right) \times 100\% \text{ of the second}$$

$$= \left(\frac{100+20}{100+50}\right) \times 100\% \text{ of the second}$$

i.e., 80% of the second.

Illustration 10: Two numbers are, respectively, 32% and 20% less than a third number. What per cent is the first of the second?

Solution: Here, $x = 32$ and $y = 20$.

$$\therefore \quad \text{First number} = \left(\frac{100-x}{100-y}\times 100\right)\% \text{ of the second}$$

$$= \left(\frac{100-32}{100-20}\times 100\right)\% \text{ of the second}$$

i.e., 85% of the second.

4. (a) If the price of a commodity increases by P%, then the reduction in consumption so as not to increase the expenditure is

$$\left(\frac{P}{100+P}\times 100\right)\%$$

(b) If the price of a commodity decreases by P%, then the increase in consumption so as not to decrease the expenditure is

$$\left(\frac{P}{100-P}\times 100\right)\%$$

Explanation

Let the original price of the commodity be ₹100.

Then, the increased price $= 100 + \frac{P}{100}\times 100$

$= ₹(100 + P)$.

Therefore, to keep the price unchanged, there should be a reduction in the consumption of the commodity by ₹P.

$\because$ Decrease in ₹$(100 + P)$ = ₹P

$\therefore$ Decrease in ₹100 $= \frac{P}{100+P}\times 100$

$\therefore$ Required reduction in consumption is

$$\left(\frac{P}{100+P}\times 100\right)\%$$

Similarly, (b) part can be proved.

Illustration 11: If the price of sugar increases by 25%, find how much per cent its consumption be reduced so as not to increase the expenditure.

Solution: Reduction in consumption

$$= \left(\frac{P}{100+P}\times 100\right)\%$$

$$= \left(\frac{25}{100+25}\times 100\right)\% \text{ or } 20\%$$

Illustration 12: If the price of a commodity decreases by 25%, find how much per cent its consumption be increased so as not to decrease the expenditure.

Solution: Increase in consumption

$$= \left(\frac{P}{100-P}\times 100\right)\%$$

$$= \left(\frac{25}{100-25}\times 100\right)\% \text{ or } 33\frac{1}{3}\%$$

5. If a number is changed (increased/decreased) successively by x% and y%, then net % change is given by $\left(x+y+\frac{xy}{100}\right)\%$ which represents increase or decrease in value according as the sign is +ve or –ve.

If x or y indicates decrease in percentage, then put –ve sign before x or y, otherwise +ve sign.

Explanation

Let the given number be N.

If it is increased by x%, then it becomes

$$N + x\% \text{ of } N = N + \frac{Nx}{100} = \frac{N(x+100)}{100}.$$

If it is further increased by y%, then it becomes

$$\frac{N(x+100)}{100} + \frac{y}{100}\times\frac{N(x+100)}{100}$$

$$= \frac{N(x+100)\,(y+100)}{(100)^2}$$

$$\therefore \quad \text{Net change} = \frac{N(x+100)\,(y+100)}{(100)^2} - N$$

$$= \frac{N(100x+100y+xy)}{(100)^2}$$

$$\therefore \quad \%\ \text{change} = N\left(x+y+\frac{xy}{100}\right)\times\frac{1}{100}\times\frac{100}{N}$$

$$= \left(x+y+\frac{xy}{100}\right)\%$$

Illustration 13: If salary of a person is first increased by 15% and thereafter decreased by 12%, what is the net change in his salary?

Solution: Here, $x = 15$ and $y = -12$.

$\therefore$ The net% change in the salary

$$= \left(x+y+\frac{xy}{100}\right)\% = \left(15-12-\frac{15\times12}{100}\right)\% \text{ or } 1.2\%$$

Since the sign is +ve, the salary of the person increases by 1.2%

Illustration 14: The population of a town is decreased by 25% and 40% in two successive years. What per cent population is decreased after two years?

Solution: Here, $x = -25$ and $y = -40$.

$\therefore$ The net% change in population

$$= \left(x+y+\frac{xy}{100}\right)\%$$

$$= \left(-25-40+\frac{25\times40}{100}\right)\% \text{ or } -55\%$$

Since the sign is –ve, there is decrease in population after two years by 55%

6. If two parameters A and B are multiplied to get a product and if A is changed (increased/decreased) by x% and another parameter B is changed (increased/decreased) by y%, then the net % change in the product ($A \times B$) is given $\left(x+y+\frac{xy}{100}\right)$% which represents increase or decrease in value according as the sign in +ve or –ve.

If x or y indicates decrease in percentage, then put –ve sign before x or y, otherwise +ve sign.

Illustration 15: If the side of a square is increased by 20%, its area is increased by k%. Find the value of k.

Solution: Since side × side = area

$\therefore$ Net% change in area

$$= \left(x+y+\frac{xy}{100}\right)\% = \left(20+20+\frac{20\times20}{100}\right)\%$$

[Here, $x = 20$ and $y = 20$]

$= 44\%$

Therefore, the area is increased by 44%.

Here, $k = 44$.

Illustration 16: The radius of a circle is increased by 2%. Find the percentage increase in its area.

Solution: Since $\pi \times$ radius × radius = area

$\therefore$ Net% change in area

$$= \left(x+y+\frac{xy}{100}\right)\% = \left(2+2+\frac{2\times2}{100}\right)\%$$

[Here, $x = 2$ and $y = 2$]

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

Therefore, the percentage increase in area is $4\frac{1}{25}\%$

Illustration 17: The tax on a commodity is diminished by 15% and its consumption increases by 10%. Find the effect on revenue.

Solution: Since tax × consumption = revenue

$\therefore$ Net% change in revenue

$$= \left(x+y+\frac{xy}{100}\right)\% = \left(-15+10-\frac{15\times10}{100}\right)\%$$

[Here, $x = -15$ and $y = 10$]

$= -6.5\%$

$\therefore$ The revenue decreases by 6.5%

7. If the present population of a town (or value of an item) be P and the population (or value of item) changes at r% per annum, then

(a) Population (or value of item) after n years

$$= P\left(1+\frac{r}{100}\right)^n$$

(b) Population (or value of item) n years ago

$$= \frac{P}{\left(1+\frac{r}{100}\right)^n}.$$

where r is +ve or –ve according as the population (or value of item) increases or decreases.

Explanation

Population at the end of first year

$$= P + \frac{r}{100}P = P\left(1+\frac{r}{100}\right).$$

Now, the population at the beginning of second year

$$= P\left(1+\frac{r}{100}\right).$$

∴ Population at the end of second year

$$= P\left(1+\frac{r}{100}\right)+\frac{r}{100}P\left(1+\frac{r}{100}\right) = P\left(1+\frac{r}{100}\right)^2$$

⋮ ⋮ ⋮

Population at the end of n years $= P\left(1+\frac{r}{100}\right)^n$.

Illustration 18: The population of a town increases 5% annually. If its present population is 84000, what will it be in 2 years time?

Solution: Here, $P = 84000$, $r = 5$ and $n = 2$.

∴ Population of the town after 2 years

$$= P\left(1+\frac{r}{100}\right)^n = 84000\left(1+\frac{5}{100}\right)^2$$

$$= 84000 \times \frac{105}{100}\times\frac{105}{100} = 92610.$$

Illustration 19: The population of a town increases at the rate of 5% annually. If the present population is 4410, what it was 2 years ago?

Solution: Here, $P = 4410$, $r = 5$ and $n = 2$.

∴ Population of the town 2 years ago

$$= \frac{P}{\left(1+\frac{r}{100}\right)^n} = \frac{4410}{\left(1+\frac{5}{100}\right)^2} = \frac{4410}{\frac{105}{100}\times\frac{105}{100}} = 4000.$$

8. If a number A is increased successively by x% followed by y% and then by z%, then the final value of A will be

$$A\left(1+\frac{x}{100}\right)\left(1+\frac{y}{100}\right)\left(1+\frac{z}{100}\right)$$

In case a given value decreases by any percentage, we will use a –ve sign before that.

Illustration 20: The population of a town is 144000. It increases by 5% during the first year. During the second year, it decreases by 10% and increases by 15% during the third year. What is the population after 3 years?

Solution: Here, $P = 144000$, $x = 5$, $y = -10$ and $z = 15$.

∴ Population of the town after 3 years

$$= A\left(1+\frac{x}{100}\right)\left(1+\frac{y}{100}\right)\left(1+\frac{z}{100}\right)$$

$$= 144000\left(1+\frac{5}{100}\right)\left(1-\frac{10}{100}\right)\left(1+\frac{15}{100}\right)$$

$$= \frac{144000\times105\times90\times115}{100\times100\times100} = 156492.$$

9. In an examination, the minimum pass percentage is x% If a student secures y marks and fails by z marks, then the maximum marks in the examination is $\frac{100(y+z)}{x}$.

Explanation

Let the maximum marks be m.

Given: x% of $m = y + z$

$$\Rightarrow \quad \frac{x}{100} \times m = y + z \text{ or } m = \frac{100(y+z)}{x}.$$

Illustration 21: In an examination, a student must get 60% marks to pass. If a student who gets 120 marks, fails by 60 marks, find the maximum marks.

Solution: Here, $x = 60$, $y = 120$ and $z = 60$.

∴ Maximum marks

$$= \frac{100(y+z)}{x} = \frac{100(120+60)}{60} = \frac{100\times180}{60} = 300.$$

10. In an examination x% and y% students respectively fail in two different subjects while z% students fail in both the subjects, then the percentage of students who pass in both the subjects will be $(100 - (x + y - z))$%

Explanation

Percentage of students who failed in one subject = $(x - z)$%

Percentage of students who failed in other subject = $(y - z)$%

Percentage of students who failed in both the subjects = z%

∴ Percentage of students who passed in both the subjects

$$= [100 - [(x - z) + (y - z) + z]]\%$$

$$= (100 - (x + y - z))\%$$

Illustration 22: In an examination, 42% students failed in Mathematics and 52% failed in Science. If 17% failed in both the subjects, find the percentage of those who passed in both the subjects.

Solution: Here, $x = 42$, $y = 52$ and $z = 17$.

∴ Percentage of students passing both the subjects

$$= (100 - (x + y - z))\%$$

$$= (100 - (42 + 52 - 17))\% \text{ or } 23\%$$

EXERCISE-I

1. What percentage is equivalent to $5\frac{1}{4}$?

(a) 525% (b) 425%
(c) 625% (d) None of these

2. 0 · 005 = (... ? ...)%

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$%

(c) $\frac{1}{3}$% (d) None of these

3. $6\frac{2}{3}$% expressed as a fraction in its lowest term is:

(a) $\frac{2}{15}$ (b) $\frac{1}{15}$

(c) $\frac{3}{20}$ (d) None of these

4. What fraction is 0.6%

(a) $\frac{7}{500}$ (b) $\frac{9}{500}$

(c) $\frac{3}{500}$ (d) None of these

5. 0 · 025 in terms of rate per cent is:

(a) 3.5% (b) 2.5%
(c) 1.5% (d) None of these

6. What per cent of 12 is 84?

(a) 800% (b) 600%
(c) 700% (d) None of these

7. Express $\frac{7}{8}$ as percentage.

(a) $67\frac{1}{2}$ (b) $87\frac{1}{2}$%

(c) $97\frac{1}{4}$% (d) None of these

8. Express $8\frac{1}{3}$% as a fraction.

(a) $\frac{1}{12}$ (b) $\frac{1}{16}$

(c) $\frac{1}{18}$ (d) None of these

9. $37\frac{1}{2}$% of ₹48 is:

(a) ₹20 (b) ₹16
(c) ₹18 (d) None of these

10. What per cent of $\frac{2}{7}$ is $\frac{1}{35}$?

(a) 15% (b) 18%
(c) 10% (d) None of these

11. 75% of 480 = (?) × 15

(a) 12 (b) 36
(c) 24 (d) None of these

12. If 200% of a number is 90, then what is the 80% of that number?

(a) 48
(b) 36
(c) 24
(d) None of these

13. If $37\frac{1}{2}$% of a number is 45, then $87\frac{1}{2}$% of the number will be:

(a) 115 (b) 135
(c) 105 (d) None of these

14. ? × 15 = 37·5% of 220.

(a) 5.5 (b) 7.5
(c) 6.5 (d) None of these

15. What per cent of 4 Km is 8 metres?

(a) 0.4 (b) 0.2
(c) 0.8 (d) None of these

16. x% of y + y% of x = ?

(a) 3% of xy
(b) 2% of xy
(c) 5% of xy
(d) None of these

17. 0·35% of a number is equivalent to multiplying it by the number:

(a) 0.0025 (b) 0.0045
(c) 0.0035 (d) None of these

18. If 8% of x = 4% of y, then 20% of x is:

(a) 15% of y (b) 10% of y
(c) 20% of y (d) None of these

19. x% of y + ?% of x = x% of (x + y).

(a) $x + y$ (b) x
(c) y (d) None of these

20. A number x is 125% of y. To compute y, the number x has to be multiplied by:

(a) 0.08 (b) 0.4
(c) 0.8 (d) None of these

21. 25% of 25% = ?

(a) 6.25 (b) 0.0625
(c) 0.625 (d) None of these

22. Which number is 60% less than 80?

(a) 24 (b) 36
(c) 32 (d) None of these

23. 20% of 30% of 20% of ₹850 is:

(a) ₹9.50 (b) ₹10.20
(c) ₹10.50 (d) None of these

24. The greatest of $16\frac{2}{3}$%, $6\frac{2}{3}$%, 0·3 is:

(a) $16\frac{2}{3}$% (b) $6\frac{2}{3}$%
(c) 0.3 (d) Cannot be compared

25. 40% of 20% + 30% of 25% + 50% of 28% is equivalent to:

(a) 29.5% (b) 28.5%
(c) 30.5% (d) None of these

26. If 90% of A = 30% of B and B = x% of A, then the value of x is:

(a) 800 (b) 300
(c) 700 (d) None of these

27. 1 quintal 25 Kg is what per cent of 1 metric tonne?

(a) $16\frac{1}{2}$% (b) $8\frac{1}{2}$%
(c) $12\frac{1}{2}$% (d) None of these

28. If 12% of x is equal to 6% of y, then 18% of x will be equal to how much per cent of y?

(a) 7% (b) 9%
(c) 11% (d) None of these

29. If a number is 20% more than the other, how much per cent is the second number less than the first?

(a) $12\frac{1}{3}$% (b) $16\frac{2}{3}$%
(c) $16\frac{1}{3}$% (d) None of these

30. If A's income is 25% less than that of B, then how much per cent is B's income more than that of A?

(a) $33\frac{1}{3}$% (b) $66\frac{2}{3}$%
(c) $11\frac{2}{3}$% (d) None of these

31. If the given two numbers are respectively 7% and 28% of a third number, then what percentage is the first of the second?

(a) 20% (b) 25%
(c) 18% (d) None of these

32. Two numbers are respectively 60% and 20% more than a third number. Second number expressed as a percentage of first is:

(a) 75% (b) 90%
(c) 80% (d) None of these

33. Two numbers are less than a third number by 30% and 37%, respectively. How much per cent is the second number less than the first?

(a) 15%
(b) 10%
(c) 20%
(d) None of these

34. Two numbers are respectively 20% and 10% more than a third number. How much per cent is the first number more than the second?

(a) $9\frac{1}{11}$% (b) $7\frac{1}{11}$%
(c) $11\frac{1}{11}$% (d) None of these

35. The price of cooking oil has increased by 15%. The percentage of reduction that a family should effect in the use of cooking oil so as not to increase the expenditure on this account is:

(a) $15\frac{2}{23}$% (b) $13\frac{1}{23}$%
(c) $17\frac{1}{23}$% (d) None of these

36. If the price of apples goes down by 10%, find the percentage of increase that a family should effect in its consumption so as not to increase expenditure on this account is:

(a) $13\frac{1}{9}$% (b) $15\frac{1}{9}$
(c) $11\frac{1}{9}$% (d) None of these

37. A number is increased by 20% and then decreased by 20%, the final value of the number:

(a) Does not change
(b) Decreases by 2%
(c) Increases by 4%
(d) Decreases by 4%.

38. A man's wages were decreased by 50%. Again, the reduced wages were increased by 50%. He has a loss of:

(a) 35% (b) 25%
(c) 20% (d) None of these

39. The population of a town is decreased by 20% and 25% in two successive years. What per cent population is decreased after two years?

(a) 50% (b) 40%
(c) 60% None of these

40. The difference between a discount of 35% and two successive discounts of 20% and 20% on a certain bill was ₹22. Find the amount of the bill.

(a) ₹3200 (b) ₹2200
(c) ₹1800 (d) None of these

41. A shopkeeper marks the prices of his goods at 25% higher than the original price. After that, he allows a discount of 12%. What profit or loss did he make?

(a) 10% profit (b) 15% profit
(c) 10% loss (d) 15% loss

42. Two shopkeepers sell a ratio of similar brand and type at the same list price of ₹1000. The first allows two successive discounts of 20% and 10% and the second allows the successive discounts of 15% and 15%. Find the difference in discounts offered by the two shopkeepers.

(a) ₹3.50 (b) ₹1.50
(c) ₹2.50 (d) None of these

43. The tax on a commodity is diminished by 10% and its consumption increases by 10%. Find the effects on revenue.

(a) 1% (b) 2%
(c) 3% (d) None of these

44. The radius of a sphere is increased by 10%. The surface area increases by

(a) 21% (b) 31%
(c) 41% (d) None of these

45. When the price of an article is reduced by 15%, the sales increases by 35%. The percentage change in the total amount of receipts is:

(a) $14\frac{3}{4}$% decrease (b) $14\frac{3}{4}$% increase
(c) $13\frac{3}{4}$% decrease (d) None of these

46. If the side of a square is increased by 30%, its area is increased by:

(a) 49% (b) 69%
(c) 79% (d) None of these

47. The length and breadth of a square are increased by 30% and 20%, respectively. The area of the rectangle so formed exceeds the area of the square by:

(a) 56% (b) 46%
(c) 66% (d) None of these

48. In measuring the sides of a rectangle, one side is taken 10% in excess and the other 20% in deficit. Find the error per cent in area calculated from the measurement.

(a) 12% deficit (b) 10% deficit
(c) 12% excess (d) None of these

49. For a rectangle, the length and breadth are increased by 10% and 20%, respectively. The percentage increase in area is:

(a) 24% (b) 48%
(c) 32% (d) None of these

50. Water tax is increased by 20% but its consumption is decreased by 20%. The increase or decrease in the expenditure is:

(a) 4% decrease
(b) 4% increase
(c) 8% decrease
(d) 8% increase

51. On decreasing the price of a colour TV by 30%, its sale is increased by 20%. The effect on the revenue is:

(a) 16% decrease (b) 16% increase
(c) 20% increase (d) None of these

52. The population of a city increases at the rate of 10% annually. Its present population is 90.51 lacs. The population 3 years ago was nearly:

(a) 72 Lakhs (b) 68 Lakhs
(c) 80 Lakhs (d) None of these

53. The value of a machine depreciates at the rate of 10% every year. It was purchased 3 years ago. If its present value is ₹8748, its purchase price was:

(a) ₹16000 (b) ₹18000
(c) ₹12000 (d) None of these

54. The income of a company increases 20% per annum. If its income is ₹2664000 in the year 1999 what was its income in the year 1997?

(a) ₹1750000 (b) ₹1650000
(c) ₹1850000 (d) None of these

55. The population of a town is 32000. It increases 15% annually. What will it be in 2 years?

(a) 52340 (b) 42320
(c) 62430 (d) None of these

56. The value of a machine is ₹6250. It decreases by 10% during the first year, 20% during the second year and 30% during the third year. What will be the value of the machine after 3 years?

(a) ₹2650 (b) ₹3050
(c) ₹3150 (d) None of these

57. The population of a town increases by 12% during first year and decreases by 10% during second year. If the present population is 50400, what it was 2 years ago?

(a) 40000 (b) 35000
(c) 50000 (d) None of these

58. Ramesh loses 20% of his pocket money. After spending 25% of the remainder he has ₹480 left. What was his pocket money?

(a) ₹600 (b) ₹800
(c) ₹900 (d) None of these

59. An army lost 10% its men in war, 10% of the remaining due to diseases and 10% of the rest were hurt. Thus, the strength was reduced to 729000 active men. Find the original strength.

(a) 1000000 (b) 1200000
(c) 1500000 (d) None of these

60. The daily wage is increased by 25% and a person now gets ₹25 per day. What was his daily wage before the increase?

(a) ₹25 (b) ₹20
(c) ₹30 (d) None of these

61. A student has to secure 15% marks to get through. If he gets 80 marks and fails by 70 marks, find the maximum marks set for the examination.

(a) 900 (b) 1000
(c) 1200 (d) None of these

62. In an examination, 30% and 35% students respectively failed in History and Geography while 27% students failed in both the subjects. If the number of students passing the examination is 248, find the total number of students who appeared in the examination.

(a) 425 (b) 380
(c) 400 (d) None of these

63. Mr Katial buys a house for ₹100000 and rents it. He puts 12.5% of each month's rent aside for upkeep and repairs, pays ₹325 per year as taxes and realizes 5.5% annually on his investment. Find the monthly rent.

(a) ₹634.76 (b) ₹554.76
(c) ₹654.76 (d) None of these

64. In an examination, there were 2000 candidates, out of which 900 candidates were boys and rest were girls. If 32% of the boys and 38% of the girls passed, then the total percentage of failed candidates is:

(a) 35.3% (b) 64.7%
(c) 68.5% (d) 70%

65. From the salary of an officer, 10% is deducted as house rent, 15% of the rest he spends on children's education and 10% of the balance, he spends on clothes. After this expenditure he is left with ₹1377. His salary is:

(a) ₹2000 (b) ₹2040
(c) ₹2100 (d) ₹2200

66. If the price of gold increases by 30%, find by how much the quantity of ornaments must be reduced so that the expenditure may remain the same as before?

(a) $27\frac{2}{13}\%$ (b) $23\frac{1}{13}\%$
(c) 30% (d) 19%

67. The price of sugar has fallen by 10%. How many quintals can be bought for the same money which was sufficient to buy 18 quintals at the higher price?

(a) 20 (b) 22
(c) 25 (d) 30

68. In an examination, there are 1000 boys and 800 girls, 60% of boys and 40% girls passed. The percentage of candidates that failed is:

(a) 48.88 (b) 45.88
(c) 50.00 (d) 49.88

69. The price of an article is cut by 20%. To restore it to its original price, the new price must be increased by:

(a) 20% (b) $22\frac{1}{2}\%$
(c) 25% (d) 40%

70. In a fraction, numerator is increased by 25% and the denominator is diminished by 10%. The new fraction obtained is $\frac{5}{9}$. The original fraction is:

(a) $\frac{2}{5}$ (b) $\frac{5}{9}$

(c) $\frac{3}{5}$ (d) None of these

71. One side of a square is increased by 30%. To maintain the same area the other side will have to be decreased by:

(a) $23\frac{1}{13}\%$ (b) $76\frac{12}{13}\%$

(c) 30% (d) 15%

EXERCISE-2
(BASED ON MEMORY)

1. On a test consisting of 75 questions carrying one mark each, Samir answered 75% of the first 40 questions correctly. What approximate per cent of the other 35 questions does he need to answer correctly to score 80% on the entire test?

(a) 90 (b) 75
(c) 86 (d) 60
(e) 58

[NABARD PO, 2008]

2. If the numerator of a fraction is increased by 200% and the denominator of the fraction is increased by 150%, the resultant fractions $\frac{9}{10}$. What is the original fraction:

(a) $\frac{5}{12}$ (b) $\frac{4}{7}$

(c) $\frac{3}{4}$ (d) $\frac{7}{11}$

(e) None of these

[NABARD PO, 2008]

3. Mohan distributed his total assets to his wife, three sons, two daughters and five grandchildren in such a way that each grandchild got one-eighth of each son or one-tenth of each daughter, his wife got 40 per cent of the total share of his sons and daughters together. If each daughter received asses of worth ₹1.25 Lakh, what was the total worth of the assets received, by his wife and the three grand-children together?

(a) ₹325000 (b) ₹257500
(c) ₹282500 (d) Cannot be determined
(e) None of these

[SBI PO, 2005]

4. If the numerator of a fraction is increased by 140%, and the denominator is increased by 150%, the resultant fraction is $\frac{4}{15}$. What is the original fraction

(a) $\frac{3}{5}$ (b) $\frac{5}{16}$

(c) $\frac{4}{18}$ (d) $\frac{3}{10}$

(e) None of these

[Maharashtra (Specialist Officer), 2008]

5. On a test consisting 150 questions carrying 1 mark each, Meenal answered 80% of the first 75 questions correctly. What per cent of the other 75 questions does she need to answer correctly to score 60% on the entire exam?

(a) 60 (b) 20
(c) 50 (d) 40
(e) None of these

[Maharashtra (Specialist Officer), 2008]

6. (43% of 2750) – (38% of 2990) = ?

(a) 49.3 (b) 44.7
(c) 43.6 (d) 46.3
(e) None of these

[Bank of Baroda PO, 2007]

7. Ms Sujata invests 7% i.e., ₹2170, of her monthly salary in mutual fund. Later she invests 18% of her monthly salary in recurring deposits. Also, she invests 6% of her salary on NSC's. What is the total annual amount invested by Ms Sujata?

(a) ₹1,25,320 (b) ₹1,25,320
(c) ₹1,35,120 (d) ₹1,15,320
(e) None of these

[Bank of Baroda PO, 2007]

8. If the numerator of a fraction is increased by 250% and the denominator by 400%, the resultant fraction is $\frac{7}{19}$. What is the original fraction?

(a) $\frac{10}{19}$ (b) $\frac{5}{9}$

(c) $\frac{9}{5}$ (d) $\frac{19}{7}$

(e) None of these

[Bank of Baroda PO, 2007]

9. In a class of 65 students, each student got sweets that are 20% of the total number of students. How many sweets were there.

(a) 635 (b) 845

(c) 955 (d) Cannot be determined

(e) None of these

[IDBI Bank, 2007]

10. If the numerator of a fraction is increased by 200% and the denominatoris increased by 300%, the resultant fraction is $\frac{6}{11}$. What is the original fraction?

(a) $\frac{8}{11}$ (b) $\frac{5}{13}$

(c) $\frac{6}{17}$ (d) $\frac{17}{9}$

(e) None of these

[IDBI Bank, 2007]

11. Keshav spent ₹55,475 on his birthday party, ₹28, 525 on buying home appliances and the remainning 25% of the total amount he had as cash with him. What was the total amount?

(a) ₹1,05,000 (b) ₹1,00,000

(c) ₹1,12,000 (d) ₹1,24,000

(e) None of these

[Corporation Bank PO, 2007]

12. Mr Sinha invests 12% of his mothly salary, i.e., ₹3,660 in Insurance Policies. Later he invests 16% of his monthly salary on Family Mediclaim Policies; also he invest another 3% of his salary on NSCs. What is the total annual amount invested by Mr Sinha?

(a) ₹1,13,460

(b) ₹1,22,440

(c) ₹1,06,540

(d) Cannot be determined

(e) None of these

[Corporation Bank PO, 2007]

13. 75% of a number is 380 more than 35 of the same number. What is 20% of that number?

(a) 190 (b) 195.5

(c) 189.5 (d) 180

(e) None of these

[Allahabad Bank SO, 2007]

14. The production of wheat across the country in the year 2003 was 5600 tons. In the same year if 700 tons of wheat was produced in the state of Haryana, what percentage did it contribution to the total production of wheat across the country?

(a) 13% (b) 12.5%

(c) 13.5% (d) 14%

(e) None of these

[Allahabad Bank SO, 2007]

15. In a class of 90 students, amongst 50% of the students each student got a a number of sweets that are 20% of the total number of students and amongst the remaining 50% of the students each student got a number of sweets that are 10% of the total number of students. How many sweets were distributed among the 90 students?

(a) 1620 (b) 1215

(c) 960 (d) Cannot be determined

(e) None of these

[Allahabad Bank SO, 2007]

16. Mrs Sharma invests 15% of her monthly salary, i.e., ₹4,428 in Mutual funds. Late she invests 18% of her monthly salary on Pension Policies; also, she invests another 9% of her salary of Insurance Policies. What is the total monthly amount invested by Mrs Sharma?

(a) ₹1,13,356.80 (b) ₹12,398.40

(c) ₹56,678.40 (d) Cannot be determined

(e) None of these

[Allahabad Bank SO, 2007]

17. Two numbers are less than the third number by 50% and 54% respectively. By how much per cent is the second number less than the first number?

(a) 13 (b) 10

(c) 12 (d) Cannot be determined

(e) None of these

[Bank of Maharashtra PO, 2008]

18. In an election between two candidates, one got 52% of the total valid votes were invalid. 25% of the total votes were invalid. The total number of votes was 8400. How many valid votes did the other person get?

(a) 3276 (b) 3196

(c) 3024 (d) Cannot be determined

(e) 58

[Bank of Maharashtra PO, 2008]

19. A sum of ₹731 is divided among A, B and C, such that 'A' receives 25% more than 'B' and 'B' receives 25% less than 'C'. What is C's share in the amount?

(a) ₹172 (b) ₹200
(c) ₹262 (d) ₹258
(e) None of these

[Andhra Bank PO, 2006]

20. If the numerator of a fraction is increased by 150% and the denominator of the fraction is increased by 300%, the resultant fraction is $\frac{5}{18}$. What is the original fraction?

(a) $\frac{4}{9}$ (b) $\frac{4}{5}$
(c) $\frac{8}{9}$ (d) $\frac{8}{11}$
(e) None of these

[Andhra Bank PO, 2006]

21. What is 25% of 30% of $\frac{2}{5}$ of 2000?

(a) 36 (b) 40
(c) 56 (d) 60
(e) None of these

[Andhra Bank PO, 2006]

22. Vipul decided to donate 5% of his salary. On the day of donation he changed his mind and donated ₹1687.50, which was 75% of what he had decided earlier. How much is Vipul's salary?

(a) ₹37,500 (b) ₹45,000
(c) ₹33,750 (d) Cannot be determined
(e) None of these

[Corporation Bank PO, 2006]

23. The difference between 40% of a number and 28% of the same number is 198. Waht is 64% of that number?

(a) 1122 (b) 1065
(c) 1056 (d) 1023
(e) None of these

[LIC ADO, 2007]

24. If 50% of $(x - y)$ = 30% of $(x + y)$, then what per cent of x is y?

(a) 25% (b) 33%
(c) 40% (d) 400%

[SSC (GL) Prel. Examination, 2005]

25. Given that 10% of A's income = 15% of B's income = 20% of C's income. If sum of their incomes is ₹7800, then B's income is:

(a) ₹3600 (b) ₹3000
(c) ₹2400 (d) ₹1800

[SSC (GL) Prel. Examination, 2005]

26. If a number x is 10% less than another number y and y is 10% more than 125, then x is equal to:

(a) 150 (b) 143
(c) 140.55 (d) 123.75

[SSC (GL) Prel. Examination, 2005]

27. Salary of a person is first increased by 20% and then it is decreased by 20%. Change in his salary is:

(a) 4% decreased
(b) 4% inceased
(c) 8% decreased
(d) Neither decreased nor increased

[SSC (GL) Prel. Examination, 2005]

28. A reduction of $33\frac{1}{3}$% in the price of an item would enable a purchase to get 4 more for a rupee. The price before reduction was:

(a) 12 per rupee (b) 4 per rupee
(c) 12 per rupee (d) 8 per rupee
(e) None of these

[SSC (GL) Prel. Examination, 2005]

29. The income of a company increases 20% per annum. If its income is ₹2664000 in the year 1999, what was its income in the year 1997?

(a) ₹2220000 (b) ₹2850000
(c) ₹2121000 (d) ₹1855000
(e) None of these

[BSRB Patna PO, 2001]

30. Mr X, a businessman, had income in the year 1995 such that he earned a profit of 20% on his investment in the business. In the year 1996 his investment was less by ₹5000 but still had the same income (Income = Investment + Profit) as that in 1995. Thus the per cent profit earned in 1996 increased by 26%. What was his investment in 1995?

(a) ₹100000 (b) ₹100500
(c) ₹105000 (d) Data inadequate
(e) None of these

[SBI PO, 2001]

31. The production of a company has ups and downs every year. The production increase for two consecutive years consistently by 15% and in the third year it decrease by 10%. Again, in the next two years it increases by 15% each years and decreases by 10% in the third year. If we start counting from the year 1990 approximately what will be the effect on the production of the company in 1994?

(a) 37% increase (b) 42% increase
(c) 52% increase (d) 32% increase
(e) 27% increase

[Corporation Bank PO, 2002]

32. 125% of 260 + ? % of 700 = 500

(a) 32 (b) 56
(c) 25 (d) 46
(e) None of these

[Andhra Bank SO, 2002]

33. 45% of 750 – 25% of 480 =

(a) 216 (b) 217.50
(c) 245 (d) 236·50
(e) None of these

[Andhra Bank SO, 2001]

34. If 40% of a number is equal to two-thirds of another number, what is the ratio of the first number to the second?

(a) 7:3 (b) 3:7
(c) 2:5 (d) 5:3
(e) None of these

[Andhra Bank SO, 2001]

35. A shopkeeper earns a profit of 15% after selling a book at 20% discount on the printed price. The ratio of the cost price and the printed price of the book is:

(a) 20:23 (b) 23:20
(c) 16:23 (d) 23:16
(e) None of these

[SSC (GL) Prel. Examination, 2002]

36. Successive discounts of 20% and 15% are equivalent to a single discount of:

(a) 68% (b) 65%
(c) 35% (d) 32%

[SSC (GL) Prel. Examination, 2002]

37. The market price of a watch is ₹800. A shopkeeper gives two successive discounts and sells the watch for ₹612. If the first discount is 10%, then the second discount is:

(a) 12% (b) 20%
(c) 15% (d) 10%

[SSC (GL) Prel. Examination, 2002]

38. 5% of 5% of ₹100 is:

(a) ₹0.25 (b) ₹0.50
(c) ₹10 (d) ₹25

[SSC (GL) Prel. Examination, 2002]

39. If 20% of an electricity bill is deducted, then ₹100 are still to be paid. How much was the original bill?

(a) ₹110 (b) ₹115
(c) ₹120 (d) ₹125

[SSC (GL) Prel. Examination, 2002]

40. If x% of y is 100 and y% of z is 200, then find a relation between x and z.

(a) $z = \frac{x}{2}$ (b) $z = 2x$

(c) $x = \frac{z}{4}$ (d) $z = 4x$

[SSC (GL) Prel. Examination, 2002]

41. 40% of the greater number is equal to 60% of the smaller. If their sum is 150, then the greater number is:

(a) 70 (b) 80
(c) 90 (d) 60

[SSC (GL) Prel. Examination, 2002]

42. Two numbers are less than a third number by 30% and 37% respectively. How much per cent is the second number less than the first?

(a) 7% (b) 10%
(c) 4% (d) 3%

[SSC (GL) Prel. Examination, 2002]

43. 8% of the voters in an election did not cast their votes. In this election, there were only two candidates. The winner by obtaining 48% of the total votes defeated his rival by 1100 votes. The total number of voters in the election was:

(a) 2100 (b) 23500
(c) 22000 (d) 27500

[SSC (GL) Prel. Examination, 2003]

44. The present population of a city is 180000. If it increases at the rate of 10% per annum, its population after 2 years will be:

(a) 207800 (b) 227800
(c) 217800 (d) 237800

[SSC (GL) Prel. Examination, 2003]

45. A reduction of 20% in the price of salt enabled a purchaser to obtain 4 Kg more for ₹100. The reduced price of salt per Kg is:

(a) ₹4 (b) ₹5
(c) ₹6.25 (d) ₹6.50

[SSC (GL) Prel. Examination, 2003]

46. If 60% of A's income is equal to 75% of B's income, then B's income is equal to x% of A's income. The value of x is:

(a) 70 (b) 60
(c) 80 (d) 90

[SSC (GL) Prel. Examination, 2003]

47. A discount of 14% on the marked price of an article is allowed and then the article is sold for ₹387. The marked price of the article is:

(a) ₹450 (b) ₹427
(c) ₹500 (d) ₹440

[SSC (GL) Prel. Examination, 2003]

48. A trader marked the selling price of an article at 10% above the cost price. At the time of selling he allows certain discount and suffers a loss of 1%. He allowed a discount of

(a) 11% (b) 10%
(c) 9% (d) 10.5%

[SSC (GL) Prel. Examination, 2003]

49. By giving a discount of 10% on the marked price of ₹1100 of a cycle, a dealer gains 10%. The cost price of the cycle is:

(a) ₹1100 (b) ₹900
(c) ₹1089 (d) ₹891

[SSC (GL) Prel. Examination, 2003]

50. A trader marks his goods at 20% above the cost price. If he allows a discount of 5% on the marked price, what profit per cent does he make?

(a) 14% (b) 16%
(c) 18% (d) 20%

[SSC (GL) Prel. Examination, 2003]

51. A person gave 20% of his income to his elder son, 30% of the remaining to the younger son and 10% of the balance he denoted to a trust. He is left with ₹10080. His income was:

(a) ₹50000 (b) ₹40000
(c) ₹30000 (d) ₹20000

[SSC (GL) Prel. Examination, 2003]

52. In an examination there were 640 boys and 360 girls. 60% of boys and 80% of girls were successful. The percentage of failure was:

(a) 20 (b) 60
(c) 30.5 (d) 32.8

[SSC (GL) Prel. Examination, 2003]

53. A number is increased by 10% and then decreased by 10%. Finally the number:

(a) Does not change (b) Decreases by 1%
(c) Increases by 1% (d) Increases by 0.1%

[SSC (GL) Prel. Examination, 2003]

54. A reduction of 20% in the price of rice enables a person to buy 3·5 Kg more rice for ₹385. The original price of rice per Kg is:

(a) ₹20 (b) ₹22.50
(c) ₹25 (d) ₹27.50

[SSC (GL) Prel. Examination, 2003]

55. Difference of two numbers is 1660. If $6\frac{1}{2}\%$ of one number is $8\frac{1}{2}\%$ of the other number, the smaller number is:

(a) 7055 (b) 5395
(c) 3735 (d) 2075

[SSC (GL) Prel. Examination, 2003]

56. The price of an article is raised by 30% and then two successive discounts of 10% each are allowed. Ultimately the price of the article is:

(a) Increased by 10%
(b) Increased by 5.3%
(c) Decreased by 3%
(d) Decreased by 5.3%

[SSC (GL) Prel. Examination, 2003]

57. A tradesman gives 4% discount on the marked price and gives 1 article free for buying every 15 articles and thus gains 35%. The marked price is increased above the cost price by:

(a) 40% (b) 39%
(c) 50% (d) 20%

[SSC (GL) Prel. Examination, 2003]

58. Radha spends 40% of her salary on food, 20% on houre rent, 10% on entertainment and 10% on conveyance. If her savings at the end of a month are ₹1500, then her salary per month (in ₹) is:

(a) 8000 (b) 7500
(c) 6000 (d) 10000

[SSC (GL) Prel. Examination, 2003]

59. In a class of 35 students and 6 teachers, each student got sweets that are 20% of the total number of students and eachteacher got sweet that are 40% of the total number of students. How many sweets were there?

(a) 245 (b) 161
(c) 406 (d) 84
(e) None of these

[Oriental Bank of Commerce PO Examination, 2009]

60. If 1 micron = 10,000 angstroms, then 100 angstroms is what per cent of 10 microns?

(a) 0.0001% (b) 0.001%
(c) 0.01% (d) 0.1%

61. A man walked diagonally across a square lot. Approx., what was the per cent saved by not walking along the edges?

(a) 30 (b) 20
(c) 33 (d) 24

62. The normal dosage of a particular medicine is t tablets per day for each patient. A hospital's current supply of these tablets will last p patients for d days. If the recommended dosage increases by 20% and the number of patients decreases by one-third, then for how many days will the hospital's supply last?

(a) $\frac{5d}{4}$ (b) $\frac{4d}{5}$

(c) $\frac{4pt}{5}$ (d) None of these

63. A clothing supplier stores 800 coats in a warehouse, of which 15% are full-length-coats. If 500 of the shorter length coats are removed from the warehouse, then what per cent of the remaining coats are full-length?

(a) 5.62% (b) 34%
(c) 40% (d) 48%

64. If S is 150% of T, then T is what per cent of $S + T$?

(a) $33\frac{1}{3}\%$ (b) 40%

(c) 75% (d) 80%

65. At a school, 20% of the students are seniors. If all of the seniors attended the school play, and 60% of all the students attended the play, then what per cent of the non-seniors attended the play?

(a) 20% (b) 40%
(c) 50% (d) 100%

66. The price of an article was first increased by 10% and then again by 20%. If the last increased price be ₹33, the original price was:

(a) ₹30 (b) ₹27.50
(c) ₹26.50 (d) ₹25

[SSC (GL), 2010]

67. If an electricity bill is paid before due date, one gets a reduction of 4% on the amount of the bill. By paying the bill before due date a person got a reduction of ₹13. The amount of his electricity bill was:

(a) ₹125 (b) ₹225
(c) ₹325 (d) ₹425

[SSC (GL), 2010]

68. In a recent survey 40% houses contained two or more people. Of those houses containing only one person 25% were having only a male. What is the percentage of all houses which contain exactly one female and no males?

(a) 75 (b) 40
(c) 15 (d) None of these

[SBI PO Examination, 2000]

69. When the price of sugar decreases by 10%, a man could buy 1 Kg more for ₹270. Then the original price of sugar per Kg is:

(a) ₹25 (b) ₹30
(c) ₹27 (d) ₹32

[SSC (GL), 2011]

70. First and second numbers are less than a third number by 30% and 37%, respectively. The second number is less than the first by:

(a) 7% (b) 4%
(c) 3% (d) 10%

[SSC (GL), 2011]

71. If the height of a triangle is decreased by 40% and its base is increased by 40%, what will be the effect on its area?

(a) No change (b) 16% increase
(c) 8% decrease (d) 16% decrease

[SBI PO, 1999]

72. In 1 Kg mixture of sand and iron, 20% is iron. How much sand should be added so that the proportion of iron becomes 10%?

(a) 1 Kg (b) 200 gm
(c) 800 mgs (d) 1.8 Kg

[SBI PO Examination, 1999]

73. The price of a commodity rises from ₹6 per Kg to ₹7.50 per Kg. If the expenditure cannot increase, the percentage of reduction in consumption:

(a) 15 (b) 20
(c) 25 (d) 30

[SSC (GL), 2011]

74. There is a ratio of 5:4 between two numbers. If 40% of the first number is 12 then what would be the 50% of second number?

(a) 12 (b) 24
(c) 18 (d) Data inadequate

[Bank of Baroda PO, 1999]

75. When 30% of a number is added to another number the second number increase to its 140%. What is the ratio between the first and the second number?

(a) 3:4 (b) 4:3
(c) 3:2 (d) Data inadequate

[Bank of Baroda PO, 1999]

76. Suresh's monthly income is 30% more than that of Vinod. Vinod's monthly income is 20% less than that of Vinay. If the difference between the monthly incomes of Suresh and Vinay is ₹800, what is the monthly income of Vinod?

(a) ₹16000 (b) ₹20000
(c) ₹12000 (d) Data inadequate

[Bank of Baroda PO, 1999]

77. If 25% of a number is subtracted from a second number, the second number reduces to its five-sixths. What is the ratio between the first number and the second number?

(a) 2:3 (b) 3:2
(c) 1:3 (d) Data inadequate

[SBI Associates PO, 1999]

78. A petrol pump owner mixed leaded and unleaded petrol in such a way that the mixture contains 10% unleaded petrol. What quantity of leaded petrol should be added to 1 litre mixture so that the percentage of unleaded petrol becomes 5%?

(a) 1000 ml (b) 900 ml
(c) 1800 ml (d) None of these

[SBI Associates PO, 1999]

79. Out of a total of 85 children playing badminton or table tennis or both, total number of girls in the group is 70% of the total number of boys in the group. The number of boys playing only badminton is 50% of the number of boys and the total number of boys playing badminton is 60% of the total number of boys. The number of children playing only table tennis is 40% of the total number of children and a total of 12 children play badminton and table tennis both. What is the number of girls playing only badminton?

(a) 16 (b) 14
(c) 17 (d) Data inadequate

[SBI Associates PO, 1999]

80. If the numerator of a fraction is increased by 2 and the denominator is increased by 1, the fraction becomes $\frac{5}{8}$ and if the numerator of the same fraction is increased by 3 and the denominator is increased by 1 the fraction becomes $\frac{3}{4}$. What was the original fraction?

(a) $\frac{3}{7}$ (b) $\frac{2}{7}$
(c) $\frac{4}{7}$ (d) Data inadequate

[Guwahati PO, 1999]

81. When 50% of one number is added to a second number, the second number increases to its four-thirds. What is the ratio between the first number and the second number?

(a) 3:2 (b) 3:4
(c) 2:3 (d) Data inadequate

[Guwahati PO, 1999]

82. Raman scored 456 marks in an examination and Seeta got 54% marks in the same examination which is 24 marks less than Raman. If the minimum passing marks in the examination is 34%, then how much more marks did Raman score than the minimum passing makrs?

(a) 184 (b) 196
(c) 190 (d) 180

[Bank of Baroda PO Examination, 2011]

83. The difference between a discount of 35% and two successive discounts of 20% and 20% on a certain bill was ₹22. Find the amount of the bill.

(a) ₹1100 (b) ₹200
(c) ₹2200 (d) Data inadequate

[BSRB Mumbai PO, 1999]

84. Ram gave 40% of the amount to Deepak. Deepak in turn gave one-fourth of what he received from Ram to Subhash. After paying ₹200 to taxi driver out of the amount he got from Deepak, Subhash now has ₹600 left with him. How much amount did Ram have?

(a) ₹1200 (b) ₹4000
(c) ₹8000 (d) Data inadequate

[BSRB Chennai PO, 2000]

85. An article when sold for ₹960 fetches 20% profit. What would be the per cent profit/loss if 5 such articles are sold for ₹825 each?

(a) 3.125% profit (b)3.125% loss
(c) Neither profit nor loss (d)16.5% profit

[BSRB Bhopal PO, 2000]

86. Rakesh solved 80% of the questions in an examination correctly. If out of 41 questions solved by Rakesh, 37 questions are correct and of the remaining questions out of 8 questions 5 questions have been solved by Rakesh correctly then find the total number of questions asked in the examination.

(a) 75 (b) 65
(c) 60 (d) Cannot be determined

[BSRB Bangalore PO, 2000]

87. In a class of 60 children, 30% children can speak only English, 20% Hindi and English both and rest

of the children can speak only Hindi. How many children can speak Hindi?

(a) 42 (b) 36
(c) 30 (d) 48

[BSRB Patna PO, 2001]

88. The ratio of males and females in a city is 7:8 and the percentage of children among males and females is 25% and 20%, respectively. If the number of adult females in the city is 156800, what is the total population?

(a) 245000 (b) 367500
(c) 196000 (d) 171500

[BSRB Patna PO, 2001]

89. X, a businessman, had income in the year 1995 such that he earned a profit of 20% on his investment in the business. In the year 1996 his investment was less by ₹5000 but still had the same income (Income = Investment + Profit) as that in 1995. Thus the per cent profit earned in 1996 increased by 26%. What was his investment in 1995?

(a) ₹100000 (b) ₹100500
(c) ₹105000 (d) Data inadequate

[SBI PO, 2001]

90. The production of a company has ups and downs every year. The production increase for two consecutive years consistently by 15% and in the third year it decreases by 10%. Again in the next two years it increases by 15% each year and decreases by 10% in the third year. If we start counting from the year 1990 approximately what will be the effect on the production of the company in 1994?

(a) 37% increase (b) 42% increase
(c) 52% increase (d) 32% increase

[Corporation Bank PO, 2002]

91. In an Entrance Examination Ritu scored 56% marks, Smita scored 92% marks and Rina scored 634 marks. The maximum marks of the examination are 875. What are the average marks scored by all the three girls together?

(a) 929 (b) 815
(c) 690 (d) 643

[IBPS Bank PO, 2011]

92. In a test, a candidate secured 468 marks out of maximum marks '*A*'. If the maximum marks '*A*' were converted to 700 marks, he would have secured 336 marks. What were the maximum marks of the test?

(a) 775 (b) 875
(c) 975 (d) 1075

[IBPS Bank PO, 2011]

93. The market price of a watch is ₹800. A shopkeeper gives two successive discounts and sells the watch for ₹612. If the first discount is 10%, then the second discount is:

(a) 12% (b) 20%
(c) 15% (d) 10%

[SSC (GL) Prel. Examination, 2002]

94. An HR Company employs 4800 people, out of which 45% are males and 60% of the males are either 25 years or older. How many males are employed in the company who are younger than 25 years?

(a) 2640 (b) 2160
(c) 1296 (d) 864

[IBPS Bank PO, 2011]

95. Six-elevenths of a number is equal to 22% of second number. Second number is equal to the one-fourth of third number. The value of the third number is 2400. What is the 45% of first number?

(a) 109.8 (b) 111.7
(c) 117.6 (d) None of these

[IBPS Bank PO, 2011]

96. Bhawna decided to donate 12% of her salary to an orphanage. On the day of donation she changed her mind and donated ₹2400 which was 125% of what she had decided earlier. How much is Bhawna's salary?

(a) ₹14750 (b) ₹16000
(c) ₹18500 (d) Cannot be determined

[Uttrakhand GBO PO, 2007]

97. If the numerator of a fraction is increased by 400% and the denominator is increased by 500%. The resultant fraction is 20/27. What was the original fraction?

(a) $\frac{9}{8}$ (b) $\frac{11}{12}$
(c) $\frac{3}{4}$ (d) None of these

[New Indian Insurance PO, 2009]

98. Two numbers are less than a third number by 30% and 37%, respectively. How much per cent is the second number less than the first?

(a) 7% (b) 10%
(c) 4% (d) 3%

[SSC (GL) Prel. Examination, 2002]

99. 8% of the voters in an election did not cast their votes. In this election, there were only two candidates. The winner by obtaining 48% of the total votes defeated his rival by 1100 votes. The total number of voters in the election was:

(a) 2100 (b) 23500
(c) 22000 (d) 27500

[SSC (GL) Prel. Examination, 2003]

100. A candidate appearing for an examination has to secure 35% marks to pass. But he secured only 40 marks and failed by 30 marks. What would be the maximum marks of test?

(a) 280 (b) 180
(c) 200 (d) 150

[Corporation Bank PO, 2009]

101. In a test, minimum passing percentage for girls and boys is 35% and 40% respectively. A boy scored 483 marks and failed by 117 marks. What are the minimum passing marks for girls?

(a) 425 (b) 520
(c) 500 (d) None of these

[CBI (PO), 2010]

102. A trader marked the selling price of an article at 10% above the cost price. At the time of selling he allows certain discount and suffers a loss of 1%. He allowed a discount of:

(a) 11% (b) 10%
(c) 9% (d) 10.5%

[SSC (GL) Prel. Examination, 2003]

103. A person gave 20% of his income to his elder son, 30% of the remaining to the younger son and 10% of the balance he denoted to a trust. He is left with ₹10080. His income was:

(a) ₹50000 (b) ₹40000
(c) ₹30000 (d) ₹20000

[SSC (GL) Prel. Examination, 2003]

104. A reduction of 20% in the price of rice enables a person to buy 3.5 Kg more rice for ₹385. The original price of rice per Kg is:

(a) ₹20 (b) ₹22.50
(c) ₹25 (d) ₹27.50

[SSC (GL) Prel. Examination, 2003]

105. The price of an article is raised by 30% and then two successive discounts of 10% each are allowed. Ultimately the price of the article is:

(a) Increased by 10% (b) Increased by 5.3%
(c) Decreased by 3% (d) Decreased by 5.3%

[SSC (GL) Prel. Examination, 2003]

106. A tradesman gives 4% discount on the marked price and gives 1 article free for buying every 15 articles and thus gains 35%. The marked price is increased above the cost price by:

(a) 40% (b) 39%
(c) 50% (d) 20%

[SSC (GL) Prel. Examination, 2003

107. The number that is to be added to 10% of 320 to have the sum as 30% of 230 is:

(a) 37 (b) 32
(c) 23 (d) 73

[SSC, 2014]

108. The strength of a school increases and decreases in every alternate year by 10%. It started with increase in 2000. Then the strength of the school in 2003 as compared to that in 2000 was:

(a) Increased by 8.9%
(b) Decreased by 8.9%
(c) Increased by 9.8%
(d) Decreased by 9.8%

[SSC, 2014]

109. Two years ago, the value of a motorbike was ₹62,500. If the value depreciates by 4% every year, now its value is:

(a) ₹56,700 (b) ₹57,600
(c) ₹57,500 (d) ₹55,700

[SSC, 2014]

110. A number increased by $22\frac{1}{2}\%$ gives 98. The number is:

(a) 45 (b) 18
(c) 80 (d) 81

[SSC, 2013]

111. In an examination A got 25% marks more than B, B got 10% less than C and C got 25% more than D. If D got 320 marks out of 500, the marks obtained by A were:

(a) 405 (b) 450
(c) 360 (d) 400

[SSC, 2013]

112. Three sets of 40, 50 and 60 students appeared for an examination and the pass percentage was 100, 90 and 80, respectively. The pass percentage of the whole set is:

(a) $88\frac{2}{3}$ (b) $84\frac{2}{3}$

(c) $88\frac{1}{3}$ (d) $84\frac{1}{3}$

[SSC, 2013]

113. A clerk received annual salary of ₹3,660 in the year 1975. This was 20% more than his salary in 1974. What was his salary in 1974?

(a) ₹3,005 (b) ₹3,000
(c) ₹3,500 (d) ₹3,050

[SSC Assistant Grade III, 2013]

114. Out of his total income, Mr. Kapur spends 20% on house rent and 70% of the rest on household expenses. If he saves ₹1,800, what is his total income?

(a) 7,800 (b) 7,000
(c) 8,000 (d) 7,500

[SSC Assistant Grade III, 2013]

115. Rama's expenditure and savings are in the ratio3:2. His income increases by 10 per cent. His expenditure also increases by 12%. His savingsincreases by:

(a) 7% (b) 10%
(c) 9% (d) 13%

[SSC Assistant Grade III, 2012]

116. If the numerator of a fraction is increased by 150% and the denominator of the fraction is increased by 350%, the resultant fraction is $\frac{25}{51}$, what is the original fraction?

(a) $\frac{11}{17}$ (b) $\frac{11}{15}$

(c) $\frac{15}{17}$ (d) $\frac{13}{15}$

(e) None of these

[Corporation Bank PO, 2010]

117. Two numbers are 30% and 40% more than the third number respectively. The first number is x% of the second. Then x = ?

(a) $105\frac{2}{13}$ (b) 140

(c) $105\frac{5}{7}$ (d) $92\frac{6}{7}$

[SSC Assistant Grade III, 2012]

118. The price of cooking oil has increased by 25%. The percentage of reduction that a family should effect in the use of cooking oil, so as not to increase the expenditure on this account, is:

(a) 15% (b) 20%
(c) 25% (d) 30%

[SSC Assistant Grade III, 2012]

119. In an examination, 52% of the candidates failed in English and 42% failed in Mathematics. If 17% failed in both the subjects, then the percentage of candidates, who passed in both the subjects, was:

(a) 23 (b) 21
(c) 25 (d) 22

[SSC, 2012]

120. In an election there were only two candidates. One of the candidates secured 40% of votes and is defeated by the other candidate by 298 votes. The total number of votes polled is:

(a) 745 (b) 1460
(c) 1490 (d) 1500

[SSC, 2012]

121. A jar contains 10 red marbles and 30 green ones. How many red marbles must be added to the jar so that 60% of the marbles will be red?

(a) 25 (b) 30
(c) 35 (d) 40

[SSC, 2011]

122. If a number multiplied by 25% of itself gives a number which is 200% more than number, then the number is:

(a) 12 (b) 16
(c) 20 (d) 24

[SSC, 2011]

123. The price of onions has been increased by 50%. In order to keep the expenditure on onions the same the percentage of reduction in consumption has to be:

(a) 50% (b) $33\frac{1}{3}$%

(c) 33% (d) 30%

[SSC, 2011]

124. When the price of a toy was increased by 20%, the number of toys sold was decreased by 15%. What was its effect on the total sales of the shop?

(a) 2% increase (b) 2% decrease
(c) 4% increase (d) 4% decrease

[SSC, 2010]

125. Krishnamurthy earns ₹15000 per month and spends 80% of it. Due to pay revision, his monthly income has increased by 20% but due to price rise, he has to spend 20% more. His new savings are:

(a) ₹3,400 (b) ₹3,000
(c) ₹3,600 (d) ₹4,000

[SSC, 2010]

126. Two numbers are respectively $12\frac{1}{2}$ % and 25%more than a third number. The first number is how much per cent of the second number?
(a) 90 (b) 87.5
(c) 25 (d) 12.5

[SSC, 2010]

127. Population of a town increases 2.5% annually but is decreased by 0.5% every year due to migration. What will be the percentage of increase in 2 years?
(a) 5 (b) 4.04
(c) 4 (d) 3.96

[SSC, 2010]

128. A merchant has announced 25% rebate on prices of ready-made garments at the time of sale. If a purchaser needs to have a rebate of ₹400, then how many shirts, each costing ₹320 should he purchase?
(a) 10 (b) 7
(c) 6 (d) 5

[SSC, 2010]

129. A reduction of 10% in the price of tea enables a dealer to purchase 25 Kg more tea for ₹22500. What is the reduced price per Kg of tea?
(a) ₹70 (b) ₹80
(c) ₹90 (d) ₹100

[SSC, 2010]

130. Ram donated 4% of his income to a charity and deposited 10% of the rest in a Bank. If now he has ₹8640 left with him, then his income is:
(a) ₹12,500 (b) ₹12,000
(c) ₹10,500 (d) ₹10,000

[SSC, 2010]

131. 134% of 3894 + 38.94 of l34 = ?
(a) 11452 (b) 10000
(c) 10452 (d) 1100
(e) None of these

[IBPS PO/MT, 2013]

132. 23% of 6783 + 57% of 8431 = ?
(a) 6460 (b) 6420
(c) 6320 (d) 6630
(e) 6360

[IBPS PO/MT, 2012]

133. The sum of three consecutive numbers is 2262. What is 41% of the highest number?
(a) 301.51 (b) 303.14
(c) 308.73 (d) 306.35
(e) 309.55

[IBPS PO/MT, 2012]

134. Akash scored 73 marks in subject A. He scored 56% marks in subject B and X marks in subject C. Maximum marks in each subject were 150. The overall percentage marks obtained by Akash in all three subjects together was 54%. How many marks did he score in subject C?
(a) 84 (b) 86
(c) 79 (d) 73
(e) None of these

[IBPS PO/MT, 2012]

Directions (Q. 135): What approximate value should come in place of question mark (?) in the following question? (Note: You are not expected to calculate the exact value.)

135. 39.897% of 4331 + 58.779% of 5003 =?
(a) 4300 (b) 4500
(c) 4700 (d) 4900
(e) 5100

[IBPS PO/MT, 2011]

136. Ramola's monthly income is three times Ravina's monthly income. Ravina's monthly income is fifteen percent more than Ruchira's monthly income. Ruchira's monthly income is ₹32,000. What is Ramola's annual income?
(a) ₹1,10.400 (b) ₹13,24,800
(c) ₹36,800 (d) ₹52,200
(e) None of these

[IBPS PO/MT, 2011]

137. In a test, a candidates secured 468 marks out of maximum marks 'A'. Had the maximum marks 'A' converted to 700, he would have secured 336 marks. What was the maximum marks of the test?
(a) 775 (b) 875
(c) 975 (d) 1075
(e) None of these

[IBPS PO/MT, 2011]

138. Six-elevenths of a number is equal to 22 per cent of the second number. The second number is equal to one-fourth of the third number. The value of the third number is 2400. What is 45% of the first number?
(a) 109.8 (b) 111.7
(c) 117.6 (d) 123.4
(e) None of these

[IBPS PO/MT, 2011]

Directions (Q. 139): What will come in place of question mark(?) in the following question?

139. 32.05% of 259.99 =?

(a) 92 (b) 88
(c) 78 (d) 90
(e) 83

[SBI Associates Banks PO, 2011]

140. Mr X invested a certain amount in Debt and Equity Funds in the ratio of 4:5. At the end of one year, he earned a total dividend of 30% on his investment. After one year, he reinvested the amount including the dividend in the ratio of 6:7 in Debt and Equity Funds. If the amount reinvested in Equity Funds was ₹94,500, what was the original amount invested in Equity Funds?

(a) ₹75,000 (b) ₹81,000
(c) ₹60,000 (d) ₹65,000
(e) None of these

[SBI Associates Banks PO, 2011]

141. The product of one-third of a number and 150% of another number is what per cent of the product of the original numbers?

(a) 80% (b) 50%
(c) 75% (d) 120%
(e) None of these

[SBI Associates Banks PO, 2011]

142. Mr Shamin's salary increases every year by 10% in June. If there is no other increase or reduction in the salary and his salary in June 2011 was ₹22,385, what was his salary in June 2009?

(a) ₹18,650 (b) ₹18.000
(c) ₹19,250 (d) ₹18,500
(e) None of these

[SBI Associates Banks PO, 2011]

143. How many students passed in first class?

Statements:

I. 85% of the students who appeared in examination have passed either in first class or in second class or in pass class.

II. 750 students have passed in second class.

III. The number of students who passed in pass class is 28% of those passed in second class.

(a) All I, II and III
(b) Only I and III
(c) Only II and III
(d) Question cannot be answered even with information in all three statements.
(e) None of these

[SBI Associates Banks PO, 2011]

144. 34.5% of 1800 + 12.4% of 1500 = $(?)^3$ + 78:

(a) 27 (b) 9
(c) 81 (d) 162
(e) None of these

[Indian Overseas Bank PO, 2011]

145. 67% of 801 – 231.17 = ? –23% of 789:

(a) 490 (b) 440
(c) 540 (d) 520
(e) 590

[Indian Overseas Bank PO, 2011]

146. Five-ninths of a number is equal to twenty five per cent of the second number. The second number is equal to one-fourth of the third number. The value of the third number is 2960. What is 30 per cent of the first number?

(a) 88.8 (b) 99.9
(c) 66.6 (d) Cannot be determined
(e) None of these

[Indian Overseas Bank PO, 2011]

147. Dinesh's monthly income is four times Suresh's monthly income. Suresh's monthly income is twenty per cent more than Jyoti's monthly income. Jyoti's monthly income is ₹22,000. What is Dinesh's monthly income?

(a) ₹1,06,500 (b) ₹1,05,600
(c) ₹1,04,500 (d) ₹1,05,400
(e) None of these

[Indian Overseas Bank PO, 2011]

148. In a school there are 250 students, out of whom 12 per cent are girls. Each girl's monthly fee is ₹450 and each boy's monthly fee is 24 per cent more than that of a girl. What is the total monthly fee of girls and boys together?

(a) ₹1,36,620 (b) ₹1,36,260
(c) ₹1,32,660 (d) ₹1,32,460
(e) None of these

[Indian Overseas Bank PO, 2011]

149. A sum of ₹731 is distributed among A, B and C, suchthat A receives 25% more than B and B receives 25% less than C. What is C's share in the amount?

(a) ₹172 (b) ₹200
(c) ₹262 (d) ₹258
(e) None of these

[Andhra Bank PO, 2011]

150. Pradeep invested 20% more than Mohit. Mohit invested 10% less than Raghu. If the total sum of their investment is ₹17,880, how much amount did Raghu invest?

(a) ₹6,000 (b) ₹8,000
(c) ₹7,000 (d) ₹5,000
(e) None of these

[Corporation Bank PO, 2011]

151. If the numerator of a fraction is increased by 150% and the denominator of the fraction is increase by 300%, the resultant fraction is $\frac{5}{18}$. What is the original fraction?

(a) $\frac{4}{9}$ (b) $\frac{4}{5}$
(c) $\frac{8}{9}$ (d) $\frac{8}{11}$
(e) None of these

[Punjab and Sind Bank PO, 2011]

152. In a test, minimum passing percentage for girls and boys is 35% and 40% respectively. A boy scored 483 marks and failed by 117 marks. What is the minimum passing marks for girls?

(a) 425 (b) 520
(c) 500 (d) 625
(e) None of these

[Central Bank of India PO, 2010]

153. Twelve per cent of Kaushal's monthly salary is equal to sixteen per cent of Nandini's monthly salary. Suresh's monthly salary is half that of Nandini's monthly salary. If Suresh's annual salary is ₹1.08 Lakhs, what is Kaushal's monthly salary?

(a) ₹20,000 (b) ₹18,000
(c) ₹26,000 (d) ₹24,000
(e) None of these

[Central Bank of India PO, 2010]

154. Rita invested 25% more than Sunil. Sunil invested 30% less than Abhinav, who invested ₹6,000. What is the ratio of the amount that Rita invested to the total amount invested by all of them together?

(a) 35:104 (b) 13:29
(c) 101:36 (d) 35:103
(e) None of these

[Punjab and Sind Bank PO, 2010]

155. 15% of 578 + 22.5% of 644 = ?

(a) 213.4 (b) 233.6
(c) 231.8 (d) 231.6
(e) None of these

[Indian Bank PO, 2010]

156. Sonu invested 10% more than Mona. Mona invested 10% less than Raghu. If the total sum of their investments is ₹5,780, how much amount did Raghu invest?

(a) ₹2,010 (b) ₹2,000
(c) ₹2,100 (d) ₹2,210
(e) None of these

[Indian Bank PO, 2010]

157. Rahul spends 50% of his monthly income on household items, 20% of his monthly income on buying clothes, 5% of his monthly income on medicines and the remaining amount of ₹11,250 he saves. What is Rahul's monthly income?

(a) ₹38,200 (b) ₹34,000
(c) ₹41,600 (d) ₹45,000
(e) None of these

[IDBI Bank PO, 2009]

158. Asha's monthly income is 60% of Deepak's monthly income and 120% of Maya's monthly income. What is Maya's monthly income if Deepak's monthly income is ₹78,000?

(a) ₹39,000 (b) ₹42,000
(c) ₹36,000 (d) Cannot be determined
(e) None of these

[NABARD Bank Officer, 2009]

159. If the numerator of a fraction is increased by 240% and the denominator of the fraction is decreased by 50%, the resultant fraction is $2\frac{5}{6}$, what is the original fraction?

(a) $\frac{1}{4}$ (b) $\frac{2}{3}$
(c) $\frac{5}{12}$ (d) $\frac{4}{11}$
(e) None of these

[NABARD Bank Officer, 2009]

160. 40% of 60% of $\frac{3}{5}$ of a number is 504. What is 25% of $\frac{2}{5}$ of that number?

(a) 130 (b) 175
(c) 360 (d) 350
(e) None of these

[NABARD Bank Officer, 2009]

161. In a test consisting of 80 questions carrying one markeach, Arpita answers 65% of the first 40 questions correctly. What percent of the other 40 questions does she need to answer correctly to score 75% on the entire test?

(a) 60 (b) 80
(c) 75 (d) 40
(e) None of these

[NABARD Bank Officer]

162. Aman's expense is 30% more than Vimal's and Vimal's expense is 10% less than Raman's. If the sum of their expenses is ₹6,447, then what would be Aman's expense?

(a) ₹2,200 (b) ₹2,457
(c) ₹1,890 (d) ₹ 2,100
(e) None of these

[Corporation Bank PO, 2009]

163. A candidate appearing for an examination has to secure 35% marks to pass. But he secured only 40 marks and failed by 30 marks. What would be the maximum marks of test?

(a) 280 (b) 180
(c) 200 (d) 150
(e) 210

[Corporation Bank PO, 2009]

ANSWER KEYS

EXERCISE-1

1. (a) **2.** (b) **3.** (b) **4.** (c) **5.** (b) **6.** (c) **7.** (b) **8.** (a) **9.** (c) **10.** (c) **11.** (c) **12.** (b) **13.** (c)
14. (a) **15.** (b) **16.** (b) **17.** (c) **18.** (b) **19.** (b) **20.** (c) **21.** (b) **22.** (c) **23.** (b) **24.** (c) **25.** (a) **26.** (b)
27. (c) **28.** (b) **29.** (b) **30.** (a) **31.** (b) **32.** (a) **33.** (b) **34.** (a) **35.** (b) **36.** (c) **37.** (d) **38.** (b) **39.** (b)
40. (b) **41.** (a) **42.** (c) **43.** (a) **44.** (a) **45.** (b) **46.** (b) **47.** (a) **48.** (a) **49.** (c) **50.** (a) **51.** (a) **52.** (b)
53. (c) **54.** (c) **55.** (b) **56.** (c) **57.** (c) **58.** (b) **59.** (a) **60.** (b) **61.** (b) **62.** (c) **63.** (b) **64.** (b) **65.** (a)
66. (b) **67.** (a) **68.** (a) **69.** (c) **70.** (a) **71.** (a)

EXERCISE-2

1. (c) **2.** (c) **3.** (b) **4.** (e) **5.** (d) **6.** (d) **7.** (d) **8.** (a) **9.** (b) **10.** (a) **11.** (c) **12.** (a) **13.** (a)
14. (b) **15.** (b) **16.** (b) **17.** (e) **18.** (c) **19.** (e) **20.** (a) **21.** (d) **22.** (b) **23.** (c) **24.** (d) **25.** (c) **26.** (d)
27. (a) **28.** (e) **29.** (e) **30.** (c) **31.** (a) **32.** (c) **33.** (b) **34.** (d) **35.** (c) **36.** (d) **37.** (c) **38.** (a) **39.** (d)
40. (b) **41.** (c) **42.** (b) **43.** (d) **44.** (c) **45.** (b) **46.** (c) **47.** (a) **48.** (b) **49.** (b) **50.** (a) **51.** (d) **52.** (d)
53. (b) **54.** (d) **55.** (b) **56.** (b) **57.** (c) **58.** (b) **59.** (e) **60.** (d) **61.** (a) **62.** (a) **63.** (c) **64.** (b) **65.** (b)
66. (d) **67.** (c) **68.** (d) **69.** (b) **70.** (d) **71.** (d) **72.** (a) **73.** (b) **74.** (a) **75.** (b) **76.** (a) **77.** (a) **78.** (a)
79. (b) **80.** (d) **81.** (c) **82.** (a) **83.** (c) **84.** (c) **85.** (a) **86.** (b) **87.** (a) **88.** (b) **89.** (c) **90.** (a) **91.** (d)
92. (c) **93.** (c) **94.** (d) **95.** (d) **96.** (b) **97.** (d) **98.** (b) **99.** (d) **100.** (c) **101.** (d) **102.** (b) **103.** (d) **104.** (d)
105. (b) **106.** (c) **107.** (a) **108.** (a) **109.** (b) **110.** (c) **111.** (b) **112.** (a) **113.** (d) **114.** (d) **115.** (a) **116.** (c) **117.** (d)
118. (b) **119.** (a) **120.** (c) **121.** (c) **122.** (a) **123.** (b) **124.** (a) **125.** (c) **126.** (a) **127.** (c) **128.** (d) **129.** (c) **130.** (d)
131. (c) **132.** (e) **133.** (e) **134.** (b) **135.** (c) **136.** (b) **137.** (c) **138.** (e) **139.** (e) **140.** (a) **141.** (b) **142.** (d) **143.** (d)
144. (b) **145.** (a) **146.** (b) **147.** (b) **148.** (b) **149.** (e) **150.** (a) **151.** (a) **152.** (e) **153.** (d) **154.** (d) **155.** (d) **156.** (b)
157. (d) **158.** (a) **159.** (c) **160.** (d) **161.** (e) **162.** (b) **163.** (c)

EXPLANATORY ANSWERS

EXERCISE-I

1. (a) $5\frac{1}{4} = \frac{21}{4} = \frac{21}{4} \times 100 = 525\%$

2. (b) $0.005 = \frac{5}{1000} = \frac{5}{1000} \times 100 = \frac{1}{2}\%$

3. (b) $6\frac{2}{3}\% = \frac{\left(\frac{20}{3}\right)}{100} = \left(\frac{20}{3} \times \frac{1}{100}\right) = \frac{1}{15}$.

4. (c) $0 \cdot 6\% = \frac{0 \cdot 6}{100} = \frac{6}{1000} = \frac{3}{500}$.

5. (b) $.025 = \left(\frac{25}{1000} \times 100\right)\% = 2.5\%$

6. (c) Let x% of 12 = 84

$\Rightarrow \frac{x}{100} \times 12 = 84$

$\Rightarrow x = \frac{84 \times 100}{12} = 700.$

$\therefore$ 700% of 12 is 84.

7. (b) $\frac{7}{8} = \left(\frac{7}{8} \times 100\right)\% = \frac{175}{2}\% = 87\frac{1}{2}\%$

8. (a) $8\frac{1}{3}\% = \frac{25}{3}\% = \frac{25}{3} \times \frac{1}{100} = \frac{1}{12}$.

9. (c) $37\frac{1}{2}\%$ of ₹48 $= 48 \times \frac{75}{2 \times 100} =$ ₹18.

10. (c) Let x% of $\frac{2}{7} = \frac{1}{35}$

$\Rightarrow x = \frac{100 \times 7}{2 \times 35} = 10.$

$\therefore$ 10% of $\frac{2}{7}$ is $\frac{1}{35}$.

11. (c) Let 75% of 480 = $x \times 15$.

Then, $\frac{75}{100} \times 480 = 15x$

or, $x = \frac{75 \times 480}{100 \times 15} = 24.$

12. (b) Let 200% of $x = 90 \Rightarrow \frac{200}{100} \times x = 90$

$\Rightarrow x = \frac{100 \times 90}{200} = 45.$

$\therefore$ 80% of 45 $= \frac{80}{100} = 45 = 36.$

13. (c) Let the number be x, then

$37\frac{1}{2}\%$ of $x = 45 \Rightarrow \frac{75}{2} \times \frac{1}{100} \times x = 45$

or, $\frac{3}{8}x = 45 \Rightarrow x = \frac{45 \times 8}{3} = 120.$

$\therefore 87\frac{1}{2}\%$ of 120 $= \frac{75}{2} \times \frac{1}{100} \times 120 = 105.$

14. (a) Let $x \times 15 = 37.5\%$ of 220

$\Rightarrow 15x = \frac{37.5}{100} \times 220$

$\Rightarrow x = \frac{37.5 \times 220}{15 \times 100} = 5.5.$

15. (b) Let x% of 4 Km = 8 metre

$\Rightarrow \frac{x}{100} \times 4000 = 8$ ($\because$ 1 Km = 1000 metre)

$\Rightarrow x = \frac{8 \times 100}{4000} = \frac{1}{5} = 0.2$

$\therefore$ 0.2% of 4 Km = 8 metre.

16. (b) x% of $y + y$% of $x = \left(\frac{x}{100} \times y\right) + \left(\frac{y}{100} \times x\right)$

$= \frac{2}{100}xy = 2\%$ of xy.

17. (c) $0.35\% = 0{\cdot}35 \times \frac{1}{100} = 0.0035.$

18. (b) We have, 8% of x = 4% of y

$\Rightarrow \frac{8}{100} \times x = \frac{4}{100} \times y \Rightarrow x = \left(\frac{4}{100} \times \frac{100}{8}\right)y = \frac{y}{2}$.

$\therefore$ 20% of $x = \frac{20}{100} \times x = \frac{20}{100} \times \frac{y}{2}$

$= \frac{10}{100} \times y$

= 10% of y.

19. (b) Let the missing figure be a.

We have, $\frac{x}{100} \times y + \frac{a}{100} \times x = \frac{x}{100} \times (x + y)$

$\Rightarrow xy + ax = x(x + y)$

$\Rightarrow ax = x^2$. $\therefore$ $a = x$.

20. (c) We have, $x = 125\%$ of $y \Rightarrow x = \frac{125}{100}y = \frac{5}{4}y$

or, $y = \frac{4}{5}x = 0.8x.$

21. (b) 25% of 25% $= \frac{25}{100} \times \frac{25}{100} = \frac{625}{10000} = 0.0625.$

22. **(c)** Required number = 80 – 60% of 80

$= 80 - \frac{60}{100} \times 80 = 32.$

23. **(b)** 20% of 30% of 20% of 850

$= \frac{20}{100} \times \frac{30}{100} \times \frac{20}{100} \times 850 = \frac{1020}{100} = ₹10.20.$

24. **(c)** $16\frac{2}{3}\% = \frac{50}{3} \times \frac{1}{100} \times \frac{1}{6} = 0.167 < 0.3.$

$6\frac{2}{3}\% = \frac{20}{3} \times \frac{1}{100} = \frac{1}{15} = 0.067 < 0.3.$

$\therefore$ 0.3 is greatest.

25. **(a)** 40% of 20% $= \frac{40}{100} \times \frac{20}{100} = \frac{8}{100} = 8\%$

30% of 25% $= \frac{30}{100} \times \frac{25}{100} = \frac{75}{100} = 7.5\%$

and, 50% of 28% $= \frac{50}{100} \times \frac{28}{100} = \frac{14}{100} = 14\%$

$\therefore$ (40% of 20% + 30% of 25% + 50% of 28%)
= 8% + 7.5% + 14% = 29.5%.

26. **(b)** We have, $\frac{90}{100} \times A = \frac{30}{100} \times B$

$= \frac{30}{100} \times \frac{x}{100} \times A$

$\therefore \quad x = \left(100 \times \frac{100}{30} \times \frac{90}{100}\right) = 300.$

27. **(c)** Let 1 quintal 25 Kg = x% of 1 metric tonne

$\Rightarrow x\% = \frac{125}{1000} = \frac{1}{8} = \frac{1}{8} \times 100\%$

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

28. **(b)** We have, 12% of x = 6% of y

$\Rightarrow$ 2% of x = 1% of y

$\Rightarrow$ (2 × 9)% of x = (1 × 9)% of y

$\Rightarrow$ 18% of x = 9% of y.

29. **(b)** Here, $x = 20$.

$\therefore$ Required answer $= \left(\frac{x}{100+x} \times 100\right)\%$

$= \left(\frac{20}{100+20} \times 100\right)\% = 16\frac{2}{3}\%$

30. **(a)** Here, $x = 25$.

$\therefore$ Required answer $= \left(\frac{x}{100-x} \times 100\right)\%$

$= \left(\frac{25}{100-25} \times 100\right)\%$

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

31. **(b)** Here, $l = 7$ and $m = 28$.

$\therefore$ First number $= \frac{1}{m} \times 100\%$ of second number

$= \frac{7}{28} \times 100\%$ of second number

or, 25% of second number.

32. **(a)** Here, $x = 60$ and $y = 20$.

$\therefore$ Second number $= \left(\frac{100+y}{100+x} \times 100\right)\%$ of the first

$= \left(\frac{100+20}{100+60} \times 100\right)\%$ of the first

i.e., 75% of the first.

33. **(b)** Here, $x = 30$ and $y = 37$.

$\therefore$ Second number $= \left(\frac{100-y}{100-x} \times 100\right)\%$ of the first

$= \left(\frac{100-37}{100-30} \times 100\right)\%$ of the first

i.e., 90% of the first.

34. **(a)** Here $x = 20$ and $y = 10$.

$\therefore$ First number $= \left(\frac{100+x}{100+y} \times 100\right)\%$ of the second

$= \left(\frac{100+20}{100+10} \times 100\right)\%$ of the second

i.e., $109\frac{1}{11}\%$ of the second.

$\therefore$ The first number is $9\frac{1}{11}\%$ more than the second.

35. **(b)** Reduction in consumption

$= \left(\frac{P}{100+P} \times 100\right)\%$

$= \left(\frac{15}{100+15} \times 100\right)\%$ or $13\frac{1}{23}\%$

36. **(c)** Increase in consumption

$= \left(\frac{P}{100-P} \times 100\right)\%$

$= \left(\frac{10}{100-10} \times 100\right)\%$ or $11\frac{1}{9}\%$

37. **(d)** Here, $x = 20$ and $y = -20$.

$\therefore$ The net % change in value

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(20 - 20 - \frac{20 \times 20}{100}\right)\%$ or –4%.

Since the sign is –ve, there is decrease in value by 4%

38. **(b)** Here, $x = -50$ and $y = 50$.

$\therefore$ The net % change in wages

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(-50 + 50 - \frac{50 \times 50}{100}\right)\%$

or, –25%.

Since the sign is –ve, he has a loss of 25%

39. **(b)** Here, $x = -20$ and $y = -25$.

$\therefore$ The net % change in population

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(-20 - 25 + \frac{20 \times 25}{100}\right)$ or –40%

Since the sign is –ve, the population is decreased by 40% after two years.

40. **(b)** The equivalent discount of two successive discounts of 20% and 20%

$= \left(x + y + \frac{xy}{100}\right)$ %

$= \left(-20 - 20 + \frac{20 \times 20}{100}\right)$ % or –36%

Given: 36% – 35% = ₹22.

$\therefore$ Amount of the bill = 22 × 100 = ₹2200.

41. **(a)** Here, $x = 25$ and $y = -12$.

$\therefore$ The net% change in original price

$= \left(x + y + \frac{xy}{100}\right)$

$= \left(25 - 12 - \frac{25 \times 12}{100}\right)$ % or 10%

Since the sign is +ve, there is a profit of 10%

42. **(c)** The equivalent discount of two successive discounts of 20% and 10%

$= \left(x + y + \frac{xy}{100}\right)$ % $= \left(-20 - 10 + \frac{20 \times 10}{100}\right)$ % or 28%

$\therefore$ Discount on the list price of the radio offered by the first shopkeeper

= 28% of 1000 = $\frac{28}{100}$ × 1000 = ₹280.

Also, the equivalent discount of two successive discounts of 15% and 15%

$= \left(x + y + \frac{xy}{100}\right)$ %

$= \left(-15 - 15 + \frac{15 \times 15}{100}\right)$ % or $27\frac{3}{4}$ %

$\therefore$ Discount on the list price of radio offered by the second shopkeeper

= $27\frac{3}{4}$ % of 1000 = $\frac{111}{400}$ × 1000

= ₹277.50.

$\therefore$ Difference in discounts offered by the two shopkeepers = ₹280 – ₹277.50 = ₹2.50.

43. **(a)** Since tax × consumption = revenue

$\therefore$ Net % change in revenue

$= \left(x + y + \frac{xy}{100}\right)\% = \left(-10 + 10 - \frac{10 \times 10}{100}\right)\%$

[Here $x = -10$ and $y = 10$]

$= -1\%$.

$\therefore$ The revenue decreases by 1%

44. **(a)** Since 4π × radius × radius = surface area

$\therefore$ Net % change in area = $\left(x + y + \frac{xy}{100}\right)\%$

$= \left(10 + 10 + \frac{10 \times 10}{100}\right)\% = 21\%$

45. **(b)** We have, receipts = price × sales.

$\therefore$ Net % change in receipts

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(-15 + 35 - \frac{15 \times 35}{100}\right)\% = 14\frac{3}{4}\%$

46. **(b)** Since side × side = area

$\therefore$ Net % change in area

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(30 + 30 + \frac{30 \times 30}{100}\right)\% = 69\%$

$\therefore$ The area is increased by 69%

47. **(a)** Since $\text{side}_1 \times \text{side}_2$ = area

$\therefore$ Net % change in area

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(30 + 20 + \frac{30 \times 20}{100}\right)\%$ [Here, $x = 30$ and $y = 20$]

= 56%

$\therefore$ The area of the rectangle so formed exceeds the area of the square by 56%

48. **(a)** Since $\text{side}_1 \times \text{side}_2$ = area

$\therefore$ Error % in area = $\left(x + y + \frac{xy}{100}\right)\%$

$= \left(10 - 20 - \frac{10 \times 20}{100}\right)\%$ [Here, $x = 10$ and $y = -20$]

= –12%, i.e., 12% deficit.

49. (c) Since $\text{side}_1 \times \text{side}_2 = \text{area}$

$\therefore$ Net % change in area

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(10 + 20 + \frac{10 \times 20}{100}\right)\%$

$= 32\%$

$\therefore$ The area of the rectangle increases by 32%.

50. (a) Since tax × consumption = expenditure

$\therefore$ Net % change in expenditure

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(20 - 20 - \frac{20 \times 20}{100}\right)\%$ [Here, $x = 20$ and $y = -20$]

$= -4\%$

$\therefore$ Expenditure decreases by 4%

51. (a) Net % change in revenue

$= \left(x + y + \frac{xy}{100}\right)\%$

$= \left(-30 + 20\frac{30 \times 20}{100}\right)\%$

[Here, $x = -30$ and $y = 20$]

$= -16\%$

52. (b) We have, $P = 90.51$, $r = 10$ and $n = 3$.

$\therefore$ The population 3 years ago

$= \frac{P}{\left(1 + \frac{r}{100}\right)^n} = \frac{90 \cdot 51}{\left(1 + \frac{10}{100}\right)^3}$

$= \frac{9051}{100} \times \frac{100}{110} \times \frac{100}{110} \times \frac{100}{110}$

$= 68$ Lakhs.

53. (c) Here, $P = 8748$, $r = -10$ and $n = 3$.

$\therefore$ Purchase price of the machine

$= \frac{P}{\left(1 + \frac{r}{100}\right)^n} = \frac{8748}{\left(1 - \frac{10}{100}\right)^3}$

$= \frac{8748 \times 100 \times 100 \times 100}{90 \times 90 \times 90} = ₹12000.$

54. (c) Here, $P = 2664000$, $r = 20$ and $n = 2$.

$\therefore$ Company's income in the year 1997

$= \frac{P}{\left(1 + \frac{r}{100}\right)^n} = \frac{2664000}{\left(1 + \frac{20}{100}\right)^2}$

$= \frac{2664000 \times 5 \times 5}{6 \times 6}$

$= ₹1850000.$

55. (b) Here, $P = 32000$, $r = 15$ and $n = 2$.

$\therefore$ Population of the town in 2 years

$= P\left(1 + \frac{r}{100}\right)^n = 32000\left(1 + \frac{15}{100}\right)^2$

$= 32000 \times \frac{115}{100} \times \frac{115}{100} = 42320.$

56. (c) Here, $A = 6250$, $x = -10$, $y = -20$ and $z = -30$.

$\therefore$ Value of the machine after 3 years

$= A\left(1 + \frac{x}{100}\right)\left(1 + \frac{y}{100}\right)\left(1 + \frac{z}{100}\right)$

$= 6250\left(1 - \frac{10}{100}\right)\left(1 - \frac{20}{100}\right)\left(1 - \frac{30}{100}\right)$

$= \frac{6250 \times 90 \times 80 \times 70}{100 \times 100 \times 100} = ₹3150.$

57. (c) Here, $A = 50400$, $x = 12$ and $y = -10$.

$\therefore$ Population of the town 2 years ago

$= \frac{A}{\left(1 + \frac{x}{100}\right)\left(1 + \frac{y}{100}\right)}$

$= \frac{50400}{\left(1 + \frac{12}{100}\right)\left(1 - \frac{10}{100}\right)}$

$= \frac{50400 \times 100 \times 100}{112 \times 90}$

$= 50000.$

58. (b) Let ₹A be the pocket money.

Then, $A\left(1 + \frac{x}{100}\right)\left(1 + \frac{y}{100}\right) = 480$ (Given)

Here, $x = -20$ and $y = -25$.

$\therefore \quad A\left(1 - \frac{20}{100}\right)\left(1 - \frac{25}{100}\right) = 480$

$\Rightarrow A = \frac{480 \times 100 \times 100}{80 \times 75} = ₹800.$

59. (a) Let A be the original strength.

Then, $A\left(1 + \frac{x}{100}\right)\left(1 + \frac{y}{100}\right)\left(1 + \frac{z}{100}\right) = 729000$ (Given)

Here, $x = -10$, $y = -10$ and $z = -10$.

$\therefore \quad A\left(1 - \frac{10}{100}\right)\left(1 - \frac{10}{100}\right)\left(1 - \frac{10}{100}\right) = 729000$

$\Rightarrow A = \frac{729000 \times 100 \times 100 \times 100}{90 \times 90 \times 90} = 1000000$ men.

60. (b) Let the daily wage before the increase was ₹A.

Then, $A\left(1 + \frac{x}{100}\right) = 25$. Here, $x = 25$.

$\therefore \quad A\left(1 + \frac{25}{100}\right) = 25 \Rightarrow A = \frac{25 \times 100}{125} = ₹20.$

61. **(b)** Here, $x = 15$, $y = 80$ and $z = 70$.

$\therefore$ Maximum marks $= \dfrac{100(y+z)}{x} = \dfrac{100(80+70)}{15}$

$= 1000.$

62. **(c)** Percentage of students passing the examination

$= (100 - (30 + 35 - 27))\%$

[Here, $x = 30$, $y = 35$ and $z = 27$]

$= 62(100 - 38)\% = 62\%$

Let the total number of students appearing in the examination be x.

Given: 62% of $x = 248$

or, $\dfrac{62}{100} \times x = 248$ or $x = \dfrac{248 \times 100}{62} = 400.$

Therefore, 400 students appeared in the examination.

63. **(b)** Let the monthly rent be ₹x.

We have, 5.5% of 100000 $= x -$ 12.5% of $x - 325$

$\Rightarrow \dfrac{5500}{12} = x - \dfrac{x}{8} - \dfrac{325}{12}$

$\Rightarrow \dfrac{5500}{12} + \dfrac{325}{12} = \dfrac{7}{8} \times x$

$\Rightarrow x = \dfrac{5825}{12} \times \dfrac{8}{7}$ = ₹554.76 per month.

64. **(b)** Boys = 900, Girls = 1100

Passed = (32% of 900) + (38% of 1100)

$= 288 + 418 = 706$

Failed $= 2000 - 706 = 1294$

Failed % $= \left(\dfrac{1294}{2000} \times 100\right)\% = 64.7\%$

65. **(a)** Suppose that his salary = ₹100

House rent = ₹10, balance = ₹90

Expenditure on education $= ₹\left(\dfrac{15}{100} \times 90\right)$

$= ₹13.50$

Balance = ₹76.50.

Expenditure on clothes $= ₹\left(\dfrac{10}{100} \times 76 \cdot 50\right)$

$= ₹7.65$

Balance now = ₹68.85

If balance is ₹68.85, salary = ₹100

If balance is ₹1377, salary $= ₹\dfrac{100}{68 \cdot 85} \times 1377$

$= ₹2000.$

66. **(b)** Reduction $= \dfrac{30}{100+30} \times 100\% = 23\dfrac{1}{13}\%$

67. **(a)** 90% of original price can buy = 18 quintals

$\therefore$ He can buy $\dfrac{18 \times 100}{90} = 20$ quintals at the lower price.

68. **(a)** Number of candidates who failed

$= 40\%$ of 1000 + 60% of 800

$= 400 + 480$

$= 880$

$\therefore$ Fail % $= \left(\dfrac{880}{1800} \times 100\right)\% = 48.88\%$

69. **(c)** New price must be increased by

$\left(\dfrac{20}{100-20} \times 100\right)\% = 25\%.$

70. **(a)** Let the fraction be $\dfrac{x}{y}$

Then, $\dfrac{x + 0.25x}{y - 0.10y} = \dfrac{5}{9}$ $\quad \dfrac{x(1.25)}{y(0.9)} = \dfrac{5}{9}$

$\dfrac{x}{y} = \dfrac{5}{9} \times \dfrac{90}{125}$ $\quad \dfrac{x}{y} = \dfrac{2}{5}.$

71. **(a)** Let the side of the square = x

After increase, length of one side $= 1.3x$

Let after decrease, length of other side = y

Then, $(1.3x)(y) = x^2$

$y = \dfrac{10x}{13}$

Decrease in other side $= x - \dfrac{10x}{13} = \dfrac{3x}{13}$

Percentage decrease in other side

$= \dfrac{\frac{3x}{13}}{x} \times 100 = \dfrac{300}{13} = 23\dfrac{1}{13}\%$

EXERCISE-2
(BASED ON MEMORY)

1. **(c)** 75% of 40 + x% of 35 = 80% of 75

$\Rightarrow$ 30 + x% of 35 = 60 $\quad \Rightarrow \quad$ x% of 35 = 30

$\therefore \quad x = \dfrac{30 \times 100}{35} = 85.71\% \approx 86\%$

2. **(c)** Suppose original fraction $= \dfrac{x}{y}$

Then, $\dfrac{3x}{2.5y} = \dfrac{9}{10}$ $\quad \therefore \quad \dfrac{x}{y} = \dfrac{3}{4}$

3. (b) Share of each daughter
= ₹1.25 Lakhs

∴ Share of grand child $= \frac{1}{10} \times 1.25$
$= 0.125$ Lakh

And share of each son $= 0.125 \times 8$
$= ₹1$ Lakh

∴ Money received by three sons and two daughters
$= 3 \times 1 + 2 \times 1.25$
= ₹5.5 Lakhs

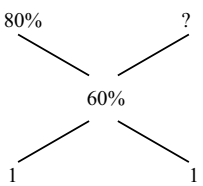
∴ Money received by his wife

$= \frac{40}{100} \times 5.5$ ₹2.2 Lakhs

∴ Money received by his wife and three grandchildren
$= 2.2 + 3 \times 0.125$
= ₹2575000

4. (e) The original fraction

$$= \frac{\frac{4}{140} \times 100}{\frac{15}{150} \times 100} = \frac{4}{140} \times \frac{150}{15} = \frac{2}{7}$$



Here, $= \frac{80 \times 1 + ? \times 1}{1+1}$

∴ $? = 60 \times 2 - 80 \times 1 = 40$

6. (d) $\frac{43}{100} \times 2750 - \frac{38}{100 \times 2990} = 1182.5 - 1136.2 = 46.3$

7. (d) We have, 7% of Sujata's monthly salary = ₹2170
(7 + 18 + 6)% of Sujata's monthly salary

$\frac{2170}{7} \times 31 = ₹9610$

Thus, total annual amount invested by Sujata
$= 9610 \times 12 = 1,15,320$

8. (a) Go through the given options.

$$\frac{10 \times \frac{350}{100}}{10 \times \frac{500}{100}} = \frac{10 \times 35}{19 \times 50} = \frac{7}{19}$$

9. (b) Number of sweets = 20% of 65×65
$= 13 \times 65 = 845$.

10. (a) $\frac{x+2x}{y+3y} = \frac{6}{11} \Rightarrow \frac{3x}{4y} = \frac{6}{11} \quad \therefore \quad \frac{x}{y} = \frac{6 \times 4}{11 \times 3} = \frac{8}{11}$

11. (c) 75% of toal amount
$= 55,475 + 28525 = 84000$

Total amount $= 84000\left(\frac{4}{3}\right) = ₹1,12,000$

12. (a) 12% of monthly salary = ₹3660

∴ 31% of monthly salary = ₹3660 $\left(\frac{31}{12}\right)$
= ₹9455

∴ Annual investment $= 12 \times 9455$
= ₹1,13,460

13. (a) 40% of the number = 380
∴ 20% the of number = 190

14. (b) Required % $= \frac{700}{5600} \times 100 = \frac{100}{8} = 12.5$

15. (b) Total number of sweets
= (50% of 90) (20% of 90) + (50% of 90) (10% of 90)
$= (45 \times 18) + (45 \times 9) = 45 \times 27 = 1215$

16. (b) 15% of salary = ₹4,428

∴ 42% of salary $= \frac{4428}{15} \times 42 = ₹12,398.4$

17. (e) Suppose the third number is 100.
Then first no. = 50 and second no. = 46

∴ requirded % $= \frac{50-46}{50} \times 100 = 8$

18. (c) Total valid votes
= 75% of 8400 = 6300
Votes got by the other person
= 48% of 6300 = 3024

19. (e) Ratio of shares of A, B and C
= 75:60:80
= 15:12:16

Now, the share of C $= \frac{16}{(15+12+16)} \times 731$

$= \frac{16}{43} \times 731 = ₹272$

20. (a) Go through the given options. Check the options a

$\frac{4+6}{9+27} = \frac{10}{36} = \frac{5}{18}$

21. (d) Required value

$= \frac{25}{100} \times \frac{30}{100} \times \frac{2}{5} \times 2000$
= 60

22. (b) Vipul's salary

$= 1687.50 \times \frac{100}{75} \times \frac{100}{5} = 45,000$

23. **(c)** (40% – 25%) of x = 198

$\Rightarrow$ 12% of x = 198

$\therefore$ 64% of $x = \frac{198}{12} \times 64$

= 66 × 16 = 1056

24. **(d)** 50% of $(x - y)$ = 30% of $(x + y)$

$\Rightarrow \frac{x-y}{2} = \frac{3(x+y)}{10}$

$\Rightarrow 5x - 5y = 3x + 3y$

$\Rightarrow 2x = 8y \Rightarrow x = 4y$

$\Rightarrow x = \frac{400}{100} y \Rightarrow$ 400% of y.

25. **(c)** 10% of A = 15% of B

= 20% of C

$\Rightarrow \frac{A}{10} = \frac{3B}{20} = \frac{C}{5} = k$, say

$\Rightarrow A = 10k, B = \frac{20k}{3}, C = 5k$

Given $A + B + C$ = 7800

$\Rightarrow 10k + \frac{20k}{3} + 5k = 7800$

$\Rightarrow 65k = 7800 \times 3 \Rightarrow k = 360$

$\therefore$ B's income = $\frac{20k}{3} = \frac{20 \times 360}{3}$

= 20 × 120 = ₹2400

26. **(d)** $x = y$ – 10% y

y = 125 + 10% of 125

= 125 + 12.5 = 137.5

$\therefore$ x = 137.5 – 10% of 137.5

= 137.5 – 13.75 = 123.75

27. **(a)** (100 + 20)% = 120%

$\left(120 - 120 \times \frac{20}{100}\right)\% = 96\%$

29. **(e)** Income of company in 1997

$= \frac{2664000}{\left(1 + \frac{20}{100}\right)^2}$

$= 2664000 \times \frac{25}{36} =$ ₹1850000.

30. **(c)** Let the investment of X in 1995 be ₹x

$\therefore$ Profit = ₹$\frac{x}{5}$ $\therefore$ Income = ₹$\left(x + \frac{x}{5}\right)$ = ₹$\frac{6x}{5}$

Investment of company X in 1996 would be $(x - 5000)$

From the question,

$(x - 5000) \times \frac{126}{100} = \frac{6}{5} x \Rightarrow x =$ ₹105000.

31. **(a)** Suppose the production of the company in the year 1990 be x

Then, production of the company in year 1994

$= x \times \frac{115}{100} \times \frac{115}{100} \times \frac{90}{100} \times \frac{115}{100} = 1.368x$

$\therefore$ Increase % in the production in year 1994

$= \frac{(1.368x - x) \times 100}{x} = 36.8\% \approx 37\%.$

32. **(c)** ? % of 700 = 500 – 125% of 260

? % of 700 = 500 – $\frac{125}{100}$ × 260

$\therefore$? = $\frac{175 \times 100}{700}$ = 25.

33. **(b)** 45% of 750 – 25% of 480

= $\frac{45}{100}$ × 750 – $\frac{25}{100}$ × 480

= 337.50 – 120 = 217.5.

34. **(d)** Suppose the first number is x and the second number is y

Therefore, 40% of $x = \frac{2}{3}$ of y

$\therefore \frac{x}{y} = \frac{2}{3} \times \frac{100}{40} = \frac{5}{3}$.

35. **(c)** Let the printed price be ₹x

Discount = 20%

$\therefore$ SP = $\frac{4x}{5}$

Profit = 15%

$\therefore$ CP = $\frac{100 \times \frac{4x}{5}}{100 + 15} = \frac{80x}{115} = \frac{16x}{23}$

$\therefore \frac{\text{CP}}{\text{Printed Price}} = \frac{16}{23}$.

36. **(d)** – 20 – 15 + $\frac{(-20) \times (-15)}{100}$ = –35 + 3 = –32

$\therefore$ Two successive discounts of 20% and 15% are equivalent to a single discount of 32%

37. **(c)** Let the second discount be x%

$\therefore$ 800 – 10% = 720

720 – x% of 720 = 612

$\Rightarrow \frac{x}{100}$ × 720 = 108

$\Rightarrow x = \frac{108 \times 100}{720}$ = 15.

38. **(a)** 5% of (5% of 100) = 5% of 5

= $\frac{1}{4}$ = 0.25.

39. (d) Let the original bill was for ₹x

$\therefore$ x – 20% of x = 100

$\Rightarrow \frac{4x}{5} = 100 \Rightarrow x = 125.$

40. (b) x% of y = 100, y% of z = 200

$\Rightarrow xy = 10000, yz = 20000$

$\Rightarrow \frac{xy}{yz} = \frac{10000}{20000} = \frac{1}{2}$

$\Rightarrow z = 2x.$

41. (c) Let the numbe₹be x and y

$\therefore$ $x + y = 150$

40% of x = 60% of y

$\Rightarrow 2x = 3y$

$\therefore \frac{3y}{2} + y = 150 \Rightarrow 5y = 300 \Rightarrow y = 60$

$\Rightarrow x = 90$

Hence, the greater number = 90.

42. (b) Let the numbe₹be x, y and z

$\therefore$ $x = z$ – 30% of $z = \frac{7z}{10}$

$y = z$ – 37% of $z = \frac{63z}{100}$

$\Rightarrow \frac{10x}{7} = \frac{100y}{63} \Rightarrow x = \frac{10y}{9}$

$\Rightarrow y = \frac{9x}{10} = x - \frac{x}{10}$

$\Rightarrow$ $y = x$ – 10% of x.

43. (d) 8% votes are invalid.

Winner got 48% of the total votes.

Loser will get

100 – (8 + 48) = 44% of the total votes

Now, the total number of vote₹in the election

$= \frac{1100}{4} \times 100 = 27500.$

44. (c) Population of a city after 2 years

$= 180000\left(1+\frac{10}{100}\right)^2 = 217800.$

45. (b) Reduced Price = $\frac{20\% \text{ of } 100}{4}$ = ₹5 per Kg.

46. (c) 60% of A = 75% of B or, $\frac{3A}{5} = \frac{3B}{4}$

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

Now, B = x% of A

or, $x = \frac{B}{A} \times 100 = \frac{5}{4} \times 100 = 80\%.$

47. (a) Marked price of the article

$= \frac{387}{100-14} \times 100 = ₹450.$

48. (b) Let the CP of the article be ₹100, then MP of the article = ₹110

If the trader has a loss of 1%, it means that the trader sold the article at ₹99

$\therefore$ % discount = $\frac{110-99}{110} \times 100 = 10\%$

49. (b) CP of cycle = $1100 \times \frac{90}{100} \times \frac{100}{110}$ = ₹900.

50. (a) Profit % = +20 – 5 – $\frac{20 \times 5}{100}$ = 15 – 1 = 14%

51. (d) Let the income = ₹x

Given: $\frac{90}{100} \times \frac{70}{100} \times \frac{80}{100} x = 10080$

$\Rightarrow 504x = 10080000$ or, x = ₹20000.

52. (d) Number of failure students

= 40% of 640 + 20% of 360 = 256 + 72 = 328

% of failure = $\frac{328}{1000} \times 100 = 32.80\%$

54. (d) Let the original price of rice per Kg be ₹x

Now, $\frac{385}{4x/5} - \frac{385}{x} = 3.5$ or, x = ₹27.50.

55. (b) Ratio of two numbers = $\frac{13}{2}\% : \frac{17}{2}\%$ = 13:17

Smaller number = $\frac{13}{4} \times 1660 = 5395.$

56. (b) Two successive discounts of 10%

$= -10 - 10 + \frac{(-10) \times (-10)}{100} = -19\%$

So, resultant = $+30 - 19 + \frac{30 \times (-19)}{100} = +5.3\%$

57. (c) Let CP of one article be ₹x

$\therefore$ CP of 16 articles = ₹16x

SP of 16 articles = $₹16x\left(\frac{135}{100}\right)$

Let the marked price of the article be increased by y% above the cost price.

Then, $15x\left(\frac{100+y}{100}\right) \times \left(\frac{96}{100}\right) = 16x\left(\frac{135}{100}\right)$

or, $(100 + y)6 = 900$

or, $y = 150$

i.e., M.P. of the article is 50% above the cost price.

58. (b) Salary = $\frac{1500}{20} \times 100 = ₹7500.$

59. (e) Each student got sweets = $\frac{20}{100} \times 35 = 7$ sweets

35 students got sweets = 35 × 7 sweets

Each teacher got sweets = $\frac{40}{10} \times 35 = 14$

6 teachers got sweets = 6 × 14 = 84

Total sweets = 245 + 84 = 329

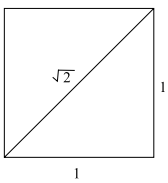
60. (d) Let 100 angstroms $= x\%$ of 10 microns

$\Rightarrow$ 100 angstroms = $x\%$ of 100000 angstroms

$\Rightarrow x = \frac{100 \times 100}{100000} = \frac{1}{10} = 0.1.$

61. (a) Suppose side of the square = 1 metre

$\therefore$ Diagonal = $\sqrt{2}$ m



Distance saved by not walking along the edges

$= 2 - \sqrt{2}$

i.e., $\left(\frac{2-\sqrt{2}}{2} \times 100\right)\%$ i.e., 29.3% $\approx$ 30%.

62. (a) $\frac{ptd}{(t + 20\% \text{ of } t)\left(p - \frac{p}{3}\right)} = \frac{ptd}{\frac{6t}{5} \times \frac{2p}{3}} = \frac{5}{4}d.$

63. (c) 120 coats for full length. 500 shorter length coats are removed.

$\therefore$ Percentage of full length coats out of the remaining 300 coats

$= \frac{120}{300} \times 100 = 40.$

64. (b) $S = 150\%$ of T

$\Rightarrow S = \frac{150T}{100}$

$\Rightarrow S = \frac{3}{2}T$

$\Rightarrow S + T = \frac{3}{2}T + T = \frac{5T}{2}$

$\Rightarrow T = \frac{2}{5}(S + T)$

$= 40\%$ of $(S + T)$.

65. (b) Suppose total number of students = 100

$\therefore$ No. of seniors who attended the play = 20

Total number of students who attended the play = 60

$\therefore$ No. of non-seniors who attended the play

$= 60 - 20 = 40$ i.e., 40%

66. (d) Effective increase percentage

$= \left(10 + 20 + \frac{20 \times 10}{100}\right)\% = 32$

Therefore, $x \times \frac{132}{100} = 33$

$\Rightarrow x = \frac{32 \times 100}{132} = ₹25$

67. (c) Let the amount of the bill be ₹x

Therefore, $\frac{4x}{100} = 13$

$4x = 1300$

$\Rightarrow x = \frac{1300}{4} = ₹325$

68. (d) Houses containing only one person

$= 100 - 40 = 60\%$

Houses containing only a male

$= 60 \times \frac{25}{100} = 15\%$

$\therefore$ Houses containing only one female

$= 60 - 15 = 45\%$.

69. (b) Let the original cost price of sugar be ₹x per Kg.

$\Theta \quad \frac{270 \times 100}{90x} - \frac{270}{x} = 1$

$\frac{270}{x}\left(\frac{10}{9} - 1\right) = 1$

$\Rightarrow \frac{30}{x} = 1$

$\therefore x =$ ₹30 per Kg

70. (d) Let the third number be 100

Then, first number = 70

Therefore, second number = 63

Hence, required % $= \frac{70 - 63}{70} \times 100$

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

71. (d) Required effect $= \left(+40 - 40 - \frac{40 \times 40}{100}\right)\%$

$= -16\%$.

i.e., the area will decrease by 16%.

72. (a) In 1 Kg mixture quantity of iron = 20 gm

Let x gm sand should be added, then 10% of $(1000 + x) = 200$

$\therefore x = 1000$ gm = 1 Kg.

73. (b) Increase % $= \frac{7.50 - 6 \times 100}{6} = 25$

Therefore, decrease percentage in consumption

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

74. **(a)** $\frac{a}{b} = \frac{5}{4}$, $b = \frac{4}{5}a$ (Given)

Given: (40% of a) $= \frac{2}{5}a = 12$

$\therefore$ $a = 5 \times 6$ and $b = \frac{4}{5} \times 5 \times 6 = 24$

$\therefore$ 50% of $b = \frac{24}{2} = 12$.

75. **(b)** Let the first and the second number be x and y, respectively, then

y + 30% of x = 140% of y

or, $y + 0.3x = 1.4y$

or, $0.3x = 0.4y$

$\therefore$ $x:y = 4:3$

76. **(a)** Suresh = Vinod + 30% of Vinod
= 1.3 Vinod

Vinod = Vinay – 20% of Vinay
= 80% of Vinay
= 0.8 Vinay

$\therefore$ Suresh = 1.3 × 0.8 Vinay
= 1.04 Vinay

Now,

Suresh – Vinay = 1.04 Vinay – Vinay
= 0.04 Vinay
= ₹800 (given)

$\therefore$ Vinay = ₹20000

$\therefore$ Vinod = 0.8 × 20000 = ₹16000.

77. **(a)** Let the first and second numbers be x and y, respectively.

$y - x \times \frac{25}{100} = y \times \frac{5}{6}$

or, $y - \frac{x}{4} = \frac{5}{6}y$ or, $\frac{1}{6}y = \frac{x}{4}$

$\therefore$ $x:y = 2:3$.

78. **(a)** In 1 l mixture quantity of unleaded petrol = 100 ml

Let x ml leaded petrol be added, then 5% of $(1000 + x)$ = 100 ml

or, $5(1000 + x) = 100 \times 100$

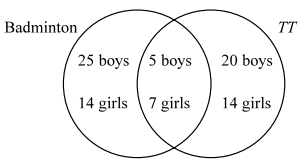
$x = \frac{5000}{5} = 1000$ ml.

79. **(b)** Let the number of boys = x

Then, $x + \frac{7x}{10} = 85$

$\Rightarrow$ $x = 50$

No. of girls = 85 – 50 = 35.



80. **(d)** Let the original fraction be $\frac{x}{y}$

Then, $\frac{x+2}{y+1} = \frac{5}{8}$ or, $8x - 5y = -11$ ...(1)

Again, $\frac{x+3}{y+1} = \frac{3}{4}$ or, $4x - 3y = -9$ ...(2)

Solving, we get $x = 3$ and $y = 7$

$\therefore$ Fraction = $\frac{3}{7}$

81. **(c)** Let the numbers be y and x, respectively.

x + 50% of $y = \frac{4x}{3}$ or, $\frac{y}{2} = \frac{4x}{3} - x$

or, $\frac{y}{2} = \frac{x}{3}$ or, $\frac{y}{x} = \frac{2}{3}$.

82. **(a)** Let the total marks of the exam be x.

Then,

$x \times \frac{54}{100} = 456 - 24$

$\Rightarrow$ $x \times \frac{54}{100} = 432$

$\Rightarrow$ $x \times \frac{432 \times 100}{54} = 800$

$\therefore$ Minimum passing marks

$= 800 \times \frac{34}{100}$

$= 272$

Hence, required more marks get by Raman

$= 456 - 272$

$= 184$

83. **(c)** Successive discounts $= 20\% + \frac{20 \times 80}{100}$

$= 20 + 16 = 36\%$

Difference in discounts = 36 – 35 = 1%

$\therefore$ Bill amount = 22 × 100
= ₹2200.

84. **(c)** $D = \frac{2}{5}R$ $S = \frac{1}{4} \times \frac{2}{5}R = \frac{1}{10}R$

and, $\frac{1}{10}R - 200 = 600$

$\therefore$ $\frac{1}{10}R = 800$

$\therefore$ R = ₹8000

85. **(a)** CP of the article $= 960 \times \frac{100}{120}$ = ₹800

$\therefore$ C.P. of 5 articles = ₹800 × 5 = ₹4000

$\therefore$ S.P. of 5 articles = ₹825 × 5 = ₹4125

$\therefore$ Gain % $= \frac{4125 - 4000}{4000} \times 100 = 3.125\%$

86. **(b)** Suppose there are $8x$ questions apart from 41 questions. Then,

$$\frac{37+5x}{41+8x} = 80\% = \frac{4}{5}$$

$\Rightarrow$ $185 + 25x = 164 + 32x$

$\Rightarrow$ $7x = 21 \Rightarrow x = 3$

$\therefore$ Total number of questions $= 41 + 8x$

$= 41 + 8 \times 3$

$= 41 + 24 = 65.$

87. **(a)** Number of students who speak only English

$= 30\%$ of $60 = 18$

Number of students who speak Hindi and English

$= 20\%$ of $60 = 12$

$\therefore$ Number of students who speak only Hindi

$= (60 - 30) = 30$

$\therefore$ Number of students who speak Hindi

$= 30 + 12 = 42.$

88. **(b)** Number of females $= 156800 \times \frac{100}{80} = 196000$

$\therefore$ Number of males $= \frac{7}{8} \times 196000 = 171500$

$\therefore$ Total population $= 196000 + 171500 = 367500.$

89. **(c)** Let the investment of X in 1995 be ₹x

$\therefore$ Profit $= ₹\frac{x}{5}$ $\quad\therefore$ Income $= ₹\left(x+\frac{x}{5}\right) = ₹\frac{6x}{5}$

Investment of company X in 1996 would be $(x - 5000)$

From the question,

$(x - 5000) \times \frac{126}{100} = \frac{6}{5}x \Rightarrow x = ₹105000.$

90. **(a)** Suppose the production of the company in the year 1990 be x

Then, production of the company in year 1994

$= x \times \frac{115}{100}\times\frac{115}{100}\times\frac{90}{100}\times\frac{115}{100}$

$= 1.368x$

$\therefore$ Increase % in the production in year 1994

$= \frac{(1.368x - x)\times 100}{x}$

$= 36.8\%$

$\approx 37\%.$

91. **(d)** Θ Maximum marks in examination = 875

$\therefore$ Ritu's marks $= 875 \times \frac{56}{100} = 490$

and Smita's marks $= 875 \times \frac{92}{100} = 805$

and Rina's marks = 634

Hence, required average marks

$= \frac{490+805+634}{3} = \frac{1929}{3} = 643$

92. **(c)** $\because$ Candidate secured 336 marks in 700 total marks

$\therefore$ Candidate secured 468 marks in $\frac{700}{336} \times 468$

$= 975$ total marks.

93. **(c)** Let the second discount be $x\%$

$\therefore$ $800 - 10\% = 720$

$720 - x\%$ of $720 = 612$

$\Rightarrow$ $\frac{x}{100} \times 720 = 108$

$\Rightarrow$ $x = \frac{108\times 100}{720} = 15.$

94. **(d)** $\because$ Total number of employees = 4800

$\therefore$ Males people $= 4800 \times \frac{45}{100} = 2160$

Hence, number of people, younger than 25 year

$= 2160 \times \frac{40}{100} = 864$

95. **(d)** $\because$ Third number = 2400

$\therefore$ Second number $= \frac{1}{4} \times 2400 = 600$

and first number $\times \frac{6}{11} = 22\%$ of 600

$\Rightarrow$ First number $= \frac{11}{6} \times 600 \times \frac{22}{100}$

$= 242$

Hence, 45 of the first number $= \frac{242\times 45}{100} = 108.90$

96. **(b)** Suppose the salary of Bhawna was ₹x.

$\left(\frac{12}{100}\text{ of } x\right)\times\frac{125}{100} = 2400$

$x\times\frac{12}{100}\times\frac{125}{100} = 2400$

$x = \frac{2400\times 100\times 100}{12\times 125}$

$= ₹16000$

97. **(d)** Suppose the original fraction is $\frac{x}{y}$.

According to question,

$$\frac{x + x\times\frac{400}{100}}{y + y\times\frac{500}{100}} = \frac{20}{27}$$

$\Rightarrow$ $\frac{x+4x}{y+5y} = \frac{20}{27}$

$\Rightarrow$ $\frac{5x}{6y} = \frac{20}{27}$

$\Rightarrow$ $\frac{x}{y} = \frac{20\times 6}{5\times 27}$

$\Rightarrow$ $\frac{x}{y} = \frac{8}{9}$

98. **(b)** Let the numbers be x, y and z

$\therefore \quad x = z - 30\%$ of $z = \frac{7z}{10}$

$y = z - 37\%$ of $z = \frac{63z}{100}$

$\Rightarrow \quad \frac{10x}{7} = \frac{100y}{63} \Rightarrow x = \frac{10y}{9}$

$\Rightarrow \quad y = \frac{9x}{10} = x - \frac{x}{10}$

$\Rightarrow \quad y = x - 10\%$ of x.

99. **(d)** 8% votes are invalid.

Winner got 48% of the total votes.

Loser will get

$100 - (8 + 48) = 44\%$ of the total votes

Now, the total number of voters in the election

$= \frac{1100}{4} \times 100 = 27500.$

100. **(c)** Suppose maximum marks = x

Then, $x \times \frac{35}{100} = 40 + 30$

$\Rightarrow \quad x \times \frac{35}{100} = 70 \Rightarrow x = \frac{70 \times 100}{35}$

$x = 200$ marks

101. **(d)** According to passing percentage = 40% (boys)

According to question,

$x \times 40\% = 483 + 117$ (If total marks = x)

$x \times \frac{40}{100} = 600$

$x = \frac{600 \times 100}{40}$

$x = 1500$

Passing marks for girls $= 1500 \times \frac{35}{100} = 525$

102. **(b)** Let the C.P. of the article be ₹100, then M.P. of the article = ₹110

If the trader has a loss of 1%, it means that the trader sold the article at ₹99

$\therefore$ % discount $= \frac{110 - 99}{110} \times 100 = 10\%.$

103. **(d)** Let the income = ₹x

Given,

$\frac{90}{100} \times \frac{70}{100} \times \frac{80}{100} x = 10080$

$\Rightarrow \quad 504x = 10080000$

or, $x =$ ₹20000.

104 **(d)** Let the original price of rice per Kg be ₹x

Now, $\frac{385}{4x/5} - \frac{385}{x} = 3.5$ or $x =$ ₹27.50.

105. **(b)** Two successive discounts of 10%

$= -10 - 10 + \frac{(-10) \times (-10)}{100} = -19\%$

So, resultant $= +30 - 19 + \frac{30 \times (-19)}{100} = +5.3\%$

106. **(c)** Let C.P. of one article be ₹x

$\therefore$ C.P. of 16 articles = ₹$16x$

S.P. of 16 articles = ₹$16x\left(\frac{135}{100}\right)$

Let the marked price of the article be increased by y% above the cost price.

Then, $15x\left(\frac{100+y}{100}\right) \times \left(\frac{96}{100}\right) = 16x\left(\frac{135}{100}\right)$

or, $(100 + y)6 = 900$ or $y = 150$

i.e., M.P. of the article is 50% above the cost price.

107. **(a)** Let the number to be added be x.

Now, according to the question,

$\frac{320 \times 10}{100} + x = \frac{230 \times 30}{100}$

$\Rightarrow \quad 32 + x = 69$

$\Rightarrow \quad x = 69 - 32 = 37$

108. **(a)**

Quicker Method:

Increase in first year = 10%

Decrease in second year = 10%

Effective result

$= \left(10 - 10 - \frac{10 \times 10}{100}\right)\% = -1\%$

Increase in third year = 10%

$\therefore$ Effective result $= \left(10 - 1 - \frac{10 \times 1}{100}\right)\%$

$= (9 - 0.1)\% = 8.9\%$ (increase)

109. **(b)** Present worth of bike $= P\left(1 - \frac{R}{100}\right)^T$

$= 62500\left(1 - \frac{4}{100}\right)^2 = 62500\left(1 - \frac{1}{25}\right)^2$

$= 62500\left(\frac{25-1}{25}\right)^2 = \frac{62500 \times 24 \times 24}{25 \times 25}$

$=$ ₹57600

110. **(c)** Let the number be x.

Now, according to the question,

$x \times \frac{245}{200} = 98 \quad \Rightarrow \quad x = \frac{98 \times 200}{245} = 80$

111. **(b)** If D gets 100 marks, then

Marks obtained by C = 125

Marks obtained by B $= \frac{125 \times 90}{100}$

Marks obtained by $A = \frac{125 \times 90}{100} \times \frac{125}{100}$

$\because \quad 100 \equiv \frac{125 \times 125 \times 90}{10000}$

$\therefore \quad 320 \equiv \frac{125 \times 125 \times 90 \times 320}{1000000} = 450.$

112. (a) Required percentage

$$= \frac{40 \times 100 + 50 \times 90 + 60 \times 80}{40 + 50 + 60} = 88\frac{2}{3}\%$$

113. (d) Salary of the clerk in

$$1974 = \frac{3660 \times 100}{120} = ₹3050$$

114. (d) Total percentage of expenditure

$$= \left(20 + \frac{80 \times 70}{100}\right)\% = 76\%$$

Let the total income be ₹x.

Now, according to the question,

$$x \times \frac{24}{100} = 1800 \quad \Rightarrow \quad x = \frac{1800 \times 100}{24} = ₹7500$$

115. (a) Let Rama's expenditure be ₹$3x$ and Savings be ₹$2x$.

New income $= \frac{5x \times 110}{100} = ₹\frac{11x}{2}$

Expenditure $= \frac{3x \times 112}{100} = ₹\frac{336x}{100}$

$\therefore$ Savings $= \frac{11x}{2} - \frac{336x}{100}$

$= \frac{550x - 336x}{100} = ₹\frac{214}{100}x$

Increase in savings $= \frac{214x}{100} - 2x = \frac{14x}{100}$

$\therefore$ Percentage increase $= \frac{14x}{200x} \times 100 = 7\%$

116. (c) The original fraction

$$= \frac{25}{51} \times \frac{(350 + 100)}{150 + 100} = \frac{25}{51} \times \frac{45}{25} = \frac{15}{17}$$

117. (d) Third number = 100

First number = 130

Second number = 140

Now, according to the question,

$$\frac{130}{140} \times 100 = x \quad \Rightarrow \quad x = \frac{650}{7} = 92\frac{6}{7}$$

118. (b) Quicker Method:

$$\text{Percentage decrease} = \frac{r}{100 + r} \times 100\%$$

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

119. (a) Percentage of candidates who failed in one or two or both subjects = 52 + 42 – 17 = 77

$\therefore$ Percentage of passed candidates

=100 – 77 = 23

120. (c) Let the total number of votes polled be x

Now, according to the question,

$$x \times \left(\frac{60 - 40}{100}\right) = 298$$

$$\Rightarrow \quad x \times \frac{1}{5} = 298$$

$\Rightarrow x = 298 \times 5 = 1490$

121. (c) Let the red marbles be added be x.

Now, according to the question,

$$\frac{10 + x}{40 + x} \times 100 = 60$$

$$\Rightarrow \quad \frac{(10 + x) \times 5}{40 + x} = 3$$

$$\Rightarrow \quad 50 + 5x = 120 + 3x$$

$$\Rightarrow \quad 5x - 3x = 120 - 50$$

$$\Rightarrow \quad 2x = 70 \quad \Rightarrow \quad x = \frac{70}{2} = 35$$

122. (a) Let the number be x.

Now, according to the question,

$$x \times \frac{x}{4} = x \times \frac{300}{100}$$

$$\Rightarrow \quad \frac{x^2}{4} = 3x \quad \Rightarrow \quad x = 3 \times 4 = 12$$

123. (b) Quicker Method:

$$\text{Required reduction per cent} = \frac{x}{100 + x} \times 100$$

$$= \frac{50}{150} \times 100 = \frac{50}{150} \times 100 = 33\frac{1}{3}\%$$

124. (a) Increase in price = 20%

New price = ₹120

New sales = (100 − 15) = 85

Old sales = 100 × 100 = ₹10000

New sales = 120 × 85 = ₹10200

$$\text{Effect} = \frac{200}{10000} \times 100\% = 2\% \text{ increase}$$

125. (c) ∵ 80% expenditure of ₹15000 salary = ₹12000

Savings = ₹(15000 − 12000) = ₹3000

After 20% price rise

⇒ Increased expenditure = 20% of ₹12000

= ₹2400

⇒ New Expenditure = ₹(12000 + 2400)

= ₹14400

$$\Rightarrow \text{New Income} = ₹\left(15000 \times \left(\frac{100+20}{100}\right)\right)$$

$$= \left(\frac{15000 \times 120}{100}\right) = ₹18000$$

∴ New savings = ₹(18000 − 14400)

= ₹3600

126. (a) Let the third number be x.

$$\text{First number} = x + \frac{12.5x}{100} = \frac{225x}{200}$$

$$\text{Second number} = x + \frac{25x}{100} = \frac{125x}{100} = \frac{250x}{200}$$

$$\text{Now, required percentage} = \frac{\frac{225x}{200}}{\frac{250x}{200}} \times 100\%$$

$$= \frac{225x}{250x} \times 100\% = 90\%$$

127. (c) Let the population of the town be 100 Population increase = 2.5%

∴ New population = 102.5

Now, according to the question, Population decreases by 0.5%

$$= \frac{102.5 \times 0.5}{100} = 0.5125$$

After one year, population = 102.5 − 0.5125 = 101.9875

∴ Total increase % = (101.9875 − 100) = 1.98%

Required percentage of increase in two years

$$= \left(101.98 + \frac{101.98 \times 1.98}{100}\right) - 100$$

= (101.98 + 2.019) −100

= 103.999 – 100

= 3.999% ≈ 4%

128. (d) Discount on one shirt $= ₹\frac{320 \times 25}{100} = ₹80$

Let, on buying x shirts, the total discount = $80x$

∴ $80x = 400 \Rightarrow x = 5$

∴He should purchase 5 shirts.

129. (c) Quicker Method:

$$\text{Required reduced price} = \frac{10}{100} \times \frac{22500}{25} = ₹90$$

130. (d) Let Ram's income be ₹100

⇒ Donation given to charity = ₹4

⇒ Remaining amount = ₹96

⇒ Again deposited amount in bank

$$= ₹\frac{96 \times 10}{100}$$

⇒ Amount left with him

$$= ₹\left(96 - \frac{96 \times 10}{100}\right) = ₹\ 86.4$$

⇒ But he has actual amount = ₹8640

∴ His real income $= ₹\left(\frac{8640}{86.4} \times 100\right)$

= ₹10000

131. (c) $? = \frac{134 \times 3894}{100} + 38.94 \times 134$

$=38.94 \times 134 + 38.94 \times 134$

$\approx 2 \times (39 \times 134) = 78 \times 134 = 10452$

132. (c) ? = 23% of 6783 + 57% of 8431

$$= \frac{23}{100} \times 6783 + \frac{57}{100} \times 8431$$

$$= 23 \times 67.83 + 57 \times 84.31$$

$$= 1560.09 + 4805.67 = 6365.76 \approx 6360$$

133. (e) Let the three consecutive numbers be x, $x + 1$ and $x + 2$.

Then, $x + x + 1 + x + 2 = 2262$

or, $3x = 2262 - 3 = 2259$

$$\therefore \quad x = \frac{2259}{3} = 753$$

∴ The numbers are 753, 754, 755.

The highest number is 755.

$$41\% \text{ of } 755 = \frac{41}{100} \times 755 = 41 \times 7.55 = 309.55$$

134. (b) Akash scored in subject A = 73 marks

$$\text{Subject B} = \frac{56 \times 150}{100} = 84 \text{ marks}$$

Total marks Akash got in all the three subjects together

$$= \frac{54}{100} \times 450 = 54 \times 4.5 = 243 \text{ marks}$$

Let Akash's marks in subject C be x.

$A + B + C = 243$

or, $A + B + x = 243$

or, $x = 243 - (84 + 73) = 243 - 157 = 86$ marks

135. (c) $40\times\frac{4330}{100}+59\times\frac{5000}{100}=1732+2950$

$=4682\approx 4700$

136. (b) Ravina's monthly income $=32000\times\frac{115}{100}=₹36800$

Ramola's monthly income $=3\times 36800=₹110400$

$\therefore$ Ramola's annual income $=12\times 110400=₹1324800$

137. (c) Converted maximum marks = 700

Converted marks = 336

$\%\text{mark}=\frac{336}{700}\times 100=48\%$

$\therefore$ 468 is 48% of maximum marks A.

$\therefore\ A=\frac{468}{48}\times 100=975$

138. (e) According to the question,

$\frac{6}{11}\times$ First number = 22% of second number

Second number $=\frac{1}{4}\times$ Third number

or, Second number $=\frac{1}{4}\times 2400=600$

or, First number $=\frac{22\times\text{Second number}}{100}\times\frac{11}{6}$

$=\frac{22\times 600\times 11}{100\times 6}\times 242$

$\therefore$ Required answer $=45\%$ of $242=\frac{45\times 142}{100}=108.9$

139. (e) $\frac{32}{100}\times 260=83.2\approx 83$

140. (a) Amount reinvested in equity funds = 94500

Amount reinvested in debt + equity funds

$=94500\times\frac{13}{7}=175500$

Amount invested earlier in debt + equity funds

$=\frac{175500}{1.3}=135000$

Original amount invested in equity funds

$=\frac{5}{9}\times 135000=75000$

141. (b) Let the original numbers be x and y and their product be xy.

Product of $\frac{1}{3}$ rd of x and 150% of $y=\frac{x}{3}\times\frac{3}{2}y=\frac{xy}{2}$

Required answer $=\frac{xy}{2\times xy}\times 100=50\%$

142. (d) Salary in June 2011 = 22385

$\therefore$ Salary in June 2009 $=\frac{22385}{1.1\times 1.1}=18500$

143. (d) Using statement II and III, we can find the number of students in second class and pass class only.

As there in no link given between the first class and the other classes, we cannot find the number of students in first class.

144. (b) $\frac{34.5}{100}\times 1800+\frac{12.8}{100}\times 1500=(?)^3+78$

$\Rightarrow (?)^3=621+186-78$

$\Rightarrow (?)^3=729$

$\therefore\ ?=9$

145. (a) $\frac{67}{100}\times 800-231=?-\frac{23}{100}\times 790$

$\Rightarrow\ 536-231+181.7=?$

$\therefore\ ?=486.7\approx 490$

146. (b) Second number $=\frac{1}{4}\times 2960=740$

Let the first number be x. Then,

$\frac{5}{9}x=\frac{25}{100}\times 740$

$\Rightarrow x=\frac{9}{5}\times\frac{1}{4}\times 740=333$

So, 30% of 1st number $=\frac{30}{100}\times 333=99.9$

147. (b) Suresh's monthly income = 1.2 × 22000 = ₹26400

Dinesh's monthly income = 26400 × 4 = ₹105600

148. (b) Total girls $=\frac{12}{100}\times 250=30$

Total boys = 250 – 30 = 220

Each boy's monthly fee = 1.24 × 450 = 558

Total monthly fee of boys and girls together = (220 × 558) + (30 × 450)

= 122760 + 13500 = ₹136260

149. (e) Let C's share be ₹x.

Then, B gets = $0.75x$

A gets = $1.25\times 0.75x$

So, $x+0.75x+0.9375x=731$

$\Rightarrow 2.6875x=731$

$\Rightarrow\ x=\frac{731}{2.6875}=272$

150. (a) Ratio of their investments = R:M:P = 50:45:54

Then, Raghu invested $\frac{17880\times 50}{149}=₹6000$

151. (a) Let the original fraction be $\frac{x}{y}$.

Now, according to the question,

$$= \frac{x \times 250}{y \times 400} = \frac{5}{18} \quad \text{or,} \quad \frac{x}{y} = \frac{5 \times 400}{18 \times 250} = \frac{4}{9}$$

152. (e) 40% minimum passing marks for boys
= 483 + 117 = 600

$$\Rightarrow \quad 1\% = \frac{600}{40}$$

$$\Rightarrow \quad 100\% = \frac{600}{40} \times 100 = 1500$$

Minimum passing marks for girls
= 35% of 1500 = 35 × 15 = 525

153. (d) 12% of K = 16% of N

$K \rightarrow$ Kaushal's monthly salary

$N \rightarrow$ Nandini's monthly salary

$S \rightarrow$ Suresh's monthly salary

$$S = \frac{N}{2} \Rightarrow \quad N = 2S$$

$$K = \frac{16}{12} \times N = \frac{16}{12} \times 2S$$

$$= \frac{16}{6} \times \frac{1.08}{12} = \frac{16}{6} \times 0.09 = 0.24 \text{ lakh} = 24{,}000$$

154. (d) Sunil's investment $= 6000 \times \frac{70}{100} = ₹1200$

Rita's investment $= 4200 \times \frac{5}{4} = ₹5250$

Total amount invested = 6000 + 4200 + 5250 = ₹15450

Required ratio = 5250:15450 = 35:103

155. (d) [15% = (10 + 5)%] of 578 + 20% of 644 + 2.5% of 644
= 57.8 + 28.9 + 128.8 + 2.5 × 6.44
= 86.7 + 128.8 + 5 × 3.22
= 86.7 + 128.8 = 231.6

156. (b) Let money invested by Raghu = ₹x

Money invested by Mona $= \frac{9}{10}x = 0.9x$

Money invested by Sonu $= \frac{9}{10}x \times \frac{110}{100} = 0.99x$

Also, $x + 0.9x + 0.99x = 5780$

$$\Rightarrow \quad x = \frac{5780}{2.89} = 2000$$

157. (d) Remaining monthly income
= (100 − (50 + 20 + 5)% = 25%
Given that 25% = 11,250
$\Rightarrow$ 100% = 4 × 11250 = ₹45000

158. (a) Maya's monthly income

$$= 78{,}000 \times \frac{60}{100} \times \frac{100}{120} = ₹39000$$

159. (c) Let the fraction be x/y.

Then,

$$\frac{x + \frac{240x}{100}}{y - \frac{y}{2}} = \frac{17}{6}$$

$$\Rightarrow \frac{\frac{17x}{5}}{\frac{y}{2}} = \frac{17}{6} \Rightarrow \frac{x}{y} = \frac{5}{12}$$

160. (d) $\frac{504 \times 5 \times 5 \times 5 \times 2}{2 \times 3 \times 3 \times 4 \times 5} = 350$

161. (e) Required percentage is

$$\frac{60 - 40 \times \frac{65}{100}}{40} \times 100 = \frac{34}{40} \times 100 = 85\%$$

Note:

Using alligation. Since ratio is 1:1, 75% should be between 65% and the required percentage = 85%

162. (b) Let the Raman's expense be ₹x.

Then, Vimal's expense $= ₹x\left(\frac{100-10}{100}\right) = ₹\frac{9x}{10}$

and, Aman's expense $= ₹\frac{9x}{10}\left(\frac{100+30}{100}\right) = ₹\frac{117x}{100}$.

Now, according to the question,

$$₹\left(x + \frac{9x}{10} + \frac{117x}{100}\right) = ₹6447$$

$$\Rightarrow \quad 100x + 90x + 117x = 6447 \times 100$$

$$\Rightarrow \quad x = \frac{6447 \times 100}{307} - 2100$$

$$\therefore \quad \text{Aman's expense} = ₹\frac{117 \times 2100}{100} = ₹2457$$

163. (c) 35% = 40 + 30 marks, 100% = 200 marks