11 Percentage

I. Concept of Percentage: By a certain *percent*, we mean that many hundredths. Thus, x percent means x hundredths, written as $x\%$.

To express $x\%$ as a fraction: We have, $x\% = \dfrac{x}{100}$.

Thus, $20\% = \dfrac{20}{100} = \dfrac{1}{5}$; $48\% = \dfrac{48}{100} = \dfrac{12}{25}$, etc.

Thus, $\dfrac{1}{4} = \left(\dfrac{1}{4} \times 100\right)\% = 25\%$; $0.6 = \dfrac{6}{10} = \dfrac{3}{5} = \left(\dfrac{3}{5} \times 100\right)\% = 60\%$.

II. If a certain value p increases by $x\%$, then increased value $= (100 + x)\%$ of p.

If a certain value p decreases by $x\%$, then decreased value $= (100 - x)\%$ of p.

III. If the price of a commodity increases by $R\%$, then the reduction in consumption so as not to increase the expenditure is

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

If the price of a commodity decreases by $R\%$, then the increase in consumption so as not to decrease the expenditure is

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

IV. Results on Population: Let the population of a town be P now and suppose it increases at the rate of $R\%$ per annum, then:

1. Population after n years $= P\left(1 + \dfrac{R}{100}\right)^n$.

2. Population n years ago $= \dfrac{P}{\left(1 + \dfrac{R}{100}\right)^n}$.

V. Results on Depreciation: Let the present value of a machine be P. Suppose it depreciates at the rate of $R\%$ per annum. Then:

1. Value of the machine after n years $= P\left(1 - \dfrac{R}{100}\right)^n$.

2. Value of the machine n years ago $= \dfrac{P}{\left(1 - \dfrac{R}{100}\right)^n}$.

VI. If A is $R\%$ more than B, then B is less than A by $\left[\dfrac{R}{(100 + R)} \times 100\right]\%$.

If A is $R\%$ less than B, then B is more than A by $\left[\dfrac{R}{(100 - R)} \times 100\right]\%$.

SOLVED EXAMPLES

Ex. 1. *Express each of the following as a fraction:*

    (i) 56%   **(ii) 4%**   **(iii) 0.6%**   **(iv) 0.08%**

Sol. (i) $56\% = \dfrac{56}{100} = \dfrac{14}{25}$.   (ii) $4\% = \dfrac{4}{100} = \dfrac{1}{25}$.

    (iii) $0.6\% = \dfrac{0.6}{100} = \dfrac{6}{1000} = \dfrac{3}{500}$.   (iv) $0.08\% = \dfrac{0.08}{100} = \dfrac{8}{10000} = \dfrac{1}{1250}$.

Ex. 2. *Express each of the following as a decimal:*   **(R.R.B., 2006)**

    (i) 6%   **(ii) 28%**   **(iii) 0.2%**   **(iv) 0.04%**   **(v) $\dfrac{1}{2}$%**

Sol. (i) $6\% = \dfrac{6}{100} = 0.06$.   (ii) $28\% = \dfrac{28}{100} = 0.28$.

    (iii) $0.2\% = \dfrac{0.2}{100} = 0.002$.   (iv) $0.04\% = \dfrac{0.04}{100} = 0.0004$.

    (v) $\dfrac{1}{2}\% = \dfrac{1}{2} \times \dfrac{1}{100} = \dfrac{1}{200} = 0.005$.

Ex. 3. *Express each of the following as rate percent:*

    (i) $\dfrac{23}{36}$ **(ii) 0.004**   **(iii) $6\dfrac{3}{4}$**

Sol. (i) $\dfrac{23}{36} = \left(\dfrac{23}{36} \times 100 \right)\% = \left(\dfrac{575}{9} \right)\% = 63\dfrac{8}{9}\%$.

    (ii) $0.004 = \dfrac{4}{1000} = \left(\dfrac{4}{1000} \times 100 \right)\% = 0.4\%$.

    (iii) $6\dfrac{3}{4} = \dfrac{27}{4} = \left(\dfrac{27}{4} \times 100 \right)\% = 675\%$.

Ex. 4. *Evaluate:*   **(Bank P.O., 2009)**

    (i) 70% of 320 + 45% of 240   **(ii) $16\dfrac{2}{3}$% of 600 gm − $33\dfrac{1}{3}$% of 180 gm**

Sol. (i) 70% of 320 + 45% of 240 $= \left(\dfrac{70}{100} \times 320 + \dfrac{45}{100} \times 240 \right) = 224 + 108 = 332$.

    (ii) $16\dfrac{2}{3}\%$ of 600 gm $- 33\dfrac{1}{3}\%$ of 180 gm

        $= \left[\left(\dfrac{50}{3} \times \dfrac{1}{100} \times 600 \right) - \left(\dfrac{100}{3} \times \dfrac{1}{100} \times 180 \right) \right]$ gm $= (100 - 60)$ gm $= 40$ gm.

Ex. 5. **(i) 2 is what percent of 50?**

    (ii) $\dfrac{1}{2}$ is what percent of $\dfrac{1}{3}$?

    (iii) What percent of 7 is 84?

    (iv) What percent of 2 metric tonnes is 40 quintals?

    (v) What percent of 6.5 litres is 130 ml?

    (vi) What percent is 1 minute 10 seconds of half an hour?   **(P.C.S., 2009)**

Sol. (i) Required percentage $= \left(\dfrac{2}{50} \times 100 \right)\% = 4\%$.

    (ii) Required percentage $= \left(\dfrac{1}{2} \times \dfrac{3}{1} \times 100 \right)\% = 150\%$.

(iii) Required percentage $= \left(\dfrac{84}{7} \times 100\right)\% = 1200\%$.

(iv) 1 metric tonne = 10 quintals.

∴ Required percentage $= \left(\dfrac{40}{2 \times 10} \times 100\right)\% = 200\%$.

(v) Required percentage $= \left(\dfrac{130}{6.5 \times 1000} \times 100\right)\% = 2\%$.

(vi) 1 minute 10 seconds $= 1\dfrac{10}{60}$ min $= 1\dfrac{1}{6}$ min $= \dfrac{7}{6}$ min.

Half an hour = 30 min.

∴ Required percentage $= \left(\dfrac{7}{6} \times \dfrac{1}{30} \times 100\right)\% = \left(\dfrac{35}{9}\right)\% = 3.89\%$.

Ex. 6. *Find the missing figures:*
  (i)?% *of 25 = 2.125*   **(ii)** *9% of? = 63*   **(iii)** *0.25% of? = 0.04*

Sol. (i) Let $x\%$ of 25 = 2.125. Then, $\dfrac{x}{100} \times 25 = 2.125 \Leftrightarrow x = (2.125 \times 4) = 8.5$.

(ii) Let 9% of x = 6.3. Then, $\dfrac{9}{100} x = 6.3 \Leftrightarrow x = \left(\dfrac{6.3 \times 100}{9}\right) = 70$.

(iii) Let 0.25% of x = 0.04. Then, $\dfrac{0.25}{100} x = 0.04 \Leftrightarrow x = \left(\dfrac{0.04 \times 100}{0.25}\right) = 16$.

Ex. 7. *Which is greatest in* $16\dfrac{2}{3}\%, \dfrac{2}{15}$ *and 0.17?*

Sol. $16\dfrac{2}{3}\% = \left(\dfrac{50}{3} \times \dfrac{1}{100}\right) = \dfrac{1}{6} = 0.166, \dfrac{2}{15} = 0.133$. Clearly, 0.17 is the greatest.

Ex. 8. *Saroj invests ₹ 72318, which is 17% of her annual income, in mutual funds. What is her monthly income?*   **(Bank Recruitment, 2009)**

Sol. Let the annual income be ₹ x.

Then, 17% of x = 72318 $\Rightarrow \dfrac{17}{100} x = 72318 \Rightarrow x = \left(\dfrac{72318 \times 100}{17}\right) = 425400$.

∴ Saroj's monthly income $= ₹ \left(\dfrac{425400}{12}\right) = ₹ 35450$.

Ex. 9. *An inspector rejects 0.08% of the meters as defective. How many will he examine to reject 2?*

Sol. Let the number of meters to be examined be x.

Then, 0.08% of x = 2 $\Leftrightarrow \left(\dfrac{8}{100} \times \dfrac{1}{100} \times x\right) = 2 \Leftrightarrow x = \left(\dfrac{2 \times 100 \times 100}{8}\right) = 2500$.

Ex. 10. *The price of a TV set inclusive of sales tax of 9% is ₹ 13407. Find its marked price.*   **(R.R.B., 2008)**

Sol. Let the M.P. of T.V. set be ₹ x.

Then, $x + 9\%$ of x = 13407 $\Rightarrow x + \dfrac{9x}{100} = 13407 \Rightarrow \dfrac{109x}{100} = 13407 \Rightarrow x = \left(\dfrac{13407 \times 100}{109}\right) = 12300$.

Hence, marked price = ₹ 12300.

Ex. 11. *The difference between 31% of a number and 13% of the same number is 576. What is 17% of that number?*   **(Bank Recruitment, 2010)**

Sol. Let the number be x.

Then, 31% of x − 13% of x = 576 $\Rightarrow (31 − 13)\%$ of x = 576 $\Rightarrow 18\%$ of x = 576

$\Rightarrow \dfrac{18}{100} x = 576 \Rightarrow x = \left(\dfrac{576 \times 100}{18}\right) = 3200$.

∴ 17% of the number = 17% of 3200 $= \left(\dfrac{17}{100} \times 3200\right) = 544$.

Ex. 12. *Sixty-five percent of a number is 21 less than four-fifths of that number. What is the number?*

Sol. Let the number be x.

Then, $\frac{4}{5}x - (65\% \text{ of } x) = 21 \iff \frac{4}{5}x - \frac{65}{100}x = 21 \iff 15x = 2100 \iff x = 140.$

Ex. 13. *If the sales tax be reduced from $3\frac{1}{2}\%$ to $3\frac{1}{3}\%$, then what difference does it make to a person who purchases an article with marked price of ₹ 8400?*

Sol. Required difference $= \left(3\frac{1}{2}\% \text{ of } ₹ 8400\right) - \left(3\frac{1}{3}\% \text{ of } ₹ 8400\right)$

$= \left(\frac{7}{2} - \frac{10}{3}\right)\% \text{ of } ₹ 8400 = \frac{1}{6}\% \text{ of } ₹ 8400 = ₹\left(\frac{1}{6} \times \frac{1}{100} \times 8400\right) = ₹ 14.$

Ex. 14. *Difference of two numbers is 1660. If 7.5% of one number is 12.5% of the other number, find the two numbers.*

Sol. Let the numbers be x and y. Then, 7.5% of x = 12.5% of $y \iff x = \frac{125}{75}y = \frac{5}{3}y.$

Now, $x - y = 1660 \Rightarrow \frac{5}{3}y - y = 1660 \Rightarrow \frac{2}{3}y = 1660 \Rightarrow y = \left(\frac{1660 \times 3}{2}\right) = 2490.$

∴ One number = 2490, Second number $= \frac{5}{3}y = 4150.$

Ex. 15. *The difference between the value of a number increased by 25% and the value of the original number decreased by 30% is 22. What is the original number?* **(SNAP, 2010)**

Sol. Let the number be x. Then,

125% of x − 70% of x = 22 $\Rightarrow$ 55% of x = 22 $\Rightarrow \frac{55}{100}x = 22 \Rightarrow x = \left(\frac{22 \times 100}{55}\right) = 40.$

Hence, required number = 40.

Ex. 16. *Mrs. Roy spent ₹ 44620 on Deepawali shopping, ₹ 32764 on buying laptop and the remaining 32% of the total amount she had as cash with her. What was the total amount?* **(S.B.I.,P.O., 2008)**

Sol. Let the total amount be ₹ x. Then,

(100 − 32)% of x = 44620 + 32764 $\Rightarrow$ 68% of x = 77384 $\Rightarrow x = \left(\frac{77384 \times 100}{68}\right) = 113800.$

Hence, total amount = ₹ 113800.

Ex. 17. *In expressing a length 81.472 km as nearly as possible with three significant digits, find the percentage error.*

Sol. Error = (81.5 − 81.472) km = 0.028 km.

∴ Required percentage $= \left(\frac{0.028}{81.472} \times 100\right)\% = 0.034\%.$

Ex. 18. *The monthly income of a person was ₹ 13500 and his monthly expenditure was ₹ 9000. Next year, his income increased by 14% and his expenditure by 7%. Find the percentage increase in his savings.* **(S.S.C., 2006)**

Sol. Increased income = 114% of ₹ 13500 = ₹ $\left(\frac{114}{100} \times 13500\right) = ₹ 15390.$

Increased expenditure = 107% of ₹ 9000 = ₹ $\left(\frac{107}{100} \times 9000\right) = ₹ 9630.$

Increased saving = ₹ (15390 − 9630) = ₹ 5760.

Original savings = ₹ (13500 − 9000) = ₹ 4500.

Increase = ₹ (5760 − 4500) = ₹ 1260.

∴ Increase % in savings $= \left(\frac{1260}{4500} \times 100\right)\% = 28\%.$

Ex. 19. *Salesperson A's compensation for any week is ₹ 360 plus 6 percent of the portion of A's total sales above ₹ 1000 for that week. Salesperson B's compensation for any week is 8 percent of B's total sales for that week. For what amount of total weekly sales would both salespersons earn the same compensation?* **(M.B.A., 2006)**

Sol. Let the required weekly sales be ₹ x.

Then, A's compensation = ₹ $[360 + 6\%$ of $(x - 1000)]$

B's compensation = 8% of ₹ x.

∴ $360 + 6\%$ of $(x - 1000) = 8\%$ of $x \Rightarrow 360 + \dfrac{6}{100}(x - 1000) = \dfrac{8}{100}x$

$$\Rightarrow 360 + \dfrac{3}{50}x - 60 = \dfrac{2}{25}x \Rightarrow \dfrac{x}{50} = 300 \Rightarrow x = 15000.$$

Hence, required weekly sales = ₹ 15000.

Ex. 20. *A man buys a house for ₹ 5 lakh and rents it. He puts $12\dfrac{1}{2}\%$ of each month's rent aside for repairs, pays ₹ 1660 as annual taxes and realizes 10% on his investment thereafter. Find the monthly rent of the house.*

(M.A.T., 2009)

Sol. Let the annual rent of the house be ₹ x. Then,

$$x - \left(12\dfrac{1}{2}\% \text{ of } x + 1660\right) = 10\% \text{ of } 500000$$

$$\Rightarrow x - \left(\dfrac{25}{2} \times \dfrac{1}{100} \times x + 1660\right) = 50000$$

$$\Rightarrow \dfrac{7x}{8} - 1660 = 50000 \Rightarrow \dfrac{7x}{8} = 51660 \Rightarrow x = \left(\dfrac{51660 \times 8}{7}\right) = 59040.$$

Hence, monthly rent = ₹ $\left(\dfrac{59040}{12}\right)$ = ₹ 4920.

Ex. 21. *The present population of a village is 5500. If the number of males increases by 11% and the number of females increases by 20%, then the population will become 6330. What is the present population of females in the village?*

Sol. Let the number of males be x. Then, number of females = $(5500 - x)$.

∴ 111% of x + 120% of $(5500 - x)$ = 6330

$$\Rightarrow \dfrac{111}{100}x + \dfrac{120}{100}(5500 - x) = 6330$$

$\Rightarrow 111x + 660000 - 120x = 633000 \Rightarrow 9x = 27000 \Rightarrow x = 3000.$

Hence, present population of females = 5500 − 3000 = 2500.

Ex. 22. *In an election between two candidates, 75% of the voters cast their votes, out of which 2% of the votes were declared invalid. A candidate got 9261 votes which were 75% of the total valid votes. Find the total number of votes enrolled in that election.*

Sol. Let the total number of votes enrolled be x. Then,

Number of votes cast = 75% of x. Valid votes = 98% of (75% of x).

∴ 75% of [98% of (75% of x)] = 9261

$$\Leftrightarrow \left(\dfrac{75}{100} \times \dfrac{98}{100} \times \dfrac{75}{100} \times x\right) = 9261 \Leftrightarrow x = \left(\dfrac{9261 \times 100 \times 100 \times 100}{75 \times 98 \times 75}\right) = 16800.$$

Ex. 23. *Shobha's Mathematics Test had 75 problems i.e., 10 arithmetic, 30 algebra and 35 geometry problems. Although she answered 70% of the arithmetic, 40% of the algebra and 60% of the geometry problems correctly, she did not pass the test because she got less than 60% of the problems right. How many more questions she would have needed to answer correctly to earn a 60% passing grade?*

Sol. Number of questions attempted correctly = (70% of 10 + 40% of 30 + 60% of 35)

$$= (7 + 12 + 21) = 40.$$

Questions to be answered correctly for 60% grade = 60% of 75 = 45.

∴ Required number of questions = (45 − 40) = 5.

Ex. 24. *If 50% of (x − y) = 30% of (x + y), then what percent of x is y?*

Sol. 50% of $(x − y)$ = 30% of $(x + y)$ $\Leftrightarrow$ $\dfrac{50}{100}(x − y) = \dfrac{30}{100}(x + y)$

$\Leftrightarrow 5(x − y) = 3(x + y) \Leftrightarrow 2x = 8y \Leftrightarrow x = 4y.$

∴ Required percentage $= \left(\dfrac{y}{x} \times 100\right)\% = \left(\dfrac{y}{4y} \times 100\right)\% = 25\%.$

Ex. 25. *Mr. Jones gave 40% of the money he had, to his wife. He also gave 20% of the remaining amount to each of his three sons. Half of the amount now left was spent on miscellaneous items and the remaining amount of ₹ 12,000 was deposited in the bank. How much money did Mr. Jones have initially?*

Sol. Let the initial amount with Mr. Jones be ₹ x. Then,

Money given to wife $= ₹ \dfrac{40}{100} x = ₹ \dfrac{2x}{5}$. Balance $= ₹ \left(x − \dfrac{2x}{5}\right) = ₹ \dfrac{3x}{5}$.

Money given to 3 sons $= ₹ \left[3 \times \left(\dfrac{20}{100} \times \dfrac{3x}{5}\right)\right] = ₹ \dfrac{9x}{25}$.

Balance $= ₹ \left(\dfrac{3x}{5} − \dfrac{9x}{25}\right) = ₹ \dfrac{6x}{25}$.

Amount deposited in bank $= ₹ \left(\dfrac{1}{2} \times \dfrac{6x}{25}\right) = ₹ \dfrac{3x}{25}$.

∴ $\dfrac{3x}{25} = 12000 \Leftrightarrow x = \left(\dfrac{12000 \times 25}{3}\right) = 100000.$

So, Mr. Jones initially had ₹ 1,00,000 with him.

Short-cut Method: Let the initial amount with Mr. Jones be ₹ x. Then,

$\dfrac{1}{2}$ of $[100 − (3 \times 20)]\%$ of $(100 − 40)\%$ of $x = 12000$.

$\Leftrightarrow \dfrac{1}{2} \times \dfrac{40}{100} \times \dfrac{60}{100} \times x = 12000 \Leftrightarrow \dfrac{3}{25} x = 12000 \Leftrightarrow x = \left(\dfrac{12000 \times 25}{3}\right) = 100000.$

Ex. 26. *Peter got 30% of the maximum marks in an examination and failed by 10 marks. However, Paul who took the same examination got 40% of the total marks and got 15 marks more than the passing marks. What were the passing marks in the examination?* **(M.B.A., 2007)**

Sol. Let the maximum marks be x. Then,

$(30\% \text{ of } x) + 10 = (40\% \text{ of } x) − 15 \Rightarrow \dfrac{30}{100} x + 10 = \dfrac{40}{100} x − 15 \Rightarrow \dfrac{10x}{100} = 25 \Rightarrow x = 250.$

∴ Passing marks $= (30\% \text{ of } 250) + 10 = \left(\dfrac{30}{100} \times 250\right) + 10 = 85.$

Ex. 27. *10% of the inhabitants of a village having died of cholera, a panic set in, during which 25% of the remaining inhabitants left the village. The population is then reduced to 4050. Find the number of original inhabitants.*

Sol. Let the total number of original inhabitants be x.

Then, $(100 − 25)\%$ of $(100 − 10)\%$ of $x = 4050$

$\Leftrightarrow \left(\dfrac{75}{100} \times \dfrac{90}{100} \times x\right) = 4050 \Leftrightarrow \dfrac{27}{40} x = 4050 \Leftrightarrow x = \left(\dfrac{4050 \times 40}{27}\right) = 6000.$

∴ Number of original inhabitants = 6000.

Ex. 28. *If $z = \dfrac{x^2}{y}$ and x, y are both increased in value by 10%, find the percentage change in the value of z.*

(M.B.A., 2007)

Sol. Let X, Y and Z represent the changed values of x, y and z respectively.

Then, $X = 110\%$ of $x = \dfrac{11x}{10}$; $Y = 110\%$ of $y = \dfrac{11y}{10}$.

$$\therefore \; Z = \frac{X^2}{Y} = \frac{\left(\frac{11x}{10}\right)^2}{\left(\frac{11y}{10}\right)} = \frac{11}{10} \cdot \frac{x^2}{y} = \frac{11}{10}Z.$$

Increase in the value of $z = \left(\frac{11z}{10} - z\right) = \frac{z}{10}$.

$\therefore$ Increase % $= \left(\frac{z}{10} \times \frac{1}{z} \times 100\right)\% = 10\%$.

Ex. 29. *An investor earns 3% return on $\frac{1}{4}$ of his capital, 5% on $\frac{2}{3}$ and 11% on the remainder. What is the average rate of return he earns on his total capital?* (M.A.T., 2008)

Sol. Let the investor's total capital be ₹ x.

Then, total return $= ₹ \left[3\% \text{ of } \frac{x}{4} + 5\% \text{ of } \frac{2x}{3} + 11\% \text{ of } \left\{x - \left(\frac{x}{4} + \frac{2x}{3}\right)\right\}\right]$

$= ₹ \left(\frac{3x}{400} + \frac{10x}{300} + \frac{11x}{1200}\right) = ₹ \frac{x}{20}$.

$\therefore$ Average rate of return $= \left(\frac{x}{20} \times \frac{1}{x} \times 100\right)\% = 5\%$.

Ex. 30. *In a tournament, a player has a record of 40% wins, out of the number of games he has played so far which in turn is $\frac{2}{5}$ of the total number of games he plays. What is the maximum percentage of the remaining games that the player can lose and still win 50% of all the games played?*

Sol. Let the total number of games played be x.

Number of games already played $= \frac{2x}{5}$.

Games already lost $= 60\% \text{ of } \frac{2x}{5} = \frac{6x}{25}$.

Number of games that the player can lose $= 50\% \text{ of } x = \frac{x}{2}$.

$\therefore$ Number of games that the player can still lose $= \left(\frac{x}{2} - \frac{6x}{25}\right) = \frac{13x}{50}$.

Remaining games to be played $= \left(x - \frac{2x}{5}\right) = \frac{3x}{5}$.

$\therefore$ Required percentage $= \left(\frac{13x}{50} \times \frac{5}{3x} \times 100\right)\% = 43.3\%$.

Ex. 31. *A man's wage was reduced by 50%. Again the reduced wage was increased by 50%. Find his loss in terms of percentage.* (R.R.B., 2008)

Sol. Let original wage = ₹ 100.

New final wage = 150% of (50% of ₹ 100) $= ₹ \left(\frac{150}{100} \times \frac{50}{100} \times 100\right) = ₹ 75$.

$\therefore$ Loss = 25%.

Ex. 32. *A man's working hours a day were increased by 20% and his wages per hour were increased by 15%. By how much percent was his daily earning increased?* (R.R.B., 2008)

Sol. Let the original number of working hours a day be x and original wages per hour be ₹ y.

Then, original daily earning = ₹ (xy). Increased working hours = 120% of $x = \frac{6x}{5}$.

Increased wages per hour = 115% of ₹ y = ₹ $\dfrac{23y}{20}$.

New daily earning = ₹ $\left(\dfrac{6x}{5} \times \dfrac{23y}{20} \right)$ = ₹ $\left(\dfrac{69xy}{50} \right)$.

Increase in daily earning = ₹ $\left(\dfrac{69\,xy}{50} - xy \right)$ = ₹ $\left(\dfrac{19\,xy}{50} \right)$.

∴ Increase % = $\left(\dfrac{19\,xy}{50} \times \dfrac{1}{xy} \times 100 \right)\% = 38\%$.

Ex. 33. *The salary of a person was reduced by 10%. By what percent should his reduced salary be raised so as to bring it at par with his original salary?* (S.S.C., 2005, 2007)

Sol. Let the original salary be ₹ 100. New salary = ₹ 90.

Increase on 90 = 10. Increase on 100 = $\left(\dfrac{10}{90} \times 100 \right)\% = 11\dfrac{1}{9}\%$.

Ex. 34. *When the price of a product was decreased by 10%, the number sold increased by 30%. What was the effect on the total revenue?*

Sol. Let the price of the product be ₹ 100 and let original sale be 100 pieces.
Then, Total Revenue = ₹ (100 × 100) = ₹ 10000.
New revenue = ₹ (90 × 130) = ₹ 11700.

∴ Increase in revenue = $\left(\dfrac{1700}{10000} \times 100 \right)\% = 17\%$.

Ex. 35. *If the numerator of a fraction be increased by 15% and its denominator be diminished by 8%, the value of the fraction is $\dfrac{15}{16}$. Find the original fraction.*

Sol. Let the original fraction be $\dfrac{x}{y}$.

Then, $\dfrac{115\% \text{ of } x}{92\% \text{ of } y} = \dfrac{15}{16}$ ⇒ $\dfrac{115x}{92y} = \dfrac{15}{16}$ ⇒ $\dfrac{x}{y} = \left(\dfrac{15}{16} \times \dfrac{92}{115} \right) = \dfrac{3}{4}$.

Ex. 36. *The price of petrol is increased by 25%. How much percent must a car owner reduce his consumption of petrol so as not to increase his expenditure on petrol?* (S.S.C., 2005, 2007)

Sol. Reduction in consumption = $\left[\dfrac{R}{(100 + R)} \times 100 \right]\% = \left(\dfrac{25}{125} \times 100 \right)\% = 20\%$.

Ex. 37. *The population of a town is 1,76,400. If it increases at the rate of 5% per annum, what will be its population 2 years hence? What was it 2 years ago?*

Sol. Population after 2 years = $176400 \times \left(1 + \dfrac{5}{100} \right)^2 = \left(176400 \times \dfrac{21}{20} \times \dfrac{21}{20} \right) = 194481$.

Population 2 years ago = $\dfrac{176400}{\left(1 + \dfrac{5}{100} \right)^2} = \left(176400 \times \dfrac{20}{21} \times \dfrac{20}{21} \right) = 160000$.

Ex. 38. *The value of a machine depreciates at the rate of 10% per annum. If its present value is ₹ 1,62,000, what will be its worth after 2 years? What was the value of the machine 2 years ago?*

Sol. Value of the machine after 2 years

= ₹ $\left[162000 \times \left(1 - \dfrac{10}{100} \right)^2 \right]$ = ₹ $\left(162000 \times \dfrac{9}{10} \times \dfrac{9}{10} \right)$ = ₹ 131220.

Value of the machine 2 years ago

= ₹ $\left[\dfrac{162000}{\left(1 - \dfrac{10}{100} \right)^2} \right]$ = ₹ $\left(162000 \times \dfrac{10}{9} \times \dfrac{10}{9} \right)$ = ₹ 200000.

Ex. 39. *During one year, the population of a town increased by 5% and during the next year, the population decreased by 5%. If the total population is 9975 at the end of the second year, then what was the population size in the beginning of the first year?*

Sol. Population in the beginning of the first year

$$= \frac{9975}{\left(1 + \frac{5}{100}\right)\left(1 - \frac{5}{100}\right)} = \left(9975 \times \frac{20}{21} \times \frac{20}{19}\right) = 10000.$$

Ex. 40. *If A earns $33\frac{1}{3}\%$ more than B, how much percent does B earn less than A?*   **(B.Ed Entrance, 2009)**

Sol. Required percentage $= \left[\frac{\left(\frac{100}{3}\right)}{\left(100 + \frac{100}{3}\right)} \times 100\right]\% = \left(\frac{100}{400} \times 100\right)\% = 25\%.$

Ex. 41. *If A's salary is 30% less than that of B, then how much percent is B's salary more than that of A?*
                                                                                                          (R.R.B., 2008)

Sol. Required percentage $= \left[\frac{30}{(100 - 30)} \times 100\right]\% = \frac{300}{7}\% = 42\frac{6}{7}\%.$

Ex. 42. *How many kg of pure salt must be added to 30 kg of 2% solution of salt and water to increase it to a 10% solution?*   **(M.A.T., 2004)**

Sol. Amount of salt in 30 kg solution $= \left(\frac{2}{100} \times 30\right)$ kg $= 0.6$ kg.

Let x kg of pure salt be added.

Then, $\frac{0.6 + x}{30 + x} = \frac{10}{100} \iff 60 + 100x = 300 + 10x \iff 90x = 240 \iff x = \frac{8}{3} = 2\frac{2}{3}.$

Ex. 43. *After 25 kg of water had been evaporated from a solution of salt and water, which had 20% salt, the remaining solution had 30% salt. Find the weight of the original solution.*   **(S.S.C., 2007)**

Sol. Let the weight of the original solution be x kg.

Then, weight of salt in x kg solution = 20% of x kg = $\frac{x}{5}$ kg.

Weight of water in x kg solution = $\left(x - \frac{x}{5}\right)$ kg = $\frac{4x}{5}$ kg.

Weight of solution after evaporation = $(x - 25)$ kg.

$\therefore \quad \frac{x}{5(x - 25)} = \frac{30}{100} \iff 150(x - 25) = 100x \iff 50x = 3750 \iff x = 75.$

Hence, weight of the original solution = 75 kg.

Ex. 44. *Due to a reduction of $6\frac{1}{4}\%$ in the price of sugar, a man is able to buy 1 kg more for ₹ 120. Find the original and reduced rate of sugar.*

Sol. Let original rate be ₹ x per kg.

Reduced rate $= ₹\left[\left(100 - \frac{25}{4}\right) \times \frac{1}{100}x\right] = ₹\frac{15x}{16}$ per kg.

$\therefore \quad \frac{120}{\frac{15x}{16}} - \frac{120}{x} = 1 \iff \frac{128}{x} - \frac{120}{x} = 1 \iff x = 8.$

So, original rate = ₹ 8 per kg.

Reduced rate $= ₹\left(\frac{15}{16} \times 8\right)$ per kg $= ₹ 7.50$ per kg.

Ex. 45. *In an examination, 35% of total students failed in Hindi, 45% failed in English and 20% in both. Find the percentage of those who passed in both the subjects.*

Sol. Let A and B be the sets of students who failed in Hindi and English respectively.

Then, n (A) = 35, n (B) = 45, n (A $\cap$ B) = 20.

So, n (A $\cup$ B) = n (A) + n (B) − n (A $\cap$ B) = (35 + 45 − 20) = 60.

∴ Percentage failed in Hindi or English or both = 60%.

Hence, percentage passed = (100 − 60)% = 40%.

Ex. 46. *In an examination, 80% of the students passed in English, 85% in Mathematics and 75% in both English and Mathematics. If 40 students failed in both the subjects, find the total number of students.*

Sol. Let the total number of students be x.

Let A and B represent the sets of students who passed in English and Mathematics respectively.

Then, number of students passed in one or both the subjects

= n (A $\cup$ B) = n (A) + n (B) − n (A $\cap$ B) = 80% of x + 85% of x − 75% of x

$= \left(\dfrac{80}{100} x + \dfrac{85}{100} x - \dfrac{75}{100} x \right) = \dfrac{90}{100} x = \dfrac{9}{10} x.$

∴ Students who failed in both the subjects $= \left(x - \dfrac{9x}{10} \right) = \dfrac{x}{10}.$

So, $\dfrac{x}{10} = 40$ or $x = 400$. Hence, total number of students = 400.

Ex. 47. *Ajay ordered 4 pairs of black socks and some additional pairs of blue socks. The price of the black socks per pair was twice that of the blue ones. When the order was filled, it was found that the number of pairs of the two colours had been interchanged. This increased the bill by 50%. Find the ratio of the number of pairs of black socks to the number of pairs of blue socks in the original order.* **(M.B.A., 2011)**

Sol. Suppose he ordered n pairs of blue socks.

Let the price of each pair of blue socks be ₹ x.

Then, price of each pair of black socks = ₹ $2x$.

Actual bill = ₹ $(4 \times 2x + nx)$ = ₹ $(8x + nx)$.

Bill made on interchange = ₹ $(2nx + 4x)$.

∴ $2nx + 4x$ = 150% of $(8x + nx)$ $\Rightarrow$ $2nx + 4x = \dfrac{3}{2} (8x + nx)$

$\Rightarrow$ $2(2nx + 4x) = 3(8x + nx)$

$\Rightarrow$ $4nx + 8x = 24x + 3nx \Rightarrow nx = 16x \Rightarrow n = 16.$

Hence, required ratio = 4 : 16 = 1 : 4.

EXERCISE

(OBJECTIVE TYPE QUESTIONS)

Directions: *Mark (✓) against the correct answer:*

1. How is $\dfrac{3}{4}$ expressed as percentage? **(R.R.B., 2006)**

   (*a*) 0.75%   (*b*) 7.5%

   (*c*) 75%   (*d*) 60%

2. The ratio 5 : 4 expressed as a percent equals

   (*a*) 12.5%   (*b*) 40%

   (*c*) 80%   (*d*) 125%

3. 3.5 can be expressed in terms of percentage as

   (*a*) 0.35%   (*b*) 3.5%

   (*c*) 35%   (*d*) 350%

4. When expressed as a fraction 64% would mean

   (*a*) $\dfrac{16}{25}$ (*b*) $\dfrac{9}{64}$

   (*c*) $\dfrac{8}{81}$ (*d*) $\dfrac{12}{121}$

5. Half of 1 percent written as a decimal is

(L.I.C.A.D.O., 2008)

   (*a*) 0.005   (*b*) 0.05

   (*c*) 0.02   (*d*) 0.2

6. 12% of 5000 = ? **(CLAT, 2010)**

   (*a*) 600   (*b*) 620

   (*c*) 680   (*d*) 720

7. 38% of 341 =?   (Bank Recruitment, 2009)
(a) 120.68   (b) 129.58
(c) 135.78   (d) 136.28
(e) None of these

8. (550% of 250) ÷ 275 =?   (Bank P.O., 2009)
(a) 15   (b) 0.5
(c) 1.5   (d) 25
(e) None of these

9. 280% of 3940 =?   (L.I.C.A.D.O., 2007)
(a) 10132   (b) 11032
(c) 11230   (d) 11320
(e) None of these

10. 92.5% of 550 =?   (Bank Recruitment, 2008)
(a) 506.45   (b) 508.75
(c) 518.55   (d) 521.65
(e) None of these

11. 2% of 2 =?
(a) 0.04   (b) 0.4
(c) 0.02   (d) 0.004

12. 10% of 5 and 5% of 10 add up to   (P.C.S., 2008)
(a) 0.10   (b) 0.25
(c) 1.0   (d) 2.5

13. 36% of 245 − 40% of 210 = 10 −?   (Bank P.O., 2010)
(a) 4.2   (b) 4.9
(c) 5.6   (d) 6.8
(e) None of these

14. 45% of 300 + $\sqrt{?}$ = 56% of 750 − 10% of 250

                                  (R.R.B., 2009)

(a) 60   (b) 130
(c) 260   (d) 67600

15. 15% of 578 + 22.5% of 644 =?   (Bank P.O., 2010)
(a) 231.4   (b) 231.6
(c) 231.8   (d) 233.6
(e) None of these

16. 140% of 56 + 56% of 140 =?   (Bank P.O., 2009)
(a) 78.4   (b) 87.4
(c) 156.6   (d) 158.6
(e) None of these

17. (7.9% of 134) − (3.4% of 79) =?   (Bank P.O., 2009)
(a) 7.3   (b) 7.8
(c) 8.1   (d) 8.6
(e) None of these

18. (23.6% of 1254) − (16.6% of 834) =?   (S.B.I.P.O., 2008)
(a) 153.5   (b) 155.5
(c) 157.5   (d) 159.5
(e) None of these

19. (0.85% of 405) + (2.25% of 550) =?   (Bank P.O., 2007)
(a) 13.8175   (b) 14.7125
(c) 15.7150   (d) 16.7175
(e) None of these

20. What is 45% of 25% of $\frac{4}{5}$ th of 850?   (Bank P.O., 2009)
(a) 67.5   (b) 69.5
(c) 76.5   (d) 83.5
(e) None of these

21. What is 28% of 36% of $\frac{5}{7}$ th of 5000 ?   (Bank P.O., 2008)
(a) 360   (b) 375
(c) 420   (d) 480
(e) None of these

22. (0.56% of 225) × (3.25% of 430) =?   (Bank P.O., 2006)
(a) 15.3195   (b) 15.6175
(c) 17.3075   (d) 17.6085
(e) None of these

23. An agent sells goods of value of ₹ 15000. The commission which he receives at the rate of $12\frac{1}{2}$% is   (SNAP, 2010)
(a) ₹ 1875   (b) ₹ 2000
(c) ₹ 2125   (d) ₹ 2700

24. One-eighth of a number is 41.5. What will 69% of that number be?
(a) 219.12   (b) 225.76
(c) 229.08   (d) 232.4
(e) None of these

25. Ten percent of twenty plus twenty percent of ten equals
(a) 10 percent of 20   (b) 20 percent of 10
(c) 1 percent of 200   (d) 2 percent of 200

26. 60% of 264 is the same as
(a) 10% of 44   (b) 15% of 1056
(c) 30% of 132   (d) None of these

27. 270 candidates appeared for an examination, of which 252 passed. The pass percentage is:
(a) 80%   (b) $83\frac{1}{2}$%
(c) $90\frac{1}{3}$%   (d) $93\frac{1}{3}$%

28. 5 out of 2250 parts of earth is sulphur. What is the percentage of sulphur in earth?
(a) $\frac{11}{50}$ (b) $\frac{2}{9}$
(c) $\frac{1}{45}$ (d) $\frac{2}{45}$

29. In an examination Sumit scores a total of 626 marks out of 850. What is his approximate percentage in the examination? **(Bank Recruitment, 2009)**

(*a*) 64　　　　　　　(*b*) 67

(*c*) 74　　　　　　　(*d*) 79

(*e*) 83

30. The marks obtained by a student are given below. What is his total percentage in all the subjects?

Subjects	Total Marks	Marks Obtained
Mathematics	100	100
Science	100	84
Social Studies	100	67
English	50	25
Hindi	50	24

(*a*) 56%　　　　　　(*b*) 68%

(*c*) 75%　　　　　　(*d*) 80%

31. The following table gives the marks obtained by a student in the first and second semester examinations in four subjects in a given year.

Subjects	1st Semester	2nd Semester	Maximum Marks
Physics	35	30	50
Chemistry	30	25	50
Mathematics	65	45	100
Social Science	80	85	100

The aggregate percentage of marks obtained by the student in the given year is nearly

(*a*) 56　　　　　　　(*b*) 61

(*c*) 64　　　　　　　(*d*) 66

32. I paid ₹ 27.20 as sales tax on a watch worth ₹ 340. Find the rate of sales tax.

(*a*) 8%　　　　　　　(*b*) 9%

(*c*) 10%　　　　　　(*d*) 12%

33. What percent of 88 is 33?

(*a*) 34.5%　　　　　(*b*) 35.5%

(*c*) 36.5%　　　　　(*d*) 37.5%

34. 0.01 is what percent of 0.1? **(S.S.C., 2005)**

(*a*) $\dfrac{1}{100}$　　　　　(*b*) $\dfrac{1}{10}$

(*c*) 10　　　　　　　(*d*) 100

35. What percent is 1 minute and 12 seconds of an hour?

(*a*) 2%　　　　　　　(*b*) 10%

(*c*) 12%　　　　　　(*d*) 20%

36. The enrolment of students in a school increases from 560 to 581. What is the percent increase in the enrolment?

(*a*) 2.75%　　　　　(*b*) 3.25%

(*c*) 3.72%　　　　　(*d*) 3.75%

37. What percent of 7.2 kg is 18 gms?

(*a*) .025%　　　　　(*b*) .25%

(*c*) 2.5%　　　　　　(*d*) 25%

38. What percent of ₹ 2650 is ₹ 1987.50?

(*a*) 60%　　　　　　(*b*) 75%

(*c*) 80%　　　　　　(*d*) 90%

39. What percent of a day is 3 hours?

(*a*) $12\dfrac{1}{2}$%　　　　(*b*) $16\dfrac{2}{3}$%

(*c*) $18\dfrac{2}{3}$%　　　　(*d*) $22\dfrac{1}{2}$%

40. The price for a pair of cuff links is ₹ 1.00. The price for a 5-pair package of cuff links is ₹ 3.40. The 5-pair package is what percent cheaper per pair than 5 pairs purchased separately? **(M.A.T., 2004)**

(*a*) 32%　　　　　　(*b*) 47%

(*c*) 62%　　　　　　(*d*) 63%

41. A bakery opened with its daily supply of 40 dozen rolls. Half of the rolls were sold by noon and 60% of the remaining rolls were sold between noon and closing time. How many dozen rolls were left unsold? **(SNAP, 2010)**

(*a*) 6　　　　　　　(*b*) 8

(*c*) 10　　　　　　　(*d*) 12

42. 5 kg of metal A and 20 kg of metal B are mixed to form an alloy. The percentage of metal A in the alloy is

(*a*) 20%　　　　　　(*b*) 25%

(*c*) 40%　　　　　　(*d*) None of these

43. 30% apples out of 450 are rotten. How many apples are in good condition? **(R.R.B., 2006)**

(*a*) 125　　　　　　(*b*) 180

(*c*) 240　　　　　　(*d*) 315

44. A company pays rent of ₹ 25000 per month for office space to its owner. But if the company pays the annual rent at the beginning of the year the owner gives a discount of 5% on the total annual rent. What is the annual amount the company pays to the owner after the discount?

(Bank Recruitment, 2008)

(*a*) ₹ 2,75,000　　　(*b*) ₹ 2,85,000

(*c*) ₹ 2,95,000　　　(*d*) ₹ 3,00,000

(*e*) None of these

45. An interval of 3 hours 40 minutes is wrongly estimated as 3 hours 45.5 minutes. The error percentage is **(S.S.C., 2006)**

(*a*) 2.5　　　　　　(*b*) 5

(*c*) 5.2　　　　　　(*d*) 5.5

46. The following table gives the income distribution of 200 households of a village:

Monthly Income (in ₹)	Number of Households
< 1000	25
< 2000	80
< 5000	170
< 10000	200

What is the percentage of households whose monthly income is above ₹ 2000 but below ₹ 5000?

(P.C.S., 2006)

(a) 32.5   (b) 45

(c) 85   (d) 90

47. In two successive years 100 and 75 students of a school appeared at the final examination. Respectively 75% and 60% of them passed. The average rate of pass is

(a) $68\frac{4}{7}\%$ (b) 78%

(c) 80%   (d) $80\frac{1}{2}\%$

48. A toy merchant announces 25% rebate in prices of balls. If one needs to have a rebate of ₹ 40, then how many balls each costing ₹ 32, he should purchase? **(M.B.A., 2007)**

(a) 5   (b) 6

(c) 7   (d) 10

49. 1.14 expressed as a percent of 1.9 is   **(S.S.C., 2010)**

(a) 6%   (b) 10%

(c) 60%   (d) 90%

50. Kamal has 160 toffees. He gave 5% toffees to Ravi, 15% toffees to Anita and one-fourth of the toffees to Gagan. How many toffees are left with Kamal after the distribution? **(Bank Recruitment, 2010)**

(a) 78   (b) 69

(c) 88   (d) 79

(e) None of these

51. A shopkeeper sells note-books at the rate of ₹ 45 each and earns a commission of 4%. He also sells pencil boxes at the rate of ₹ 80 each and earns a commission of 20%. How much amount of commission will he earn in two weeks if he sells 10 note-books and 6 pencil boxes a day?

(a) ₹ 1496   (b) ₹ 1586

(c) ₹ 1596   (d) ₹ 1956

(e) None of these

52. It costs ₹ 1 to photocopy a sheet of paper. However, 2% discount is allowed on all photocopies done after first 1000 sheets. How much will it cost to copy 5000 sheets of paper? **(IGNOU, 2003)**

(a) ₹ 3920   (b) ₹ 3980

(c) ₹ 4900   (d) ₹ 4920

53. A housewife saved ₹ 2.50 in buying an item on sale. If she spent ₹ 25 for the item, approximately how much percent she saved in the transaction?

(Section Officers', 2003)

(a) 8%   (b) 9%

(c) 10%   (d) 11%

54. How many litres of pure acid are there in 8 litres of a 20% solution?

(a) 1.4   (b) 1.5

(c) 1.6   (d) 2.4

55. Rajeev buys goods worth ₹ 6650. He gets a rebate of 6% on it. After getting the rebate, he pays sales tax @ 10%. Find the amount he will have to pay for the goods. **(M.A.T., 2002)**

(a) ₹ 6876.10   (b) ₹ 6999.20

(c) ₹ 6654   (d) ₹ 7000

56. Which one of the following shows the best percentage?

(a) $\dfrac{384}{540}$ (b) $\dfrac{425}{500}$

(c) $\dfrac{570}{700}$ (d) $\dfrac{480}{660}$

57. In a class of 65 students and 4 teachers, each student got sweets that are 20% of the total number of students and each teacher got sweets that are 40% of the total number of students. How many sweets are there? **(Bank P.O., 2009)**

(a) 104   (b) 845

(c) 949   (d) 897

(e) None of these

58. A student scores 55% marks in 8 papers of 100 marks each. He scores 15% of his total marks in English. How much does he score in English?

(Bank Recruitment, 2008)

(a) 44   (b) 45

(c) 66   (d) 77

(e) None of these

59. A, B, C and D have ₹ 40, 50, 60 and 70 respectively when they go to visit a fair. A spends ₹ 18, B spends ₹ 21, C spends ₹ 24 and D spends ₹ 27. Who has done the highest expenditure proportionate to his resources?

(a) A   (b) B

(c) C   (d) D

60. A country follows a progressive taxation system under which the income tax rate applicable varies for different slabs of income. Total tax is computed by calculating the tax for each slab and adding them up. The rates applicable are as follows:

(M.A.T., 2005, 2006)

Annual Income Slab (in ₹)	Tax Rate Applicable
0 – 50,000	0%
50,001 – 60,000	10%
60,001 – 1,50,000	20%
> 1,50,000	30%

If my annual income is ₹ 1,70,000, then what is the tax payable by me?

(a) ₹ 17000   (b) ₹ 25000

(c) ₹ 34000   (d) ₹ 51000

61. 40% of 60% of $\frac{3}{5}$th of a number is 504. What is 25% of $\frac{2}{5}$th of that number?   **(NABARD, 2009)**

(a) 175   (b) 180

(c) 350   (d) 360

(e) None of these

62. 125% of 3060 − 85% of? = 408   **(Bank P.O., 2010)**

(a) 3890   (b) 3940

(c) 4015   (d) 4020

(e) None of these

63. 40% of 265 + 35% of 180 = 50% of? **(Bank P.O., 2010)**

(a) 84.5   (b) 169

(c) 253.5   (d) 338

(e) None of these

64. ? % of 450 + 46% of 285 = 257.1   **(Bank P.O., 2009)**

(a) 21   (b) 28

(c) 32   (d) 34

(e) None of these

65. 36% of 365 +? % of 56.2 = 156.69   **(Bank P.O., 2010)**

(a) 30   (b) 35

(c) 40   (d) 45

(e) None of these

66. 35568 ÷? % of 650 = 456

(a) 12   (b) 14

(c) 16   (d) 18

(e) None of these

67. 23% of 8040 + 42% of 545 =? % of 3000

    (Bank P.O., 2006)

(a) 56.17   (b) 63.54

(c) 69.27   (d) 71.04

(e) None of these

68. 3.2% of 500 × 2.4% of? = 288   **(S.B.I.P.O., 2008)**

(a) 600   (b) 650

(c) 700   (d) 750

69. 85% of 485.5 = 50% of?   **(Bank P.O., 2006)**

(a) 675.75   (b) 735.65

(c) 825.35   (d) 915.5

(e) None of these

70. 40% of 4.5 +? % of $\frac{2}{3}$ = 20% of 10

(a) 20   (b) 25

(c) 30   (d) 35

(e) None of these

71. 30% of 28% of 480 is the same as

(a) 15% of 56% of 240   (b) 60% of 28% of 240

(c) 60% of 56% of 240   (d) None of these

72. What is 25% of 25% equal to?

(a) 0.00625   (b) 0.0625

(c) 0.625   (d) 6.25

73. What percent is 3% of 5%?

(a) 15%   (b) 30%

(c) 50%   (d) 60%

74. 64% of a number is 2592. What is 88% of that number?   **(Bank Recruitment, 2009)**

(a) 3202   (b) 3458

(c) 3564   (d) 3826

(e) None of these

75. 42% of a number is 892.5. What is 73% of that number?   **(Bank Recruitment, 2009)**

(a) 1466.25   (b) 1508.75

(c) 1551.25   (d) 1636.25

(e) None of these

76. 15% of 45% of a number is 105.3. What is 24% of that number?   **(Bank P.O., 2009)**

(a) 374.4   (b) 375

(c) 385.5   (d) 390

(e) None of these

77. If 0.03 is X% of 0.3, then the value of X is

    (I.A.M., 2007)

(a) 3   (b) 10

(c) 30   (d) Cannot be determined

78. 40% of 60% of 32% of an amount is ₹ 432. What is the amount?   **(Bank Recruitment, 2007)**

(a) ₹ 5000   (b) ₹ 5600

(c) ₹ 6400   (d) None of these

79. Find the greatest possible number for which 30% of that number is less than 100.

(a) 325   (b) 328

(c) 331   (d) 333

(e) 335

80. If ₹ 2800 is $\frac{2}{7}$ percent of the value of a house, the worth of the house (in ₹) is

(a) 8,00,000   (b) 9,80,000

(c) 10,00,000   (d) 12,00,000

81. 15% of? % of 582 = 17.46

(a) 2   (b) 10

(c) 20   (d) None of these

82. In a year, a man manages to sell only 65% of the chicken he owns. How many chicken should the man own to sell 47775 chicken in a year?   **(M.B.A., 2005)**

(a) 55000   (b) 68500

(c) 73000   (d) 82500

(e) None of these

83. If 35% of a number is 175, then what percent of 175 is that number?

(a) 35%   (b) 65%

(c) 280%   (d) None of these

84. 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   **(S.S.C., 2010)**

(a) ₹ 125   (b) ₹ 225

(c) ₹ 325   (d) ₹ 425

85. In an examination X secures 58% marks and Y secures 105 marks less than X. If the maximum marks were 700, then what percent of marks did Y secure?

(a) 42 percent   (b) 43 percent

(c) 52 percent   (d) None of these

86. Ms. Pooja invests 13% of her monthly salary, i.e. ₹ 8554 in Mediclaim Policies. Later she invests 23% of her monthly salary on Child Education Policies ; also she invests another 8% of her monthly salary on Mutual Funds. What is the total annual amount invested by Ms. Pooja?   **(S.B.I.P.O., 2008)**

(a) ₹ 28952   (b) ₹ 43428

(c) ₹ 173712   (d) ₹ 347424

(e) None of these

87. Nupur invests ₹ 89856, which is 26% of her annual income, in mutual funds. What is her monthly income?   **(Bank Recruitment, 2008)**

(a) ₹ 23980.50   (b) ₹ 28800

(c) ₹ 28990   (d) ₹ 33606.25

(e) None of these

88. David and his wife each receives an 8 percent annual rise. If David receives a raise of ₹ 800 and his wife receives a raise of ₹ 840, what is the difference between their annual incomes after their raises?

    (Campus Recruitment, 2008)

(a) ₹ 40   (b) ₹ 460

(c) ₹ 500   (d) ₹ 540

89. If the average of a number, its 75% and its 25% is 240, then the number is   **(P.C.S., 2006)**

(a) 280   (b) 320

(c) 360   (d) 400

90. A company bought a total of 60 computers and 20 printers to modernise billing operations. If the price of each computer was three times the price of each printer, what percent of the total cost of the purchase was the total cost of the printers?

(a) 10%   (b) 11%

(c) 15%   (d) 20%

91. An individual pays 30% income tax. On this tax he has to pay a surcharge of 10%. Thus the net tax rate, he has to pay, is

(a) 27%   (b) 33%

(c) 40%   (d) 45%

92. Anand has drawn an angle of measure 45° 27′ when he was asked to draw an angle of 45°. The percentage error in his drawing is

(a) 0.5   (b) 1.0

(c) 1.5   (d) 2.0

93. The value of which of the following fractions is less than twenty percent?   **(Bank P.O., 2010)**

(a) $\dfrac{5}{6}$ (b) $\dfrac{2}{3}$

(c) $\dfrac{2}{5}$ (d) $\dfrac{1}{4}$

(e) $\dfrac{2}{11}$

94. The difference between 54% of a number and 26% of the same number is 22526. What is 66% of that number?   **(Bank Recruitment, 2009)**

(a) 48372   (b) 49124

(c) 51218   (d) 53097

(e) None of these

95. The difference between 38% of a number and 24% of the same number is ₹ 135.10. What is 40% of that number?   **(M.A.T., 2009)**

(a) 370   (b) 378

(c) 386   (d) 394

96. 76% of the students in a school are boys. If the number of girls is 204, then the total number of students is   **(R.R.B., 2010)**

(a) 760   (b) 800

(c) 850   (d) 900

97. In an examination, 65% of the total examinees passed. If the number of failures is 420, the total number of examinees is

(a) 1000   (b) 1200

(c) 1500   (d) 1625

98. There are 340 vacancies for a particular post in an organisation. Experience shows that 15% of the candidates interviewed get rejected. How many candidates should be interviewed to fill all the vacancies?

(*a*) 226   (*b*) 391

(*c*) 400   (*d*) 420

(*e*) None of these

99. Rajan got 76 percent marks and Sonia got 480 marks in a test. The maximum marks of the test is equal to the marks obtained by Rajan and Sonia together. How many marks did Rajan score in the test?

                   (Bank P.O., 2010)

(*a*) 1450   (*b*) 1520

(*c*) 1540   (*d*) 2000

(*e*) None of these

100. If a bucket is 80% full, then it contains 2 litres more water than when it is $66\frac{2}{3}\%$ full. What is the capacity of the bucket?   **(S.S.C., 2005)**

(*a*) 10 litres   (*b*) 15 litres

(*c*) $16\frac{2}{3}$ litres   (*d*) 20 litres

101. Vinay 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 Vinay's salary?

                   (Bank P.O., 2008)

(*a*) ₹ 33750   (*b*) ₹ 37500

(*c*) ₹ 45000   (*d*) Cannot be determined

(*e*) None of these

102. One-fourth of sixty percent of a number is equal to two-fifths of twenty percent of another number. What is the respective ratio of the first number to the second number?   **(Bank P.O., 2008)**

(*a*) 4: 7   (*b*) 5: 9

(*c*) 8: 13   (*d*) Cannot be determined

(*e*) None of these

103. The sum of two numbers is 2490. If 6.5% of one number is equal to 8.5% of the other, the greater number is   **(R.R.B., 2006)**

(*a*) 1079   (*b*) 1250

(*c*) 1380   (*d*) 1411

104. The number of students who opted for IT courses decreased by 23%. If the number is 1540 now, then the original number of students opting for IT courses was

(*a*) 1600   (*b*) 1800

(*c*) 2000   (*d*) 2200

105. If the monthly salary of an employee is increased by $2\frac{2}{3}\%$, he gets ₹ 72 more. His monthly salary (in ₹) is

(*a*) 2000   (*b*) 2700

(*c*) 3600   (*d*) 7200

106. A store raised the price of an item by exactly 10 percent. Which of the following could not be the resulting price of the item?

(*a*) ₹ 5.50   (*b*) ₹ 7.60

(*c*) ₹ 11.00   (*d*) ₹ 12.10

107. A number increased by $37\frac{1}{2}\%$ gives 33. The number is   **(Hotel Management, 2005)**

(*a*) 22   (*b*) 24

(*c*) 25   (*d*) 27

108. Three-fourths of a number is equal to 60% of another number and the difference between these two numbers is 20. What is the sum of these two numbers?

(*a*) 170   (*b*) 180

(*c*) 220   (*d*) Cannot be determined

(*e*) None of these

109. The number which exceeds 16% of it by 42 is

(*a*) 50   (*b*) 52

(*c*) 58   (*d*) 60

110. What percentage of numbers from 1 to 70 have squares that end in the digit 1?

(*a*) 1   (*b*) 14

(*c*) 20   (*d*) 21

111. By how much percent is four-fifths of 70 lesser than five-sevenths of 112?   **(G.B.O., 2007)**

(*a*) 24%   (*b*) 30%

(*c*) 36%   (*d*) 42%

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

(*a*) 123.75   (*b*) 140.55

(*c*) 143   (*d*) 150

113. If 75% of a number is added to 75, then the result is the number itself. The number is   **(P.C.S., 2008)**

(*a*) 50   (*b*) 60

(*c*) 300   (*d*) 400

114. When 125 is subtracted from a number, it reduces to its 37.5 percent. What is 25 percent of that number?   **(Bank P.O., 2011)**

(*a*) 50   (*b*) 75

(*c*) 125   (*d*) 175

(*e*) None of these

115. Which of the following multipliers will cause a number to be increased by 29.7%?

(a) 1.297   (b) 12.97

(c) 129.7   (d) 1297

116. The sum of two numbers is $\frac{28}{25}$ of the first number. The second number is what percent of the first?

(a) 12%   (b) 14%

(c) 16%   (d) 18%

117. A number reduced by 25% becomes 225. What percent should it be increased so that it becomes 390?   **(R.R.B., 2010)**

(a) 25%   (b) 30%

(c) 35%   (d) 45%

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

(a) 1 : 3   (b) 2 : 3

(c) 3 : 2   (d) Data inadequate

119. The difference of two numbers is 20% of the larger number. If the smaller number is 20, then the larger number is: **(Bank P.O., 2010)**

(a) 25   (b) 45

(c) 50   (d) 80

120. When any number is divided by 12, then dividend becomes $\frac{1}{4}$ th of the other number. By how much percent first number is greater than the second number?

(a) 150   (b) 200

(c) 300   (d) Data inadequate

121. If one number is 80% of the other and 4 times the sum of their squares is 656, then the numbers are

(a) 4, 5   (b) 8, 10

(c) 16, 20   (d) None of these

122. Two numbers A and B are such that the sum of 5% of A and 4% of B is two-thirds of the sum of 6% of A and 8% of B. Find the ratio of A : B. **(M.A.T., 2009)**

(a) 2 : 3   (b) 1 : 1

(c) 3 : 4   (d) 4 : 3

123. Three candidates contested an election and received 1136, 7636 and 11628 votes respectively. What percentage of the total votes did the winning candidate get?

(a) 57%   (b) 60%

(c) 65%   (d) 90%

124. The population of a town increased from 1,75,000 to 2,62,500 in a decade. The average percent increase of population per year is

(a) 4.37%   (b) 5%

(c) 6%   (d) 8.75%

125. A student multiplied a number by $\frac{3}{5}$ instead of $\frac{5}{3}$. What is the percentage error in the calculation?

(a) 34%   (b) 44%

(c) 54%   (d) 64%

126. A tempo is insured to the extent of $\frac{4}{5}$ of its original value. If the premium on it at the rate of 1.3 percent amounts to ₹ 910, the original value of the tempo is

(a) ₹ 78,500   (b) ₹ 80,000

(c) ₹ 82,500   (d) ₹ 87,500

127. When 15% is lost in grinding wheat, a country can export 30 lakh tons of wheat. On the other hand, if 10% is lost in grinding, it can export 40 lakh tons of wheat. The production of wheat in the country is:

(a) 20 lakh tons   (b) 80 lakh tons

(c) 200 lakh tons   (d) 800 lakh tons

128. In a competitive examination in State A, 6% candidates got selected from the total appeared candidates. State B had an equal number of candidates appeared and 7% candidates got selected with 80 more candidates got selected than A. What was the number of candidates appeared from each State?

(a) 7600   (b) 8000

(c) 8400   (d) Data inadequate

129. The price of a car is ₹ 3,25,000. It was insured to 85% of its price. The car was damaged completely in an accident and the insurance company paid 90% of the insurance. What was the difference between the price of the car and the amount received?

          (B.Ed Entrance, 2010)

(a) ₹ 32,500   (b) ₹ 48,750

(c) ₹ 76,375   (d) ₹ 81,250

130. Gauri went to the stationers and bought things worth ₹ 25, out of which 30 paise went on sales tax on taxable purchases. If the tax rate was 6%, then what was the cost of the tax free items?

(a) ₹ 15   (b) ₹ 15.70

(c) ₹ 19.70   (d) ₹ 20

131. A batsman scored 110 runs which included 3 boundaries and 8 sixes. What percent of his total score did he make by running between the wickets?

          (S.S.C., 2004)

(a) 45%   (b) $45\frac{5}{11}\%$

(c) $54\frac{6}{11}\%$ (d) 55%

132. After deducting a commission of 5%, a T.V. set costs ₹ 9595. Its marked price is:

(*a*) ₹ 10,000   (*b*) ₹ 10,075

(*c*) ₹ 10,100   (*d*) ₹ 10,500

133. A person who spends $66\frac{2}{3}\%$ of his income is able to save ₹ 1200 per month. His monthly expenses (in ₹) are

(*a*) ₹ 1200   (*b*) ₹ 2400

(*c*) ₹ 3000   (*d*) ₹ 3200

134. Twenty-five percent of Reena's yearly income is equal to seventy-five percent of Anubhav's monthly income. If Anubhav's yearly income is ₹ 240000, what is Reena's monthly income?

(Bank Recruitment, 2010)

(*a*) ₹ 60000   (*b*) ₹ 12000

(*c*) ₹ 5200   (*d*) Cannot be determined

(*e*) None of these

135. Twelve percent of Kaushal's monthly salary is equal to sixteen percent of Nandini's monthly salary. Sonal's monthly salary is half that of Nandini's. If Sonal's annual salary is ₹ 1.08 lacs, what is Kaushal's monthly salary? **(Bank P.O., 2010)**

(*a*) ₹ 18000   (*b*) ₹ 20000

(*c*) ₹ 24000   (*d*) ₹ 26000

(*e*) None of these

136. 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 ₹ 6447, then what would be Aman's expense? **(Bank P.O., 2009)**

(*a*) ₹ 1890   (*b*) ₹ 2100

(*c*) ₹ 2200   (*d*) ₹ 2457

(*e*) None of these

137. Two tailors X and Y are paid a total of ₹ 550 per week by their employer. If X is paid 20 percent more than the sum paid to Y, how much is Y paid per week?

(*a*) ₹ 200   (*b*) ₹ 250

(*c*) ₹ 300   (*d*) None of these

138. Prithvi spent ₹ 89745 on his college fees, ₹ 51291 on Personality Development Classes and the remaining 27% of the total amount he had as cash with him. What was the total amount? **(Bank P.O., 2008)**

(*a*) ₹ 185400   (*b*) ₹ 189600

(*c*) ₹ 191800   (*d*) ₹ 193200

(*e*) None of these

139. If a number is reduced by 40% it becomes two-thirds of another number. What is the ratio of the first number to the second number?

(*a*) 8 : 9   (*b*) 9 : 8

(*c*) 10 : 9   (*d*) 9 : 10

(*e*) None of these

140. To meet a government requirement, a bottler must test 5 percent of its spring water and 10 percent of its sparkling water for purity. If a customer ordered 120 cases of spring water and 80 cases of sparkling water, then what percent of all the cases must the bottler test before he can send it out? **(M.A.T., 2006)**

(*a*) 6.5%   (*b*) 7.0%

(*c*) 7.5%   (*d*) 8.0%

141. When income tax is 3 paise in a rupee, a person's net income is ₹ 237650. What will it be when the income tax is raised to 7 paise? **(M.B.A., 2007)**

(*a*) ₹ 233000   (*b*) ₹ 231650

(*c*) ₹ 227850   (*d*) None of these

142. A monthly return railway ticket costs 25 percent more than a single ticket. A week's extension can be had for the former by paying 5 percent of the monthly ticket's cost. If the money paid for the monthly ticket (with extension) is ₹ 84, the price of the single ticket is **(M.A.T., 2007)**

(*a*) ₹ 48   (*b*) ₹ 64

(*c*) ₹ 72   (*d*) ₹ 80

143. In limestone, 40% is calcium and the rest is carbon and oxygen. If in 20 kg of limestone, there is 9.4 kg of oxygen, then what is the percentage of carbon in it?

(*a*) 12%   (*b*) 13%

(*c*) 14%   (*d*) 15%

144. In a class of 72 children, children are seated in rows and columns in such a way that the number of children in each row is 12.5% more than the number of children in each column. How many children are there in each row?

(*a*) 8   (*b*) 9

(*c*) 12   (*d*) 18

(*e*) None of these

145. The owner of a boutique decides to calculate the percentage of customers who purchase hats. If 40 percent of the store's customers decide to purchase items, and of those customers 15 percent purchase hats, what percent of the store's customers purchase hats?

(*a*) 4%   (*b*) 6%

(*c*) 15%   (*d*) 24%

146. In a market research project, 20% opted for Nirma detergent whereas 60% opted for Surf Blue detergent. The remaining individuals were not certain. If the difference between those who opted for Surf Blue and those who were uncertain was 720, how many respondents were covered in the survey?

(M.B.A., 2007)

(*a*) 1440   (*b*) 1800

(*c*) 3600   (*d*) Data inadequate

147. In an examination it is required to get 36% of the aggregate marks to pass. A student gets 198 marks and is declared failed by 36 marks. What is the maximum aggregate marks a student can get?

(L.I.C.A.D.O., 2007)

(a) 480   (b) 550

(c) 650   (d) Cannot be determined

(e) None of these

148. 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? **(Bank P.O., 2010)**

(a) 425   (b) 500

(c) 520   (d) 625

(e) None of these

149. In an examination it is required to get 40% of the aggregate marks to pass. A student get 261 marks and is declared failed by 4% marks. What are the maximum aggregate marks a student can get?

(Bank Recruitment, 2008)

(a) 700   (b) 730

(c) 745   (d) 765

(e) None of these

150. A candidate has to obtain minimum 33% of the total marks to pass. He got 25% of the total marks and failed by 40 marks. The maximum marks are

(a) 300   (b) 400

(c) 500   (d) 600

151. In an examination it is required to get 296 of the total maximum aggregate marks to pass. A student gets 259 marks and is decided failed. The difference of marks obtained by the student and that required to pass is 5%. What are the maximum aggregate marks a student can get? **(M.A.T., 2009)**

(a) 690   (b) 740

(c) 780   (d) Cannot be determined

152. Two candidates fought an election. One of them got 62% of the total votes and won by 432 votes. What is the total number of votes polled?

(Bank Recruitment, 2009)

(a) 1500   (b) 1600

(c) 1800   (d) Cannot be determined

(e) None of these

153. In a college election between two candidates, one candidate got 55% of the total valid votes. 15% of the votes were invalid. If the total votes were 15200, what is the number of valid votes the other candidate got? **(Bank P.O., 2009)**

(a) 5814   (b) 6840

(c) 7106   (d) 8360

(e) None of these

154. At an election involving two candidates, 68 votes were declared invalid. The winning candidate secures 52% and wins by 98 votes. The total number of votes polled is

(a) 2382   (b) 2450

(c) 2518   (d) None of these

155. In a certain assembly constituency election, 80% of voters exercised their voting right and the winning candidate got elected with 65% of votes polled. What percent of total votes did he poll?

(a) 35   (b) 52

(c) 55   (d) 57

156. In an election, a total of 5,00,000 voters participated. A candidate got 2,55,000 votes which was 60% of the total valid votes. What was the percentage of invalid votes?

(a) 10%   (b) 12%

(c) 15%   (d) $\frac{300}{17}$%

157. 10% of the voters did not cast their vote in an election between two candidates. 10% of the votes polled were found invalid. The successful candidate got 54% of the valid votes and won by a majority of 1620 votes. The number of voters enrolled on the voters' list was

(a) 25000   (b) 33000

(c) 35000   (d) 40000

158. 8% of the people eligible to vote are between 18 and 21 years of age. In an election, 85% of those eligible to vote, who were between 18 and 21, actually voted. In that election, the number of persons between 18 and 21, who actually voted, was what percent of those eligible to vote?

(a) 4.2   (b) 6.4

(c) 6.8   (d) 8

159. In an election, 30% of the voters voted for candidate A whereas 60% of the remaining voted for candidate B. The remaining voters did not vote. If the difference between those who voted for candidate A and those who did not vote was 1200, how many individuals were eligible for casting vote in that election?

(a) 10,000   (b) 45,000

(c) 60,000   (d) 72,000

160. While purchasing one item costing ₹ 400, I had to pay the sales tax at 7% and on another costing ₹ 6400, the sales tax was 9%. What percent of the sales tax I had to pay, taking the two items together on an average?

(a) 8%   (b) $8\frac{13}{17}$%

(c) $8\frac{15}{17}$%   (d) $8\frac{1}{2}$%

161. A student secures 90%, 60% and 54% marks in test papers with 100, 150 and 200 respectively as maximum marks. The percentage of his aggregate is
(a) 64   (b) 68
(c) 70   (d) None of these

162. 1100 boys and 700 girls are examined in a test; 42% of the boys and 30% of the girls pass. The percentage of the total who failed is
(a) 58%   (b) $62\dfrac{2}{3}\%$
(c) 64%   (d) 78%

163. In a certain school, 20% of students are below 8 years of age. The number of students above 8 years of age is $\dfrac{2}{3}$ of the number of students of 8 years age which is 48. What is the total number of students in the school?
(a) 72   (b) 80
(c) 120   (d) 150
(e) None of these

164. In an examination, 5% of the applicants were found ineligible and 85% of the eligible candidates belonged to the general category. If 4275 eligible candidates belonged to other categories, then how many candidates applied for the examination?
(a) 30,000   (b) 35,000
(c) 37,000   (d) None of these

165. Two students appeared at an examination. One of them secured 9 marks more than the other and his marks was 56% of the sum of their marks. The marks obtained by them are:
(a) 39, 30   (b) 41, 32
(c) 42, 33   (d) 43, 34

166. At a special sale, 5 tickets can be purchased for the price of 3 tickets. If 5 tickets are purchased at the sale, the amount saved will be what percent of the original price of the 5 tickets?

(Campus Recruitment, 2010)

(a) 20%   (b) $33\dfrac{1}{3}\%$
(c) 40%   (d) 60%

167. In September 2009, the sales of a product were $\dfrac{2}{3}$rd of that in July 2009. In November 2009, the sales of the product were higher by 5% as compared to September 2009. How much is the percentage of increase in sales in November 2009 with respect to the base figure in July 2009? **(SNAP, 2010)**
(a) – 20%   (b) 25%
(c) – 30%   (d) + 40%

168. If earth's rotational motion increases by 12%, then the relation between a day and hours will be

(I.A.M., 2007)

(a) 12 hours = 1 day   (b) $20\dfrac{5}{7}$ hours = 1 day
(c) $21\dfrac{3}{7}$ hours = 1 day   (d) None of these

169. A and B are two fixed points 5 cm apart and C is a point on AB such that AC is 3 cm. If the length of AC is increased by 6%, the length of CB is decreased by   **(S.S.C., 2007)**
(a) 6%   (b) 7%
(c) 8%   (d) 9%

170.

On time	$x\%$
Up to 15 minutes delayed	43%
15-30 minutes delayed	17%
30-60 minutes delayed	12%
More than 60 minutes delayed	3%

The chart above describes departures from a certain airport on a certain day. If 1200 flights were delayed, how many flights departed on time? **(N.M.A.T., 2005)**
(a) 250   (b) 300
(c) 350   (d) 400

171. A shopkeeper has a certain number of eggs of which 5% are found to be broken. He sells 93% of the remainder and still has 266 eggs left. How many eggs did he originally have?
(a) 3800   (b) 4000
(c) 4200   (d) None of these

172. Ganpat went to fruit market with a certain amount of money. With this money he can buy either 50 oranges or 40 mangoes. He retains 10% of the money for taxi fare. If he buys 20 mangoes, the number of oranges he can buy is
(a) 6   (b) 18
(c) 20   (d) 25

173. A 14.4 kg gas cylinder runs for 104 hours when the smaller burner on the gas stove is fully opened while it runs for 80 hours when the larger burner on the gas stove is fully opened. Which of these values is the closest to the percentage difference in the usage of gas per hour, of the smaller burner over the larger burner? **(SNAP, 2008)**
(a) 23.07%   (b) 26.23%
(c) 30%   (d) 32.23%

Directions (Questions 174 to 178): *A survey of magazine reading habits of the people living in five cities P, Q, R, S and T is summarised in a table given below. The Column I in the table gives percentage of magazine-readers in each city who read only one magazine a week. The Column II gives the total number of magazine-readers*

who read two or more magazines a week. Read the table and then answer these questions:

City	I	II
P	75	6000
Q	80	3500
R	60	3000
S	55	2700
T	25	4200

174. The city with the lowest number of magazine-readers is

(a) Q   (b) R

(c) S   (d) T

175. Which city has the highest number of magazine-readers who read only one magazine a week?

(a) P   (b) Q

(c) R   (d) S

176. The highest number of magazine-readers in any given city is

(a) 17500   (b) 18000

(c) 24000   (d) 30000

177. How many magazine-readers in city Q read only one magazine a week?

(a) 14000   (b) 18000

(c) 12500   (d) 16500

178. The total number of all the magazine-readers in the five cities who read only one magazine a week is

(a) 19400   (b) 24000

(c) 41200   (d) 42000

179. If X is 90% of Y, then what percent of X is Y?

(a) 90%   (b) $101\frac{1}{9}$%

(c) $111\frac{1}{9}$%   (d) 190%

180. x% of y is y% of

(a) x (b) $100x$

(c) $\dfrac{x}{100}$ (d) $\dfrac{y}{100}$

181. If 20% of $a = b$, then b% of 20 is the same as

(a) 4% of a (b) 5% of a

(c) 20% of a (d) None of these

182. If x% of y is the same as $\dfrac{4}{5}$ of 80, then the value of xy is

(a) 320   (b) 400

(c) 640   (d) None of these

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

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

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

184. If x% of 500 = y% of 300 and x% of y% of 200 = 60, then x =? **(Bank P.O., 2009)**

(a) $10\sqrt{2}$ (b) $20\sqrt{2}$

(c) $15\sqrt{2}$ (d) $30\sqrt{2}$

(e) None of these

185. If x, y, z are three positive integers such that x is greater than y and y is greater than z, then which of the following is definitely true?

(Campus Recruitment, 2008)

(a) x% of y is greater than y% of z

(b) y% of x is greater than z% of y

(c) z% of x is greater than y% of z

(d) All of these

186. If 20% of A = 50% of B, what percentage of A is B?

(a) 20   (b) 30

(c) 40   (d) 50

187. If p% of p is 36, then p is equal to

(a) 15   (b) 60

(c) 600   (d) 3600

188. If x% of y is equal to z, what percent of z is x?

(a) $\dfrac{y^2}{100}$ (b) $\dfrac{y}{100^2}$

(c) $\dfrac{100}{y}$ (d) $\dfrac{100^2}{y}$

189. If x is 80% of y, then what percent of $2x$ is y?

(a) 40%   (b) $62\frac{1}{2}$%

(c) $66\frac{2}{3}$%   (d) 80%

190. Subtracting 6% of x from x is equivalent to multiplying x by how much?

(a) 0.094   (b) 0.94

(c) 9.4   (d) 94

191. (x% of y + y% of x) =? **(M.B.A., 2006)**

(a) x% of y (b) y% of x

(c) 2% of xy (d) xy% of 3

192. x% of x is the same as 10% of **(M.B.A., 2007)**

(a) $\dfrac{x}{10}$ (b) $\dfrac{x^2}{10}$

(c) $\dfrac{x^3}{10}$ (d) None of these

193. If a exceeds b by x%, then which one of the following equations is correct? **(M.B.A., 2007)**

(a) $a - b = \dfrac{x}{100}$

(b) $b = a + 100x$

(c) $a = \dfrac{bx}{100 + x}$

(d) $a = b + \dfrac{bx}{100}$

194. If A is 150 percent of B, then B is what percent of $(A + B)$?

(a) $33\dfrac{1}{3}$%

(b) 40%

(c) $66\dfrac{2}{3}$%

(d) 75%

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

(a) 10% of y

(b) 16% of y

(c) 80% of y

(d) None of these

196. If 20% of A = B and 40% of B = C, then 60% of $(A + B)$ is

(a) 30% of C

(b) 60% of C

(c) 75% of C

(d) None of these

197. If x% of a is the same as y% of b, then z% of b is

(Campus Recruitment, 2010)

(a) $\dfrac{xy}{z}$% of a

(b) $\dfrac{yz}{x}$% of a

(c) $\dfrac{xz}{y}$% of a

(d) None of these

198. If $A = x$% of y and $B = y$% of x, then which of the following is true?

(a) A is smaller than B.

(b) A is greater than B.

(c) Relationship between A and B cannot be determined.

(d) If x is smaller than y, then A is greater than B.

(e) None of these

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

(a) 25%

(b) $33\dfrac{1}{3}$%

(c) 40%

(d) 400%

200. If a is 60% of b, then what percent of $4a$ is $5b$?

(a) $\dfrac{25}{12}$%

(b) 148%

(c) $\dfrac{625}{3}$%

(d) 240%

201. If x = 63% of y, then y^2 is approximately what percent of x^2? **(M.C.A., 2005)**

(a) 125

(b) 200

(c) 250

(d) 350

202. If $a = b \times \dfrac{d}{c}$; b, c and d are each increased by 10%, then by how much does a increase?

(a) 10%

(b) 11%

(c) 20%

(d) 21%

203. If a% of x is equal to b% of y, then c% of y is what % of x?

(a) abc%

(b) $\dfrac{bc}{a}$%

(c) $\dfrac{ac}{b}$%

(d) c%

204. The firm uses the following function to calculate the production output (PO): PO = 5.3 C^2 L^{15}, where C = capital invested and L = labour employed. If the capital invested (C) increases by 20 percent, the change in PO will be **(JMET, 2008)**

(a) 20% decrease

(b) 32% increase

(c) 44% increase

(d) 56% increase

205. A company received two shipments of ball bearings. In the first shipment, 1 percent of the ball bearings were defective. In the second shipment, which was twice as large as the first, 4.5 percent of the ball bearings were defective. If the company received a total of 100 defective ball bearings, how many ball bearings were in the first shipment?

(a) 990

(b) 1000

(c) 2000

(d) 3000

206. In a graduate class of 200, 40% are women and $\dfrac{1}{5}$ become lecturers. If the number of men who become lecturers is twice that of women, calculate approximate percentage of men who became lecturers. **(SNAP, 2004)**

(a) 16%

(b) 18%

(c) 20%

(d) 27%

207. The contents of a certain box consist of 14 apples and 23 oranges. How many oranges must be removed from the box so that 70% of the pieces of fruit in the box will be apples? **(M.A.T., 2005)**

(a) 6

(b) 12

(c) 17

(d) 36

208. The weight of an empty bucket is 25% of the weight of the bucket when filled with some liquid. Some of the liquid has been removed. Then, the bucket, along with the remaining liquid, weighed three-fifths of the original weight. What percentage of the liquid has been removed? **(N.M.A.T., 2008)**

(a) 40%

(b) $62\dfrac{1}{2}$%

(c) $56\dfrac{2}{3}$%

(d) $53\dfrac{1}{3}$%

209. A part of ₹ 9600 is invested at a 5% annual return, while the remainder is invested at a 3% annual return. If the annual income from both portions is the same, what is the total income from the two investments?   **(M.B.A., 2011)**
(*a*) ₹ 320   (*b*) ₹ 380
(*c*) ₹ 410   (*d*) ₹ 440
(*e*) None of these

210. A salesman's commission is 5% on all sales up to ₹ 10000 and 4% of all sales exceeding this amount. He remits ₹ 31100 to the parent company after deducting his commission. His sales were worth
                                                        (M.B.A., 2008)
(*a*) ₹ 32500   (*b*) ₹ 35000
(*c*) ₹ 35100   (*d*) ₹ 36100

211. In a co-educational school there are 15 more girls than boys. If the number of girls is increased by 10% and the number of boys is also increased by 16%, there would be nine more girls than boys. What is the number of students in the school?
(*a*) 125   (*b*) 140
(*c*) 255   (*d*) 265

212. 5 kg of tea and 8 kg of sugar together cost ₹ 172. The price of tea has risen by 20% and that of sugar by 10%. Hence the same quantities of tea and sugar now cost ₹ 199.20. What is the original price of tea per kg?   **(R.R.B., 2005)**
(*a*) ₹ 16   (*b*) ₹ 18
(*c*) ₹ 19   (*d*) ₹ 20

213. 605 sweets were distributed equally among children in such a way that the number of sweets received by each child is 20% of the total number of children. How many sweets did each child receive?
                                                        (Bank P.O., 2006)
(*a*) 11   (*b*) 24
(*c*) 45   (*d*) Cannot be determined
(*e*) None of these

214. In a certain organisation, 40% employees are matriculates, 50% of the remaining are graduates and the remaining 180 are post-graduates. What is the number of graduate employees?   **(R.R.B., 2007)**
(*a*) 180   (*b*) 240
(*c*) 300   (*d*) 360

215. Gaurav spends 30% of his monthly income on food articles, 40% of the remaining on conveyance and clothes and saves 50% of the remaining. If his monthly salary is ₹ 18,400, how much money does he save every month?
(*a*) ₹ 3624   (*b*) ₹ 3864
(*c*) ₹ 4264   (*d*) ₹ 5888

216. A spider climbed $62\frac{1}{2}$% of the height of the pole in one hour and in the next hour it covered $12\frac{1}{2}$% of the remaining height. If the height of the pole is 192 m, then distance climbed in second hour is
(*a*) 3 m   (*b*) 5 m
(*c*) 7 m   (*d*) 9 m

217. A man spends 35% of his income on food, 25% on children's education and 80% of the remaining on house rent. What percent of his income he is left with?
(*a*) 8%   (*b*) 10%
(*c*) 12%   (*d*) 14%

218. Mr. More spent 20% of his monthly income on food and 15% on children's education. 40% of the remaining he spent on entertainment and transport together and 30% on medical. He is left with an amount of ₹ 8775 after all these expenditures. What is Mr. More's monthly income?   **(Bank P.O., 2009)**
(*a*) ₹ 35000   (*b*) ₹ 38000
(*c*) ₹ 40000   (*d*) ₹ 42000
(*e*) None of these

219. From the salary of an officer, 10% is deducted as house rent, 20% of the rest, he spends on conveyance, 20% of the rest he pays as income tax and 10% of the balance, he spends on clothes. Then, he is left with ₹ 15,552. Find his total salary.   **(M.A.T., 2007)**
(*a*) ₹ 25,000   (*b*) ₹ 30,000
(*c*) ₹ 35,000   (*d*) ₹ 40,000

220. Aman gave 40% of the amount he had to Rohan. Rohan in turn gave one-fourth of what he received from Aman to Sahil. After paying ₹ 200 to the taxi driver out of the amount he got from Rohan, Sahil now has ₹ 600 left with him. How much amount did Aman have?
(*a*) ₹ 4000   (*b*) ₹ 8000
(*c*) ₹ 12,000   (*d*) Data inadequate

221. On a test consisting of 250 questions, Jassi answered 40% of the first 125 questions correctly. What percent of the other 125 questions does she need to answer correctly for her grade on the entire exam to be 60%?   **(Bank P.O., 2009)**
(*a*) 60   (*b*) 75
(*c*) 80   (*d*) Cannot be determined
(*e*) None of these

222. In a certain month a baseball team that played 60 games had won 30% of its games played. After a phenomenal winning streak this team raised its average to 50%. How many games must the team have won in a row to attain this average?
                                            (Campus Recruitment, 2009)
(*a*) 12   (*b*) 20
(*c*) 24   (*d*) 30

223. The sum of the number of boys and girls in a school is 150. If the number of boys is x, then the number of girls becomes x% of the total number of students. The number of boys is

(a) 40   (b) 50

(c) 60   (d) 90

224. In an examination of n questions, a student replied 15 out of the first 20 questions correctly. Of the remaining questions, he answered one-third correctly. All the questions have the same credit. If the student gets 50% marks, the value of n is

(a) 20   (b) 40

(c) 50   (d) 100

225. The salaries of A and B together amount to ₹ 2000. A spends 95% of his salary and B, 85% of his. If now, their savings are the same, what is A's salary?

(a) ₹ 750   (b) ₹ 1250

(c) ₹ 1500   (d) ₹ 1600

226. A's marks in Biology are 20 less than 25% of the total marks obtained by him in Biology, Maths and Drawing. If his marks in Drawing be 50, what are his marks in Maths?

(a) 40   (b) 45

(c) 50   (d) Cannot be determined

227. In an examination, there are three papers and a candidate has to get 35% of the total to pass. In one paper, he gets 62 out of 150 and in the second 35 out of 150. How much must he get, out of 180, in the third paper to just qualify for a pass?

(a) 60.5   (b) 68

(c) 70   (d) 71

228. In a History examination, the average for the entire class was 80 marks. If 10% of the students scored 95 marks and 20% scored 90 marks, what was the average marks of the remaining students of the class?

(a) 65.5   (b) 72.5

(c) 75   (d) 85

229. A scored 30% marks and failed by 15 marks. B scored 40% marks and obtained 35 marks more than those required to pass. The pass percentage is

(a) 33%   (b) 38%

(c) 43%   (d) 46%

230. In an area, of the total people 40% were women and 45% coffee drinkers. One-third of the males are coffee drinkers. Suppose the total number of persons in the area is 100, then the number of female non-coffee drinkers is   **(P.C.S., 2009)**

(a) 15   (b) 20

(c) 25   (d) None of these

231. A city has a population of 3,00,000 out of which 1,80,000 are males. 50% of the population is literate. If 70% of the males are literate, then the percentage of females who are literate is   **(P.C.S., 2009)**

(a) 20%   (b) 25%

(c) 35%   (d) 45%

232. In a company there are 75% skilled workers and the remaining are unskilled. 80% of skilled workers and 20% of unskilled workers are permanent. If the number of temporary workers is 126, then what is the total number of workers?   **(M.A.T., 2006)**

(a) 360   (b) 377

(c) 480   (d) 510

233. A clothing supplier stores 800 coats in a warehouse, of which 15 percent are full-length coats. If 500 of the short-length coats are removed form the warehouse, then what percent of the remaining coats are full length?   **(M.A.T., 2006)**

(a) 5.62%   (b) 9.37%

(c) 35%   (d) 40%

234. At the college entrance examination, each candidate is admitted or rejected according to whether he has passed or failed the tests. Of the candidates who are really capable, 80% pass the tests and of the incapable, 25% pass the test. Given that 40% of the candidates are really capable, the proportion of capable college students is about   **(M.A.T., 2007)**

(a) 68%   (b) 70%

(c) 73%   (d) 75%

235. In a public school, $\frac{1}{5}$th of girls and $\frac{1}{4}$th of boys are under 12 years of age. If the number of girls is $\frac{2}{5}$th of the total, what part of the total strength of the school is accounted for by those who are 12 years or more of age?   **(M.B.A., 2008)**

(a) 23%   (b) 45%

(c) 55%   (d) 77%

236. In a city, 35% of the population is composed of migrants, 20% of whom are from rural areas. Of the local population, 48% is female while this figure for rural and urban migrants is 30% and 40% respectively. What percent of the total population comprises of females?   **(N.M.A.T., 2005)**

(a) 42.75%   (b) 44.5%

(c) 48%   (d) None of these

237. 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) 15   (b) 40

(c) 75   (d) Cannot be determined

(e) None of these

238. $37\frac{1}{2}\%$ of the candidates in an examination were girls, 75% of the boys and $62\frac{1}{2}\%$ of the girls passed and 342 girls failed. The number of boys failed was:
(a) 350   (b) 360
(c) 370   (d) 380

239. $\frac{5}{9}$ part of the population in a village are males. If 30% of the males are married, the percentage of unmarried females in the total population is

(a) 20%   (b) $27\frac{7}{9}\%$

(c) 40%   (d) 70%

240. The boys and girls in a college are in the ratio 3: 2. If 20% of the boys and 25% of the girls are adults, the percentage of students who are not adults is
(a) 58%   (b) 67.5%
(c) 78%   (d) 82.5%

241. A debtor can pay 87 paise in the rupee, but if his creditors would take 20% of his debts, he could pay them and have ₹ 42 left. His debts and assets respectively are:
(a) ₹ 400, ₹ 520   (b) ₹ 500, ₹ 521
(c) ₹ 600, ₹ 522   (d) ₹ 1000, ₹ 525

242. Of the 50 researchers in a workgroup, 40% will be assigned to Team A and the remaining 60% to Team B. However, 70% of the researchers prefer Team A and 30% prefer Team B. What is the least possible number of researchers who will not be assigned to the team they prefer?   **(M.A.T., 2005)**
(a) 15   (b) 20
(c) 30   (d) 35

243. A train starts from station A with some passengers. At station B 10% of the passengers get down and 100 passengers get in. At station C 50% get down and 25 get in. At station D 50% get down and 50 get in making the total number of passengers 200. The number of passengers who boarded the train at station A was   **(P.C.S., 2008)**
(a) 400   (b) 500
(c) 600   (d) 700

244. The charges for a five-day trip by a tourist bus for one full ticket and a half-ticket are ₹ 1440 inclusive of boarding charges which are same for a full ticket and a half-ticket. The charges for the same trip for 2 full tickets and one half-ticket inclusive of boarding charges are ₹ 2220. The fare for a half-ticket is 75% of the full ticket. Find the fare and the boarding charges separately for one full ticket.
(a) ₹ 580, ₹ 400   (b) ₹ 280, ₹ 200
(c) ₹ 480, ₹ 300   (d) ₹ 380, ₹ 400

245. 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 ₹ 78000?   **(NABARD, 2009)**
(a) ₹ 36000   (b) ₹ 39000
(c) ₹ 42000   (d) Cannot be determined
(e) None of these

246. Raju's monthly salary is 20 percent more than Anuj's monthly salary. Ravi's monthly salary is ₹ 1500 more than Anuj's salary. The sum of Raju's, Ravi's and Anuj's yearly salaries is ₹ 325200. What is the sum of the monthly salaries of Raju and Anuj together?   **(Bank P.O., 2010)**
(a) ₹ 16600   (b) ₹ 17500   (c) ₹ 17600
(d) ₹ 17680   (e) None of these

247. A sum of ₹ 2236 is divided among A, B and C in such a way that A receives 25% more than C and C receives 25% less than B. What is A's share in the amount?   **(Bank P.O., 2009)**
(a) ₹ 460   (b) ₹ 780
(c) ₹ 890   (d) ₹ 1280
(e) None of these

248. A sum of ₹ 6100 was divided among 8 men, 10 women and 12 children in such a way that each man received 25% more than a woman and each woman received 25% more than a child. How much did each woman receive?   **(R.R.B., 2006)**
(a) ₹ 201.68   (b) ₹ 203.68
(c) ₹ 206.08   (d) ₹ 206.68

249. In an examination in which full marks were 800, A gets 20% more than B, B gets 20% more than C, and C gets 15% less than D. If A got 576, what percentage of full marks did D get (approximately)?
(a) 45.7   (b) 51.2
(c) 58.8   (d) 61.7

250. In an examination, the percentage of students qualified to the number of students appeared from school A is 70%. In school B, the number of students appeared is 20% more than the students appeared from school A and the number of students qualified from school B is 50% more than the students qualified from school A. What is the percentage of students qualified to the number of students appeared from school B?
(a) 30%   (b) 70%
(c) 78.5%   (d) 87.5%

251. If the price of a book is first decreased by 25% and then increased by 20%, then the net change in the price will be
(a) No change   (b) 5% increase
(c) 5% decrease   (d) 10% decrease

252. The price of a shirt is increased by 15% and then reduced by 15%. The final price of the shirt is
(*a*) does not change   (*b*) increases by 2.25%
(*c*) decreases by 2.25%   (*d*) None of these

253. A number is first decreased by 10% and then increased by 10%. The number so obtained is 50 less than the original number. The original number is   **(S.S.C., 2005)**
(*a*) 5000   (*b*) 5050
(*c*) 5500   (*d*) 5900

254. A shopkeeper first increased the price of an article by 25% and then by 20%. What is the total percent increase?   **(P.C.S., 2008)**
(*a*) 40%   (*b*) 45%
(*c*) 50%   (*d*) 55%

255. Two successive price increases of 10% each on an article are equivalent to a single price increase of
    (S.S.C., 2010)
(*a*) 19%   (*b*) 20%
(*c*) 21%   (*d*) 22%

256. 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   **(S.S.C., 2010)**
(*a*) ₹ 25   (*b*) ₹ 26.50
(*c*) ₹ 27.50   (*d*) ₹ 30

257. The price of an article was increased by r%. Later the new price was decreased by r%. If the latest price was ₹ 1, then the original price was
(*a*) ₹ 1   (*b*) $₹\left(\dfrac{1-r^2}{100}\right)$
(*c*) $₹\dfrac{\sqrt{1-r^2}}{100}$ (*d*) $₹\left(\dfrac{10000}{10000-r^2}\right)$

258. In a factory, producing parts for an automobile, the parts manufactured on the shop floor are required to go through three quality checks, each conducted after a specific part of the processing on the raw material is completed. Only parts that are not rejected at one stage are put through the subsequent stages of production and testing. If average rejection rates at these testing machines during a month are 10%, 5% and 2% respectively, then what is the effective rejection rate for the whole plant?   **(M.A.T., 2005)**
(*a*) 15.20%   (*b*) 16.21%
(*c*) 16.48%   (*d*) 17%

259. Peter could save 10% of his income. But two years later when his income is increased by 20%, he could save the same amount only as before. By how much percent has his expenditure increased?
(*a*) 22%   (*b*) $22\dfrac{2}{9}$%
(*c*) $23\dfrac{1}{3}$%   (*d*) 24%

260. A man spends 80% of his income. With an increase in the cost of living, his expenditure increases by $37\dfrac{1}{2}$% and his income increases by $16\dfrac{2}{3}$%. His present percent savings are   **(A.A.O. Exam, 2010)**
(*a*) $5\dfrac{3}{7}$%   (*b*) $5\dfrac{5}{7}$%
(*c*) $6\dfrac{1}{3}$%   (*d*) $6\dfrac{2}{3}$%

261. A person spends 75% of his income. If his income increases by 20% and expenses increase by 15%, his saving will increase by   **(R.R.B., 2008)**
(*a*) $17\dfrac{1}{2}$%   (*b*) 20%
(*c*) $33\dfrac{1}{2}$%   (*d*) 35%

262. Madan pays income tax at the rate of 10%. If his income increased by 10% and his tax rate increases to 15%, his net income would increase by ₹ 350. What is Madan's income?
(*a*) ₹ 8000   (*b*) ₹ 10,000
(*c*) ₹ 12,000   (*d*) ₹ 14,000

263. Mr. X, a businessman had the income in the year 2010, such that he earned a profit of 20% on his investment in the business. In the year 2011, his investment was less by ₹ 5000 but still had the same income (Income = Investment + Profit) as that in 2010. Thus, the percent profit earned in 2011 increased by 6%. What was his investment in 2010?
(*a*) ₹ 1,02,000   (*b*) ₹ 1,05,000
(*c*) ₹ 1,50,500   (*d*) Data inadequate
(*e*) None of these

264. In the expression xy^2, the values of both variables x and y are decreased by 20%. By this, the value of the expression is decreased by   **(C.P.O., 2007)**
(*a*) 40%   (*b*) 48.8%
(*c*) 51.2%   (*d*) 80%

265. When water is changed into ice, its volume increases by 9%. If ice changes into water, the percentage decrease in volume is   **(R.R.B., 2006)**
(*a*) $8\dfrac{28}{109}$%   (*b*) 9%
(*c*) 10%   (*d*) 18%

266. If the price of a commodity is decreased by 20% and its consumption is increased by 20%, what will be the increase or decrease in the expenditure on the commodity?   **(S.S.C., 2007)**
(*a*) 4% increase   (*b*) 4% decrease
(*c*) 8% increase   (*d*) 8% decrease

267. Income tax is raised from 4 paise to 5 paise in a rupee but the revenue is increa-sed by 10% only. Find the decrease percent in the amount taxed. **(M.B.A., 2007)**

(a) 12   (b) 14

(c) 16   (d) None of these

268. The ticket for admission to an exhibition was ₹ 5 and it was later reduced by 20%. As a result, the sale proceeds of tickets increased by 44%. What was the percentage increase in number of visitors?

(a) 25%   (b) 50%

(c) 75%   (d) 80%

269. The income of a broker remains unchanged though the rate of commission is increased from 4% to 5%. The percentage of slump in business is

(a) 1%   (b) 8%

(c) 20%   (d) 80%

270. By how much percent must a motorist increase his speed in order to reduce by 20%, the time taken to cover a certain distance? **(R.R.B., 2006)**

(a) 20   (b) 25

(c) 30   (d) 35

271. What percent decrease in salaries would exactly cancel out the 20 percent increase?

(a) $16\frac{2}{3}$ (b) 18

(c) 20   (d) $33\frac{1}{3}$

272. The price of an article is reduced by 25%. In order to retain the original price, the present price has to be increased by **(P.C.S., 2007)**

(a) 20%   (b) 25%

(c) $33\frac{1}{3}\%$ (d) 50%

273. A number is increased by 20% and then again by 20%. By what percent should the increased number be reduced so as to get back the original number?

(a) $19\frac{11}{31}\%$ (b) $30\frac{5}{9}\%$

(c) 40%   (d) 44%

274. A person's salary is decreased by steps of 20%, 15% and 10%. Approximately by what percent should the reduced salary be increased so as to get back the original salary? **(Campus Recruitment, 2009)**

(a) 39%   (b) 44%

(c) 56%   (d) 63%

275. In a fraction, if numerator is increased by 40% and denominator is increased by 80%, then what fraction of the original is the new fraction?

(a) $\frac{1}{2}$ (b) $\frac{7}{9}$

(c) $\frac{7}{18}$ (d) Data inadequate

276. 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? **(NABARD, 2009)**

(a) $\frac{1}{4}$ (b) $\frac{2}{3}$

(c) $\frac{5}{12}$ (d) $\frac{4}{11}$

(e) None of these

277. The price of a certain item is increased by 15%. If a consumer wants to keep his expenditure on the item same as before, how much percent must he reduce his consumption of that item? **(S.S.C., 2007)**

(a) $10\frac{20}{23}\%$ (b) $13\frac{1}{23}\%$

(c) $16\frac{2}{3}\%$ (d) 15%

278. If the price of oil is increased by 30%, then by how much percent a family should reduce its consumption so that the expenditure would remain the same? **(R.R.B., 2005)**

(a) $15\frac{1}{23}\%$ (b) $15\frac{3}{14}\%$

(c) $23\frac{1}{13}\%$ (d) $76\frac{12}{13}\%$

279. The price of wheat falls by 16%. By what percentage a person can increase the consumption of wheat so that his overall budget does not change?

(a) 16%   (b) 18%

(c) 18.5%   (d) 19%

280. The price of oil is increased by 25%. If the expenditure is not allowed to increase, the ratio between the reduction in consumption and the original consumption is

(a) 1: 3   (b) 1: 4

(c) 1: 5   (d) 1: 6

281. The price of sugar per kg increased from ₹ 16 to ₹ 20. The percentage reduction in the use of sugar so that the expenditure does not increase, should be **(P.C.S., 2008)**

(a) 15%   (b) 20%

(c) 25%   (d) 40%

282. The price of sugar increases by 32%. A family reduces its consumption so that the expenditure of the sugar is up only by 10%. If the total consumption of the sugar before the price rise was 10 kg per month, then the consumption of sugar per month at present (in kg) is **(Campus Recruitment, 2011)**

(a) $8\frac{1}{3}$ (b) $8\frac{1}{2}$

(c) $8\frac{3}{4}$ (d) 9

283. Prices register an increase of 10% on foodgrains and 15% on other items of expenditure. If the ratio of an employee's expenditure on foodgrains and other items be 2: 5, by how much should his salary be increased in order that he may maintain the same level of consumption as before, his present salary being ₹ 2590?

(*a*) ₹ 323.75   (*b*) ₹ 350
(*c*) ₹ 360.50   (*d*) None of these

284. In the year 2010, 5000 students were admitted in a college. It is found that the number of students admitted is constantly increasing by 24 percent per year. How many students will be admitted in the college in the year 2012?   (Bank P.O., 2010)

(*a*) 7400   (*b*) 7480
(*c*) 7688   (*d*) 7868

285. The salary of an employee increases consistently by 50% every year. If his salary today is ₹ 10000, what will be the salary after another 4 years?

         (S.B.I. P.O., 2005)

(*a*) ₹ 26500   (*b*) ₹ 33750
(*c*) ₹ 50625   (*d*) ₹ 62500
(*e*) None of these

286. A district has 64000 inhabitants. If the population increases at the rate of $2\frac{1}{2}\%$ per annum, then the number of inhabitants at the end of 3 years will be

(*a*) 68911   (*b*) 68921
(*c*) 69200   (*d*) 70000

287. If inflation increases at a rate of 8% p.a., what will a ₹ 20 article cost at the end of two years?

(*a*) Between ₹ 20 and ₹ 21
(*b*) Between ₹ 21 and ₹ 22
(*c*) Between ₹ 22 and ₹ 23
(*d*) Between ₹ 23 and ₹ 24

288. The population of a town is 4.2×10^6. If the population increases by 75 per 1000 per annum, then what will be the population after 2 years?

         (R.R.B., 2006)

(*a*) 4633628   (*b*) 4853625
(*c*) 5253495   (*d*) 5853615

289. The population of a town is 8500. It increases by 20% in the first year and by another 25% in the second year. What would be the population of the town after 2 years?   (Bank P.O., 2008)

(*a*) 10950   (*b*) 11950
(*c*) 12550   (*d*) 12750
(*e*) None of these

290. The population of a town was 1,60,000 three years ago. If it increased by 3%, 2.5% and 5% respectively in the last three years, then the present population is

(*a*) 1,77,000   (*b*) 1,77,366
(*c*) 1,77,461   (*d*) 1,77,596

291. The population of a town 2 years ago was 62,500. Due to migration to big cities, it decreases every year at the rate of 4%. The present population of the town is

(*a*) 56,700   (*b*) 57,600
(*c*) 58,800   (*d*) 60,000

292. Depreciation applicable to an equipment is 20%. The value of the equipment 3 years from now will be less by   (M.B.A., 2009)

(*a*) 45%   (*b*) 48.8%
(*c*) 51.2%   (*d*) 60%

293. A papaya tree was planted 2 years ago. It grows at the rate of 20% every year. If at present, the height of the tree is 540 cm, what was it when the tree was planted?   (M.A.T., 2007)

(*a*) 324 cm   (*b*) 375 cm
(*c*) 400 cm   (*d*) 432 cm

294. A merchant invests a certain sum and his annual gain percent is 25. If at the end of the third year, his capital is ₹ 10000, then the amount invested by him is equal to

(*a*) ₹ 5120   (*b*) ₹ 5210
(*c*) ₹ 5500   (*d*) ₹ $5714\frac{2}{7}$

295. The population of a town is 1771561. If it had been increasing at 10% per annum, its population 6 years ago was   (P.C.S., 2008)

(*a*) 1000000   (*b*) 1100000
(*c*) 1210000   (*d*) 1331000

296. The value of a machine depreciates at the rate of 12 percent per annum. It was purchased three years ago. Its present value is ₹ 29644.032. What was the purchase price of the machine?   (S.B.I.P.O., 2008)

(*a*) ₹ 38900   (*b*) ₹ 39000
(*c*) ₹ 43500   (*d*) ₹ 48700
(*e*) None of these

297. The value of a fixed asset depreciates at the rate of 10% of the value at the beginning of each year. If the value of the asset, two years ago, was ₹ 12000 more than the value of the asset one year ago, then find the present value of the asset, given that the asset was bought two years ago.

(*a*) ₹ 14520   (*b*) ₹ 17520
(*c*) ₹ 96000   (*d*) ₹ 97200

298. A tree increases annually by $\frac{1}{8}$ of its height. By how much will it increase after $2\frac{1}{2}$ years if it stands today 8 m high?   (R.R.B., 2006)

(*a*) 10.75 m   (*b*) 11.85 m
(*c*) 12.25 m   (*d*) 15.60 m

299. The population of a town is 189000. It decreases by 8% in the first year and increases by 5% in the second year. What is the population of the town at the end of 2 years? **(Bank Recruitment, 2008)**

(*a*) 182574   (*b*) 185472

(*c*) 191394   (*d*) 193914

(*e*) None of these

300. Ashish started a business with an initial investment of ₹ 500000. In the first year, he incurred a loss of 4%. However, during the second year, he earned a profit of 5% which in the third year rose to 10%. Calculate his net profit for the entire period of three years.

(*a*) ₹ 48800   (*b*) ₹ 54400

(*c*) ₹ 55000   (*d*) None of these

301. The present value of an optical instrument is ₹ 20000. If its value will depreciate 5% in the first year, 4% in the second year and 2% in the third year, what will be its value after 3 years? **(M.B.A., 2009)**

(*a*) ₹ 16534.5   (*b*) ₹ 16756.5

(*c*) ₹ 17556.8   (*d*) ₹ 17875.2

302. The population of a variety of tiny bush in an experimental field increased by 10% in the first year, increased by 8% in the second year but decreased by 10% in the third year. If the present number of bushes in the experimental field is 26730, then the number of bushes in the beginning was **(M.A.T., 2002)**

(*a*) 25000   (*b*) 27000

(*c*) 28000   (*d*) 24600

303. The production of a company has ups and downs every year. The production increases 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 2008, approximately what will be the effect on production of the company in 2012?

(*a*) 27% increase   (*b*) 32% increase

(*c*) 37% increase   (*d*) 42% increase

(*e*) 52% increase

304. The present population of a country estimated to be 10 crores is expected to increase to 13.31 crores during the next three years. The uniform rate of growth is

(*a*) 8%   (*b*) 10%

(*c*) 12.7%   (*d*) 15%

305. The price of a commodity which was ₹ 250 three years ago is ₹ 2000 now. The annual rate of increase in the price is **(P.C.S., 2009)**

(*a*) 100%   (*b*) 200%

(*c*) $266\frac{2}{3}\%$ (*d*) None of these

306. Raju's factory kept increasing its output by the same percentage every year. Find the percentage if it is known that his output is doubled after two years. **(M.A.T., 2010)**

(*a*) $100\sqrt{2}\%$ (*b*) $100(\sqrt{2}+1)\%$

(*c*) $100(\sqrt{2}-1)\%$ (*d*) $50(\sqrt{3}-1)\%$

307. The population of a colony was 3600 three years back. It is 4800 right now. What will be the population three years down the line, if the rate of growth of population has been co stant over the years and has been compounding annually? **(M.A.T., 2010)**

(*a*) 6000   (*b*) 6400

(*c*) 7200   (*d*) 9600

308. The value of a flat worth ₹ 500000 is depreciating at the rate of 10% p.a. In how many years will its value be reduced to ₹ 364500?

(*a*) 3 years   (*b*) 4 years

(*c*) 5 years   (*d*) 6 years

309. A building worth ₹ 1,33,100 is constructed on land worth ₹ 72,900. After how many years will the value of both be the same if land appreciates at 10% p.a. and building depreciates at 10% p.a.? **(G.B.O., 2007)**

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

(*c*) $2\frac{1}{2}$ (*d*) 3

310. Given that carbon-14 decays at a constant rate in such a way that it reduces to 50% in 5568 years, find the age of an old wooden piece in which the carbon is only 12.5% of the original.

(*a*) 15836 years   (*b*) 16668 years

(*c*) 16704 years   (*d*) 17552 years

311. The population of a town increases 4% annually but is decreased by emigration annually to the extent of (1/2)%. What will be the increase percent in 3 years?

(*a*) 9.8   (*b*) 10

(*c*) 10.5   (*d*) 10.8

312. The current birth rate per thousand is 32, whereas the corresponding death rate is 11 per thousand. The net growth rate in terms of population increase in percent is given by

(*a*) 0.0021%   (*b*) 0.021%

(*c*) 2.1%   (*d*) 21%

313. Mr. Jones' total annual gross salary, which was ₹ 10 lakhs per year in 2007, was reduced by 10% in 2008. In 2007 his family expenditure for food items was 40% of the total annual gross salary. The prices of average food items increased by 5% between 2007 and 2008. Assuming that the family consumed the same amount of food in 2008, the

percentage expenditure on food items, calculated on total annual gross salary in 2008, is **(J.M.E.T., 2009)**

(a) 43%
(b) 45%
(c) 47%
(d) 49%

314. A man's income is increased by ₹ 1200 and at the same time, the rate of tax to be paid is reduced from 12% to 10%. He now pays the same amount of tax as before. What is his increased income if 20% of his income is exempted from tax in both cases?

(M.A.T., 2010)

(a) ₹ 4500
(b) ₹ 6300
(c) ₹ 6500
(d) ₹ 7200

315. If A's income is 10% more than B's, how much percentage is B's income less than A's?

(P.C.S., 2009, 2008; S.S.C., 2007; C.P.O., 2006)

(a) 9%
(b) $9\frac{1}{2}\%$
(c) $9\frac{1}{11}\%$
(d) 10%

316. A's income is 25% more than B's income. B's income in terms of A's income is **(M.B.A., 2006)**

(a) 75%
(b) 80%
(c) 90%
(d) 96%

317. If A's wage with respect to B's wage is 20% more, then how much percent is B's wage less with respect to A's wage? **(Bank P.O., 2010)**

(a) $16\frac{2}{3}\%$
(b) 17%
(c) 18%
(d) None of these

318. If A's income is 50% less than that of B, then B's income is what percent more than that of A?

(S.S.C., 2010)

(a) 50
(b) 75
(c) 100
(d) 125

319. If x is 25% less than y, then what percent is y more than x? **(M.B.A., 2007)**

(a) $16\frac{1}{2}\%$
(b) 29%
(c) $33\frac{1}{3}\%$
(d) None of these

320. p is six times as large as q. The percent that q is less than p, is

(a) $16\frac{2}{3}$
(b) 60
(c) $83\frac{1}{3}$
(d) 90

321. Two numbers are respectively 20% and 25% lower than a third number. By how much percentage is the second number lower than the first? **(R.R.B., 2006)**

(a) 5%
(b) $6\frac{1}{4}\%$
(c) $8\frac{1}{2}\%$
(d) 10%

322. Two numbers are respectively $12\frac{1}{2}\%$ and 25% more than a third number. The first number as a percentage of the second number is **(Bank P.O., 2008)**

(a) 50
(b) 60
(c) 75
(d) 90

323. A's salary is 40% of B's salary which is 25% of C's salary. What percentage of C's salary is A's salary?

(a) 5%
(b) 10%
(c) 15%
(d) 20%

324. Peter earned 40% more money than Albert. Albert earned 20% less than Michael. Peter earned more than Michael by

(a) 10%
(b) 12%
(c) 20%
(d) 25%

325. Fresh fruit contains 68% water and dry fruit contains 20% water. How much dry fruit can be obtained from 100 kg of fresh fruits?

(a) 32 kg
(b) 40 kg
(c) 52 kg
(d) 80 kg

326. A large watermelon weighs 20 kg with 96% of its weight being water. It is allowed to stand in the sun and some of the water evaporates so that only 95% of its weight is water. Its reduced weight will be

(a) 16 kg
(b) 16.5 kg
(c) 17 kg
(d) 18 kg

327. Fresh grapes contain 80 percent water while dry grapes contain 10 percent water. If the weight of dry grapes is 250 kg what was its total weight when it was fresh? **(M.A.T., 2007)**

(a) 1000 kg
(b) 1100 kg
(c) 1125 kg
(d) 1225 kg

328. An alloy of gold and silver weighs 50 g. It contains 80% gold. How much gold should be added to the alloy so that percentage of gold is increased to 90?

(SNAP, 2010)

(a) 30 g
(b) 40 g
(c) 50 g
(d) 60 g

329. In a mixture of milk and water, the proportion of water by weight was 75%. If in the 60 gms mixture 15 gm of water was added, what would be the percentage of water? **(Bank P.O., 2009)**

(a) 75%
(b) 88%
(c) 90%
(d) 100%
(e) None of these

330. One litre of water is evaporated from a 6 litre solution containing 4% sugar. The percentage of sugar in the remaining solution is **(R.R.B., 2006)**

(a) $3\dfrac{1}{3}$%   (b) 4%

(c) $4\dfrac{4}{5}$%   (d) 5%

331. The quantity of water (in ml) needed to reduce 9 ml shaving lotion containing 50% alcohol to a lotion containing 30% alcohol, is

(a) 4   (b) 5

(c) 6   (d) 7

332. 1 litre of water is added to 5 litres of alcohol-water solution containing 40% alcohol strength. The strength of alcohol in the new solution will be

(S.S.C., 2007)

(a) 30%   (b) $33\dfrac{1}{3}$%

(c) $33\dfrac{2}{3}$%   (d) 33%

333. To strengthen 400 ml of 15% alcohol solution to 32% alcohol solution, a pharmacist would need additional pure alcohol amounting to

(a) 50 ml   (b) 75 ml

(c) 100 ml   (d) 125 ml

334. 6 c.c. of a 20% solution of alcohol in water is mixed with 4 c.c. of a 60% solution of alcohol in water. The alcoholic strength of the mixture is **(M.C.A., 2005)**

(a) 20%   (b) 26%

(c) 36%   (d) 40%

335. One type of liquid contains 20% water and the second type of liquid contains 35% of water. A glass is filled with 10 parts of first liquid and 4 parts of second liquid. The percentage of water in the new mixture in the glass is

(a) 20%   (b) $24\dfrac{2}{7}$%

(c) 37%   (d) 40%

336. In some quantity of ghee, 60% is pure ghee and 40% is vanaspati. If 10 kg of pure ghee is added, then the strength of vanaspati ghee becomes 20%. The original quantity was **(Hotel Management, 2003)**

(a) 10 kg   (b) 15 kg

(c) 20 kg   (d) 25 kg

337. From 5 litres of a 20% solution of alcohol in water, 2 litres of solution is taken out and 2 litres of water is added to it. Find the strength of alcohol in the new solution. **(S.S.C., 2008)**

(a) 10%   (b) 12%

(c) 15%   (d) 18%

338. After 30 kg of water had been evaporated from a solution of salt and water, which had 15% salt, the remaining solution had 20% salt. The weight of the original solution was **(S.S.C., 2008)**

(a) 80 kg   (b) 90 kg

(c) 120 kg   (d) 135 kg

339. 85% and 92% alcoholic solutions are mixed to get 35 litres of an 89% alcoholic solution. How many litres of each solution are there in the new mixture?

(a) 10 of the first and 25 of the second

(b) 20 of the first and 15 of the second

(c) 15 of the first and 20 of the second

(d) 12 of the first and 23 of the second

340. How many litres of a 30% alcohol solution should be added to 40 litres of a 60% alcohol solution to prepare a 50% solution? **(SNAP, 2010)**

(a) 20   (b) 24

(c) 30   (d) 32

341. A 27 quartz capacity car radiator is filled with 18% alcohol solution. How many quartz be drained and then be replaced by a 90% alcohol solution for resulting solution to contain 42% alcohol?

(SNAP, 2004)

(a) 7 quartz   (b) 9 quartz

(c) 11 quartz   (d) 14 quartz

342. Two vessels contain equal quantities of 40% alcohol. Sachin changed the concentration of the first vessel to 50% by adding extra quantity of pure alcohol. Vivek changed the concentration of the second vessel to 50% replacing a certain quantity of the solution with pure alcohol. By what percentage is the quantity of alcohol added by Sachin more/less than that replaced by Vivek?

(a) $11\dfrac{1}{9}$% less   (b) $11\dfrac{1}{9}$% more

(c) $16\dfrac{2}{3}$% less   (d) 20% more

343. From a container having pure milk, 20% is replaced by water and the process is repeated thrice. At the end of the third operation, the milk is

(a) 40% pure   (b) 50% pure

(c) 51.2% pure   (d) 58.8% pure

344. An empty fuel tank of a car was filled with A type petrol. When the tank was half-empty, it was filled with B type petrol. Again when the tank was half-empty, it was filled with A type petrol. When the tank was half-empty again, it was filled with B type petrol. What is the percentage of A type petrol at present in the tank?

(a) 33.5%   (b) 37.5%

(c) 40%   (d) 50%

345. A bag contains 600 coins of 25 p denomination and 1200 coins of 50 p denomination. If 12% of 25 p coins and 24% of 50 p coins are removed, the percentage of money removed from the bag is nearly

(a) 15.6%　　　　　　　(b) 17.8%

(c) 21.6%　　　　　　　(d) 30%

346. The price of rice is reduced by 2%. How many kilograms of rice can now be bought for the money which was sufficient to buy 49 kg of rice earlier?

(a) 48 kg　　　　　　　(b) 49 kg

(c) 50 kg　　　　　　　(d) 51 kg

347. If the price of erasers goes down by 25%, a man can buy 2 more erasers for a rupee. How many erasers are available for a rupee?　　　**(S.S.C., 2005)**

(a) 2　　　　　　　　　(b) 4

(c) 6　　　　　　　　　(d) 8

348. A reduction of 21% in the price of wheat enables a person to buy 10.5 kg more for ₹ 100. What is the reduced price per kg?

(a) ₹ 2　　　　　　　　(b) ₹ 2.25

(c) ₹ 2.30　　　　　　　(d) ₹ 2.50

349. Due to an increase of 30% in the price of eggs, 3 eggs less are available for ₹ 7.80. The present rate of eggs per dozen is

(a) ₹ 8.64　　　　　　　(b) ₹ 8.88

(c) ₹ 9.36　　　　　　　(d) ₹ 10.40

350. The price of sugar having gone down by 10%, Sharad can buy 6.2 kg more for ₹ 279. The difference between the original and the reduced price (per kg) is

(a) ₹ 0.50　　　　　　　(b) ₹ 1

(c) ₹ 1.50　　　　　　　(d) ₹ 4.50

351. If the price of sugar falls by $2\frac{1}{2}$%, a person can buy 9 kg more of sugar for ₹ 1260 than before. If the price had risen by $12\frac{1}{2}$%, how much sugar would he have bought for the same sum?

(a) 288 kg　　　　　　　(b) 312 kg

(c) 328 kg　　　　　　　(d) 336 kg

352. In a survey of a city, it was found that 90 percent of the people in the city own a refrigerator and 15 percent own a washing machine. If everybody owns at least one appliance, what percentage owns both?

(a) 5 percent　　　　　　(b) 8 percent

(c) 10 percent　　　　　　(d) None of these

353. In an examination, 34% of the students failed in Mathematics and 42% failed in English. If 20% of the students failed in both the subjects, then the percentage of students who passed in both the subjects was

(a) 44　　　　　　　　　(b) 50

(c) 54　　　　　　　　　(d) 56

354. 40% of the people read newspaper X, 50% read newspaper Y and 10% read both the papers. What percentage of the people read neither newspaper?

(a) 10%　　　　　　　　(b) 15%

(c) 20%　　　　　　　　(d) 25%

355. Out of 450 students of a school, 325 play football, 175 play cricket and 50 neither play football nor cricket. How many students play both football and cricket?

(a) 50　　　　　　　　　(b) 75

(c) 100　　　　　　　　(d) 225

356. In a hotel, 60% had vegetarian lunch while 30% had non-vegetarian lunch and 15% had both types of lunch. If 96 people were present, how many did not eat either type of lunch?

(a) 20　　　　　　　　　(b) 24

(c) 26　　　　　　　　　(d) 28

357. There are 600 boys in a hostel. Each plays either hockey or football or both. If 75% play hockey and 45% play football, how many play both?

(a) 48　　　　　　　　　(b) 60

(c) 80　　　　　　　　　(d) 120

358. In a certain office, 72% of the workers prefer tea and 44% prefer coffee. If each of them prefers tea or coffee and 40 like both, the total number of workers in the office is

(a) 200　　　　　　　　(b) 240

(c) 250　　　　　　　　(d) 320

359. 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.　　　**(M.A.T., 2010)**

(a) 380　　　　　　　　(b) 400

(c) 425　　　　　　　　(d) 725

360. In an examination, 35% candidates failed in one subject and 42% failed in another subject while 15% failed in both the subjects. If 2500 candidates appeared at the examination, how many passed in either subject but not in both?

(a) 325　　　　　　　　(b) 1175

(c) 2125　　　　　　　　(d) None of these

361. Arnav ordered 4 pairs of black socks and some additional pairs of blue socks. The price of the black socks per pair was twice that of the blue socks. When the order was filled, it was found that the number of pairs of the two colours had been interchanged. This increased the bill by 50%. The ratio of the number of pairs of black socks to the number of pairs of blue socks in the original order was　　　**(M.B.A., 2011)**

(a) 1: 2　　　　　　　　(b) 1: 4

(c) 2: 1　　　　　　　　(d) 4: 1

362. A man ordered a length of rope by telephone from his nearest hardware shop. But when a worker in the shop brought the rope, he found that the man on the telephone had miswritten the order by interchanging feet and inches. As a result of this, the length of rope received was only 30% of the length he had ordered. The length of the rope which the man ordered was between

(a) 6 ft and $7\frac{1}{2}$ ft   (b) $7\frac{1}{2}$ ft and 9 ft

(c) 9 ft and $10\frac{1}{2}$ ft   (d) $10\frac{1}{2}$ ft and 12 ft

363. A gardener has supply of fertilizer A which consists of 10% nitrogen and 6% phosphoric acid and fertilizer B which consists of 5% nitrogen and 10% phosphoric acid. After testing the soil conditions, he finds that he needs at least 14 kg of nitrogen and 14 kg of phosphoric acid for his crop. If fertilizer A costs ₹ 10.60 per kg and fertilizer B costs ₹ 8.40 per kg, what is the minimum cost at which the farmer can meet the nutrient requirement by using a combination of both types of fertilizers?

(a) ₹ 1488   (b) ₹ 1576
(c) ₹ 1648   (d) ₹ 1732

364. I bought 5 pens, 7 pencils and 4 erasers. Rajan bought 6 pens, 8 erasers and 14 pencils for an amount which was half more than that I had paid. What percent of the total amount paid by me was paid for the pen?

(a) 37.5%   (b) 50%
(c) 62.5%   (d) None of these

365. The majority against a certain motion is equal to 8% of the total number of voting. If 14 of those who voted against it had voted for it, the motion would have been carried by 4 votes. Find the number of votes for and against the motion.

(a) 112, 126   (b) 138, 162
(c) 128, 144   (d) 148, 172

366. The number of votes not cast for the Praja Party increased by 25% in the National General Election over those not cast for it in the previous Assembly polls and the Praja Party lost by a majority twice as large as that by which it had won the previous Assembly polls. If a total 2,60,000 people voted each time how many voted for the Praja Party in the previous Assembly polls?

(a) 110000   (b) 120000
(c) 140000   (d) 150000

367. Solve $\left[180\%\ \text{of}\ (?)\right] \div 2 = 504$

[Indian Railway Gr. 'D' Exam, 2014]

(a) 400   (b) 480
(c) 560   (d) 600

368. What will come in the place of (?) in the expression below:

$x\%$ of y is $y\%$ of (?) [Indian Railway Gr. 'D' Exam, 2014]

(a) x (b) $100x$

(c) $\dfrac{x}{100}$ (d) $\dfrac{y}{100}$

369. How much $66\frac{2}{3}\%$ of ₹ 312 exceeds ₹ 200?

[SSC—CHSL (10+2) Exam, 2015]

(a) ₹ 96   (b) ₹ 4
(c) ₹ 8   (d) ₹ 104

370. Solve:
105.27% of 1200.11 + 11.80% of 2360.85 = 21.99% of (?) + 140.29   [IBPS—Bank Spl. Officers (IT) Exam, 2015]

(a) 500   (b) 240
(c) 310   (d) 550

371. State Electricity Board gives 15% discount on electric bills if it is paid before due date. One person gets ₹ 54 as discount. The amount of actual bill was:

(a) ₹ 362   (b) ₹ 359
(c) ₹ 360   (d) ₹ 361

[SSC—CHSL (10+2) Exam, 2015]

372. Solve (550% of 250) ÷ 275 = (?)
[United India Insurance (UIICL) Assistant (Online) Exam, 2015]

(a) 15   (b) 1.5
(c) 0.5   (d) None of these

Direction: In the question below consists of question-statement and two statements I and II are given below it. You have to decide whether the data provided in the statement are sufficient to answer the question. Give answer.

(a) The data in statement I alone are sufficient to answer the question while II alone are not sufficient to answer the question.

(b) Data in statement II alone are sufficient to answer the question while data in statement I alone are not sufficient to answer the question.

(c) The data in statement I alone or in statement II alone are sufficient to answer the question.

(d) The data in both Statements I and II are not sufficient to answer the question.

(e) The data in both Statements I and II are sufficient to answer the question.

373. What is the minimum passing percentage in a test?
[IDBI Bank Executive Officers Examination, 2015]

I. Raman scored 25% marks in the test and Sunil scored 288 marks which is 128 more than Raman.

II. Raman scored 64 marks less than the minimum passing marks.

374. 32% of 825 + 25% of 1440 = 1025 − (?)

[NICL—AAO Exam 2015]

(a) 456   (b) 206

(c) 223   (d) 401

375. In a village 60% votes were cast in an election. A and B were the contestants. A won by 600 votes. If B had got 40% more votes, there would have been a tie between them. Find the number of recognized voters in the village.

[RBI Officer Gr. 'B' (Phase I) Online Exam, 2014]

(a) 4500   (b) 2800

(c) 3500   (d) 3600

376. ? + 30.01% of 651 ÷ 25.05% of 59.98 = 135

[IBPS—Bank PO/MT Exam, 2015]

(a) 68   (b) 140

(c) 122   (d) 128.5

377. $\frac{4}{3}$ of 25% of $\frac{18}{19}$ of 57 = ?

[IBPS—RRB Officer Assistant (Online) Exam, 2015]

(a) 36   (b) 8

(c) 18   (d) 12

378. ?% of 1239.96 + 59.87% of 449.95 = 579.05

[IBPS—PO (Pre.) Exam, 2015]

(a) 35   (b) 15

(c) 25   (d) 20

379. In an examination, 96% of students passed and 500 students failed. How many students did appear at the examination?   [ESIC—UDC Exam, 2016]

(a) 14000   (b) 12500

(c) 12000   (d) 13500

380. Madhur's present salary is ₹ 3500. It will increase by 10% next year. What will be Madhur's salary after the increment?   [ESIC—UDC Exam, 2016]

(a) ₹ 3850   (b) ₹ 3950

(c) ₹ 4000   (d) ₹ 3900

381. (12% of 555) + (15% of 666) = ?

[SBI Jr. Associates (Pre.) Exam, 2016]

(a) 166.5   (b) 167.5

(c) 168.5   (d) None of these

382. 85% of 420 + ?% of 1080 = 735

[SBI Jr. Associates (Pre.) Exam, 2016]

(a) 25   (b) 30

(c) 35   (d) 40

383. 30% of 1225 − 64% of 555 = ?

[SBI Jr. Associates (Pre.) Exam, 2016]

(a) 10.7   (b) 12.3

(c) 13.4   (d) None of these

384. Nagaraj could save 10% of his income. But 2 years later, when his income increased by 20%, he could save the same amount only as before. By how much percentage has his expenditure increased?

[CDS, 2016]

(a) $22\frac{2}{9}$%   (b) $23\frac{1}{3}$%

(c) $24\frac{2}{9}$%   (d) $25\frac{2}{9}$%

385. 14% of 14 + 28% of 28 + 92% of 96 − 15% of 85 = ?

[DMRC—Customer Relations Assistant (CRA) Exam, 2016]

(a) 8.37   (b) 85.37

(c) 89.37   (d) None of these

386. The marked price of an article is ₹ 2400. The shopkeeper gives successive discounts of x% and 15% to the customer. If the customer pays ₹ 1876.8 for the article, find the value of x.

[DMRC—Customer Relation Assistant (CRA) Exam, 2016]

(a) 9%   (b) 8%

(c) 12%   (d) 11%

387. 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 total number of boys playing Badminton is 60% of the total number of boys. Number of children only playing table Tennis is 40% of the total number of children and a total of 12 children play both Badminton and Table Tennis. What is the number of girls playing only Badminton?

[DMRC—Customer Relations Assistant (CRA) Exam, 2016]

(a) 16   (b) 14

(c) 17   (d) None of these

388. Nandini Basu bought an article for ₹ 5844. She gave ₹ 156 to a mechanic to remove its defect. She then sold it for ₹ 5700. What was her loss per cent?

[ESI—UDC Exam, 2016]

(a) 5%   (b) 5.5%

(c) 2.5%   (d) 2.46%

389. A wrist watch of cost price ₹ 1250 was sold by Sharel for ₹ 1500. What was the profit percent?

[ESIC—UDC Exam, 2016]

(a) 21%   (b) 24%

(c) 25%   (d) 20%

390. In a village three people contested for the post of village Pradhan. Due to their own interest, all the voters voted and no one vote was invalid. The losing candidate got 30% votes. What could be the minimum absolute margin of votes by which the winning candidate led by the nearest rival, if each candidate got an integral per cent of votes?

[SBI Jr. Associates (Pre.) Exam, 2016]

(a) 4   (b) 2

(c) 1   (d) None of these

ANSWERS

1. (c)	**2.** (d)	**3.** (d)	**4.** (a)	**5.** (a)	**6.** (a)	**7.** (b)	**8.** (e)	**9.** (b)	**10.** (b)
11. (a)	**12.** (c)	**13.** (e)	**14.** (d)	**15.** (b)	**16.** (e)	**17.** (e)	**18.** (c)	**19.** (e)	**20.** (c)
21. (a)	**22.** (d)	**23.** (a)	**24.** (c)	**25.** (d)	**26.** (b)	**27.** (d)	**28.** (b)	**29.** (c)	**30.** (c)
31. (d)	**32.** (a)	**33.** (d)	**34.** (c)	**35.** (a)	**36.** (d)	**37.** (b)	**38.** (b)	**39.** (a)	**40.** (a)
41. (b)	**42.** (a)	**43.** (d)	**44.** (b)	**45.** (a)	**46.** (b)	**47.** (a)	**48.** (a)	**49.** (c)	**50.** (c)
51. (c)	**52.** (d)	**53.** (b)	**54.** (c)	**55.** (a)	**56.** (b)	**57.** (c)	**58.** (c)	**59.** (a)	**60.** (b)
61. (c)	**62.** (d)	**63.** (d)	**64.** (b)	**65.** (d)	**66.** (a)	**67.** (c)	**68.** (d)	**69.** (c)	**70.** (c)
71. (b)	**72.** (b)	**73.** (d)	**74.** (c)	**75.** (c)	**76.** (a)	**77.** (b)	**78.** (d)	**79.** (d)	**80.** (b)
81. (c)	**82.** (e)	**83.** (d)	**84.** (c)	**85.** (b)	**86.** (d)	**87.** (b)	**88.** (d)	**89.** (c)	**90.** (a)
91. (b)	**92.** (b)	**93.** (e)	**94.** (d)	**95.** (c)	**96.** (c)	**97.** (b)	**98.** (c)	**99.** (b)	**100.** (b)
101. (c)	**102.** (e)	**103.** (d)	**104.** (c)	**105.** (b)	**106.** (b)	**107.** (b)	**108.** (b)	**109.** (a)	**110.** (c)
111. (b)	**112.** (a)	**113.** (c)	**114.** (a)	**115.** (a)	**116.** (a)	**117.** (b)	**118.** (b)	**119.** (a)	**120.** (b)
121. (b)	**122.** (d)	**123.** (a)	**124.** (b)	**125.** (d)	**126.** (d)	**127.** (c)	**128.** (b)	**129.** (c)	**130.** (c)
131. (b)	**132.** (c)	**133.** (b)	**134.** (e)	**135.** (c)	**136.** (d)	**137.** (b)	**138.** (d)	**139.** (c)	**140.** (b)
141. (c)	**142.** (b)	**143.** (b)	**144.** (b)	**145.** (b)	**146.** (b)	**147.** (c)	**148.** (e)	**149.** (e)	**150.** (c)
151. (b)	**152.** (c)	**153.** (a)	**154.** (c)	**155.** (b)	**156.** (c)	**157.** (a)	**158.** (c)	**159.** (c)	**160.** (c)
161. (a)	**162.** (b)	**163.** (e)	**164.** (a)	**165.** (c)	**166.** (c)	**167.** (c)	**168.** (c)	**169.** (d)	**170.** (d)
171. (b)	**172.** (c)	**173.** (a)	**174.** (d)	**175.** (a)	**176.** (c)	**177.** (a)	**178.** (c)	**179.** (c)	**180.** (a)
181. (a)	**182.** (d)	**183.** (b)	**184.** (d)	**185.** (d)	**186.** (c)	**187.** (b)	**188.** (d)	**189.** (b)	**190.** (b)
191. (c)	**192.** (b)	**193.** (d)	**194.** (b)	**195.** (a)	**196.** (d)	**197.** (c)	**198.** (e)	**199.** (a)	**200.** (c)
201. (c)	**202.** (a)	**203.** (c)	**204.** (c)	**205.** (b)	**206.** (d)	**207.** (c)	**208.** (d)	**209.** (e)	**210.** (a)
211. (d)	**212.** (d)	**213.** (a)	**214.** (a)	**215.** (b)	**216.** (d)	**217.** (a)	**218.** (e)	**219.** (b)	**220.** (b)
221. (c)	**222.** (c)	**223.** (c)	**224.** (c)	**225.** (c)	**226.** (d)	**227.** (d)	**228.** (c)	**229.** (a)	**230.** (a)
231. (a)	**232.** (a)	**233.** (d)	**234.** (a)	**235.** (d)	**236.** (b)	**237.** (e)	**238.** (d)	**239.** (b)	**240.** (c)
241. (c)	**242.** (a)	**243.** (b)	**244.** (c)	**245.** (b)	**246.** (c)	**247.** (b)	**248.** (c)	**249.** (c)	**250.** (d)
251. (d)	**252.** (c)	**253.** (a)	**254.** (c)	**255.** (c)	**256.** (a)	**257.** (d)	**258.** (b)	**259.** (b)	**260.** (b)
261. (d)	**262.** (b)	**263.** (b)	**264.** (b)	**265.** (a)	**266.** (b)	**267.** (a)	**268.** (d)	**269.** (c)	**270.** (b)
271. (a)	**272.** (c)	**273.** (b)	**274.** (d)	**275.** (b)	**276.** (c)	**277.** (b)	**278.** (c)	**279.** (d)	**280.** (c)
281. (b)	**282.** (a)	**283.** (d)	**284.** (c)	**285.** (c)	**286.** (b)	**287.** (d)	**288.** (b)	**289.** (d)	**290.** (b)
291. (b)	**292.** (b)	**293.** (b)	**294.** (a)	**295.** (a)	**296.** (c)	**297.** (d)	**298.** (a)	**299.** (a)	**300.** (b)
301. (d)	**302.** (a)	**303.** (c)	**304.** (b)	**305.** (a)	**306.** (c)	**307.** (b)	**308.** (a)	**309.** (d)	**310.** (c)
311. (d)	**312.** (c)	**313.** (c)	**314.** (d)	**315.** (c)	**316.** (b)	**317.** (a)	**318.** (c)	**319.** (c)	**320.** (c)
321. (b)	**322.** (d)	**323.** (b)	**324.** (b)	**325.** (b)	**326.** (a)	**327.** (c)	**328.** (c)	**329.** (e)	**330.** (c)
331. (c)	**332.** (b)	**333.** (c)	**334.** (c)	**335.** (b)	**336.** (a)	**337.** (b)	**338.** (c)	**339.** (c)	**340.** (a)
341. (b)	**342.** (d)	**343.** (c)	**344.** (b)	**345.** (c)	**346.** (c)	**347.** (c)	**348.** (a)	**349.** (c)	**350.** (a)
351. (b)	**352.** (a)	**353.** (a)	**354.** (c)	**355.** (c)	**356.** (b)	**357.** (d)	**358.** (c)	**359.** (b)	**360.** (b)
361. (b)	**362.** (c)	**363.** (d)	**364.** (c)	**365.** (b)	**366.** (c)	**367.** (c)	**368.** (a)	**369.** (c)	**370.** (d)
371. (c)	**372.** (e)	**373.** (e)	**374.** (d)	**375.** (c)	**376.** (d)	**377.** (c)	**378.** (c)	**379.** (b)	**380.** (a)
381. (a)	**382.** (c)	**383.** (b)	**384.** (a)	**385.** (b)	**386.** (b)	**387.** (b)	**388.** (a)	**389.** (d)	**390.** (b)

SOLUTIONS

1. $\frac{3}{4} = \left(\frac{3}{4} \times 100\right)\% = 75\%.$

2. $5 : 4 = \frac{5}{4} = \left(\frac{5}{4} \times 100\right)\% = 125\%.$

3. $3.5 = \left(\frac{35}{10} \times 100\right)\% = 350\%.$

4. $64\% = \frac{64}{100} = \frac{16}{25}.$

5. $\frac{1}{2}\% = \left(\frac{1}{2} \times \frac{1}{100}\right) = \frac{0.5}{100} = 0.005.$

6. 12% of $5000 = \left(\frac{12}{100} \times 5000\right) = 600.$

7. 38% of $341 = \left(\frac{38}{100} \times 341\right) = \frac{12958}{100} = 129.58.$

8. (550% of 250) $\div 275 = \left(\frac{550}{100} \times 250\right) \div 275 = \frac{55 \times 25}{275} = 5.$

9. 280% of $3940 = \left(\frac{280}{100} \times 3940\right) = 11032.$

10. 92.5% of $550 = \left(\frac{925}{10} \times \frac{1}{100} \times 550\right) = 508.75.$

11. 2% of 2 = $\left(\dfrac{2}{100} \times 2\right) = \dfrac{4}{100} = 0.04.$

12. 10% of 5 + 5% of 10 = $\left(\dfrac{10}{100} \times 5\right) + \left(\dfrac{5}{100} \times 10\right) = 0.5 + 0.5 = 1.0.$

13. Let 36% of 245 − 40% of 210 = 10 − x.

Then, $\left(\dfrac{36}{100} \times 245\right) - \left(\dfrac{40}{100} \times 210\right) = 10 - x \Rightarrow$

$88.20 - 84 = 10 - x \Rightarrow 10 - x = 4.20 \Rightarrow x = 5.8.$

14. Let 45% of 300 + $\sqrt{x}$ = 56% of 750 − 10% of 250.

Then, $\left(\dfrac{45}{100} \times 300\right) + \sqrt{x} = \left(\dfrac{56}{100} \times 750\right) - \left(\dfrac{10}{100} \times 250\right)$

$\Rightarrow \quad 135 + \sqrt{x} = 420 - 25 \Rightarrow \sqrt{x} = 260$

$\Rightarrow \quad x = (260)^2 = 67600.$

15. 15% of 578 + 22.5% of 644 = $\left(\dfrac{15}{100} \times 578\right) + \left(\dfrac{225}{10} \times \dfrac{1}{100} \times 644\right)$

$= 86.7 + 144.9 = 231.6.$

16. 140% of 56 + 56% of 140 = $\left(\dfrac{140}{100} \times 56\right) + \left(\dfrac{56}{100} \times 140\right)$

$= 78.4 + 78.4 = 156.8.$

17. (7.9% of 134) − (3.4% of 79)

$= \left(\dfrac{79}{10} \times \dfrac{1}{100} \times 134\right) - \left(\dfrac{34}{10} \times \dfrac{1}{100} \times 79\right)$

$= \dfrac{79}{1000} \times (134 - 34) = \dfrac{79}{1000} \times 100 = \dfrac{79}{10} = 7.9.$

18. (23.6% of 1254) − (16.6% of 834)

$= \left(\dfrac{236}{10} \times \dfrac{1}{100} \times 1254\right) - \left(\dfrac{166}{10} \times \dfrac{1}{100} \times 834\right)$

$= \dfrac{1}{1000}(236 \times 1254 - 166 \times 834)$

$= \dfrac{12}{1000}(24662 - 11537) = \left(\dfrac{12 \times 13125}{1000}\right) = 157.5.$

19. (0.85% of 405) + (2.25% of 550)

$= \left(\dfrac{85}{100} \times \dfrac{1}{100} \times 405\right) + \left(\dfrac{225}{100} \times \dfrac{1}{100} \times 550\right)$

$= \dfrac{225}{10000}(153 + 550) = \left(\dfrac{225 \times 703}{10000}\right) = 15.8175.$

20. Given expression = $\left(\dfrac{45}{100} \times \dfrac{25}{100} \times \dfrac{4}{5} \times 850\right) = \dfrac{153}{2} = 76.5.$

21. Given expression = $\left(\dfrac{28}{100} \times \dfrac{36}{100} \times \dfrac{5}{7} \times 5000\right) = 360.$

22. (0.56% of 225) × (3.25% of 430)

$= \left(\dfrac{56}{100} \times \dfrac{1}{100} \times 225\right) \times \left(\dfrac{325}{100} \times \dfrac{1}{100} \times 430\right)$

$= \left(\dfrac{126}{100} \times \dfrac{13975}{1000}\right) = 1.26 \times 13.975 = 17.6085.$

23. Commission = $12\dfrac{1}{2}$% of ₹ 15000

$= ₹\left(\dfrac{25}{2} \times \dfrac{1}{100} \times 15000\right) = ₹ 1875.$

24. Let the number be x.

Then, $\dfrac{1}{8}x = 41.5 \Rightarrow x = 41.5 \times 8 = 332.$

∴ 69% of 332 = $\left(\dfrac{69}{100} \times 332\right) = 229.08.$

25. 10% of 20 + 20% of 10 = $\left(\dfrac{10}{100} \times 20\right) + \left(\dfrac{20}{100} \times 10\right)$

$= \dfrac{2}{100}(100 + 100) = \dfrac{2}{100}$ of 200

$= 2\%$ of 200.

26. 60% of 264 = $\left(\dfrac{60}{100} \times 264\right)$

$= 158.40;$ 10% of 44 = $\left(\dfrac{10}{100} \times 44\right) = 4.40;$

15% of 1056 = $\left(\dfrac{15}{100} \times 1056\right)$

$= 158.40;$ 30% of 132 = $\left(\dfrac{30}{100} \times 132\right) = 39.60.$

∴ 60% of 264 = 15% of 1056.

27. Pass percentage = $\left(\dfrac{252}{270} \times 100\right)\% = \dfrac{280}{3}\% = 93\dfrac{1}{3}\%.$

28. Required percentage = $\left(\dfrac{5}{2250} \times 100\right)\% = \dfrac{2}{9}\%.$

29. Required percentage = $\left(\dfrac{626}{850} \times 100\right)\%$

$= \dfrac{1252}{17}\% = 73.65\% \approx 74\%.$

30. Required percentage = $\left(\dfrac{100 + 84 + 67 + 25 + 24}{100 + 100 + 100 + 50 + 50} \times 100\right)\%$

$= \left(\dfrac{300}{400} \times 100\right)\% = 75\%.$

31. Total marks obtained = (35 + 30 + 30 + 25 + 65 + 45 + 80 + 85) = 395.

Maximum marks = (50 × 2 + 50 × 2 + 100 × 2 + 100 × 2)

$= 600.$

∴ Percentage of marks = $\left(\dfrac{395}{600} \times 100\right)\% = 65.8\% \approx 66\%.$

32. Rate of sales tax = $\left(\dfrac{27.20}{340} \times 100\right)\% = 8\%.$

33. Required percentage = $\left(\dfrac{33}{88} \times 100\right)\% = \dfrac{75}{2}\% = 37.5\%.$

34. Required percentage = $\left(\dfrac{0.01}{0.1} \times 100\right)\% = \left(\dfrac{1}{10} \times 100\right)\% = 10\%.$

35. 1 min 12 sec = $1\dfrac{12}{60}$ min = $1\dfrac{1}{5}$ min = $\dfrac{6}{5}$ min.

1 hour = 60 min.

∴ Required percentage = $\left(\dfrac{6}{5} \times \dfrac{1}{60} \times 100\right)\% = 2\%.$

36. Percentage increase = $\left(\dfrac{21}{560} \times 100\right)\% = \dfrac{15}{4}\% = 3.75\%.$

37. Required percentage $= \left(\dfrac{18}{7200} \times 100\right)\% = \dfrac{1}{4}\% = 0.25\%.$

38. Required percentage $= \left(\dfrac{1987.50}{2650} \times 100\right)\%$

$= \left(\dfrac{19875}{265} \times \dfrac{1}{100} \times 100\right)\% = 75\%.$

39. Required percentage $= \left(\dfrac{3}{24} \times 100\right)\% = \dfrac{25}{2}\% = 12\dfrac{1}{2}\%.$

40. Price of 5 pairs when purchased separately = ₹ 5.

Price of 5 pair package = ₹ 3.40.

Difference in price = ₹ (5 − 3.40) = ₹ 1.60.

∴ Required percentage $= \left(\dfrac{1.6}{5} \times 100\right)\% = 32\%.$

41. Number of rolls sold by noon $= \dfrac{1}{2}$ of 40 dozen = 20 dozen.

Number of rolls sold between noon and closing time

$= 60\%$ of 20 dozen $= \left(\dfrac{60}{100} \times 20\right)$ dozen = 12 dozen.

Number of rolls left unsold = [40 − (20 + 12)] dozen = 8 dozen.

42. Weight of metal A = 5 kg.

Total weight of the alloy = (5 + 20) kg = 25 kg.

∴ Required percentage $= \left(\dfrac{5}{25} \times 100\right)\% = 20\%.$

43. Number of rotten apples = 30% of 450 $= \left(\dfrac{30}{100} \times 450\right) = 135.$

∴ Number of good apples = (450 − 135) = 315.

44. Total annual rent = ₹ (25000 × 12) = ₹ 300000.

Discount = 5% of ₹ 300000 $= ₹ \left(\dfrac{5}{100} \times 300000\right) = ₹ 15000.$

∴ Annual rent paid after discount = ₹ (300000 − 15000)

$= ₹ 285000.$

45. Correct time = 3 hrs 40 min = (3 × 60 + 40) min = 220 min.

Error = 5.5 min.

∴ Error % $= \left(\dfrac{5.5}{220} \times 100\right)\% = \dfrac{5}{2}\% = 2.5\%.$

46. Total number of households = 200.

Number of households whose monthly income is above ₹ 2000 but below ₹ 5000 = (170 − 80) = 90.

∴ Required percentage $= \left(\dfrac{90}{200} \times 100\right)\% = 45\%.$

47. Total number of students = (100 + 75) = 175.

Number of students passed = 75% of 100 + 60% of 75

$= 75 + 45 = 120.$

∴ Pass percentage $= \left(\dfrac{120}{175} \times 100\right)\% = \left(\dfrac{480}{7}\right)\% = 68\dfrac{4}{7}\%.$

48. Rebate on one ball = 25% of ₹ 32 $= ₹ \left(\dfrac{25}{100} \times 32\right) = ₹ 8.$

∴ Required number of balls $= \dfrac{40}{8} = 5.$

49. Required percentage $= \left(\dfrac{1.14}{1.9} \times 100\right)\%$

$= \left(\dfrac{114}{190} \times 100\right)\% = 60\%.$

50. Number of toffees distributed

$= 5\%$ of 160 + 15% of 160 + $\dfrac{1}{4}$ of 160

$= \left(\dfrac{5}{100} \times 160\right) + \left(\dfrac{15}{100} \times 160\right) + \left(160 \times \dfrac{1}{4}\right)$

$= 8 + 24 + 40 = 72.$

∴ Number of toffees left behind = 160 − 72 = 88.

51. Revenue obtained from sale of notebooks in 2 weeks

= ₹ (45 × 10 × 14) = ₹ 6300.

Revenue obtained from sale of pencil boxes in 2 weeks

= ₹ (80 × 6 × 14) = ₹ 6720.

∴ Total commission earned

= 4% of ₹ 6300 + 20% of ₹ 6720

= 252 + 1344 = 1596.

52. Total cost = ₹ [1 × 1000 + (100 − 2)% of 1 × 4000]

= ₹ (1000 + 0.98 × 4000)

= ₹ (1000 + 3920) = ₹ 4920.

53. Actual price = ₹ (25 + 2.50) = ₹ 27.50.

∴ Saving $= \left(\dfrac{2.50}{27.50} \times 100\right)\% = \dfrac{100}{11}\% = 9\dfrac{1}{11}\% = 9\%.$

54. Quantity of pure acid = 20% of 8 litres $= \left(\dfrac{20}{100} \times 8\right)$ litres

= 1.6 litres.

55. Rebate = 6% of ₹ 6650 $= ₹ \left(\dfrac{6}{100} \times 6650\right) = ₹ 399.$

Sales tax = 10% of ₹ (6650 − 399) $= ₹ \left(\dfrac{10}{100} \times 6251\right) = ₹ 625.10.$

∴ Final amount = ₹ (6251 + 625.10) = ₹ 6876.10.

56. $\dfrac{384}{540} = \left(\dfrac{384}{540} \times 100\right)\% = 71\dfrac{1}{9}\%;$ $\dfrac{425}{500} = \left(\dfrac{425}{500} \times 100\right)\% = 85\%;$

$\dfrac{570}{700} = \left(\dfrac{570}{700} \times 100\right)\% = 81\dfrac{3}{7}\%;$ $\dfrac{480}{660}$

$= \left(\dfrac{480}{660} \times 100\right)\% = 72\dfrac{8}{11}\%.$

∴ $\dfrac{425}{500}$ shows the best percentage.

57. Number of sweets obtained by each student

= 20% of 65 = 13.

Number of sweets obtained by each teacher

= 40% of 65 = 26.

∴ Total number of sweets

= 65 × 13 + 4 × 26 = 845 + 104 = 949.

58. Total marks obtained by the student = 55% of 800

$= \left(\dfrac{55}{100} \times 800\right) = 440.$

∴ Marks scored in English

= 15% of 440 $= \left(\dfrac{15}{100} \times 440\right) = 66.$

59. Percentage of A's expenditure = $\left(\dfrac{18}{40} \times 100\right)\% = 45\%$.

Percentage of B's expenditure = $\left(\dfrac{21}{50} \times 100\right)\% = 42\%$.

Percentage of C's expenditure = $\left(\dfrac{24}{60} \times 100\right)\% = 40\%$.

Percentage of D's expenditure = $\left(\dfrac{27}{70} \times 100\right)\% = 38\dfrac{4}{7}\%$.

Clearly, A has done the highest expenditure.

60. Tax on first ₹ 50000 = Nil.
Tax on next ₹ 10000 = 10% of ₹ 10000 = ₹ 1000.
Tax on next ₹ 90000 = 20% of ₹ 90000 = ₹ 18000.
Tax on next ₹ 20000 = 30% of ₹ 20000
                    = ₹ 6000.
∴ Tax payable = ₹ (1000 + 18000 + 6000) = ₹ 25000.

61. Let the number be x.

Then, 40% of 60% of $\dfrac{3}{5}$ of x = 504

$\Rightarrow \left(\dfrac{40}{100} \times \dfrac{60}{100} \times \dfrac{3}{5} \times x\right) = 504$

$\Rightarrow \dfrac{18}{125}x = 504 \Rightarrow x = \dfrac{504 \times 125}{18} = 3500.$

∴ 25% of $\dfrac{2}{5}$ of 3500 = $\left(\dfrac{25}{100} \times \dfrac{2}{5} \times 3500\right) = 350.$

62. Let 125% of 3060 − 85% of x = 408. Then,

85% of $x = \left(\dfrac{125}{100} \times 3060\right) - 408$

$\Rightarrow \dfrac{85}{100}x = 3825 - 408$

$\Rightarrow \dfrac{17x}{20} = 3417$

$\Rightarrow x = \left(\dfrac{3417 \times 20}{17}\right) = 4020.$

63. Let 40% of 265 + 35% of 180 = 50% of x.

Then, $\left(\dfrac{40}{100} \times 265\right) + \left(\dfrac{35}{100} \times 180\right) = \left(\dfrac{50}{100} \times x\right)$

$\Rightarrow 106 + 63 = \dfrac{x}{2}$

$\Rightarrow x = 169 \times 2 = 338.$

64. Let x% of 450 + 46% of 285 = 257.1. Then,

$\left(\dfrac{x}{100} \times 450\right) + \left(\dfrac{46}{100} \times 285\right) = 257.1$

$\Rightarrow \dfrac{9x}{2} = 257.1 - 131.1 = 126$

$\Rightarrow x = \dfrac{126 \times 2}{9} = 28.$

65. Let 36% of 365 + x% of 56.2 = 156.69.

Then, $\left(\dfrac{36}{100} \times 365\right) + \left(\dfrac{x}{100} \times 56.2\right) = 156.69$

$\Rightarrow \dfrac{281}{500}x = 156.69 - 131.4 = 25.29$

$\Rightarrow x = \dfrac{25.29 \times 500}{281} = 45.$

66. Let 35568 ÷ x% of 650 = 456. Then,

$35568 \div \left(\dfrac{x}{100} \times 650\right) = 456$

$\Rightarrow \dfrac{13x}{2} \times 456 = 35568$

$\Rightarrow 2964x = 35568$

$\Rightarrow x = \dfrac{35568}{2964} = 12.$

67. Let 23% of 8040 + 42% of 545 = x% of 3000. Then,

$\left(\dfrac{23}{100} \times 8040\right) + \left(\dfrac{42}{100} \times 545\right) = \left(\dfrac{x}{100} \times 3000\right)$

$\Rightarrow 30x = 1849.2 + 228.9 = 2078.1$

$\Rightarrow x = \dfrac{2078.1}{30} = 69.27.$

68. Let 3.2% of 500 × 2.4% of x = 288.

Then, $\left(\dfrac{32}{10} \times \dfrac{1}{100} \times 500\right) \times \left(\dfrac{24}{10} \times \dfrac{1}{100} \times x\right) = 288$

$\Rightarrow 16 \times \dfrac{3x}{125} = 288 \Rightarrow x = \dfrac{288 \times 125}{16 \times 3} = 750.$

69. Let 85% of 485.5 = 50% of x.

Then, $\left(\dfrac{85}{100} \times 485.5\right) = \dfrac{50x}{100} \Rightarrow \dfrac{x}{2} = 412.675$

$\Rightarrow x = 825.35.$

70. Let 40% of 4.5 + x% of $\dfrac{2}{3}$ = 20% of 10.

Then, $\left(\dfrac{40}{100} \times 4.5\right) + \left(\dfrac{x}{100} \times \dfrac{2}{3}\right) = \left(\dfrac{20}{100} \times 10\right)$

$\Rightarrow \dfrac{x}{150} = 2 - 1.8 = 0.2$

$\Rightarrow x = 0.2 \times 150 = 30.$

71. Clearly, 60% of 28% of 240 = $\left(\dfrac{60}{100} \times \dfrac{28}{100} \times 240\right)$

$= \left(\dfrac{30}{100} \times \dfrac{28}{100} \times 2 \times 240\right)$

$= \left(\dfrac{30}{100} \times \dfrac{28}{100} \times 480\right)$

= 30% of 285% of 480.

72. 25% of 25% = $\dfrac{25}{100} \times \dfrac{25}{100} = \dfrac{1}{16} = 0.0625.$

73. Required percentage = $\left(\dfrac{3\%}{5\%} \times 100\right)\%$

$= \left[\dfrac{(3/100)}{(5/100)} \times 100\right]\% = 60\%.$

74. Let the number be x.

Then, 64% of $x = 2592 \Rightarrow \dfrac{64x}{100} = 2592$

$\Rightarrow x = \left(\dfrac{2592 \times 100}{64}\right) = 4050.$

$\therefore$ 88% of 4050 = $\left(\dfrac{88}{100} \times 4050\right)$ = 3564.

75. Let the number be x.

Then, 42% of x = 892.50 $\Rightarrow \dfrac{42x}{100}$ = 892.50

$$\Rightarrow x = \left(\dfrac{892.5 \times 100}{42}\right) = 2125.$$

$\therefore$ 73% of 2125 = $\left(\dfrac{73}{100} \times 2125\right)$ = 1551.25.

76. Let the number be x. Then, 15% of 45% of x = 105.3

$$\Rightarrow \left(\dfrac{15}{100} \times \dfrac{45}{100} \times x\right) = 105.3$$

$$\Rightarrow \dfrac{27x}{400} = 105.3$$

$$\Rightarrow x = \left(\dfrac{105.3 \times 400}{27}\right) = 1560.$$

$\therefore$ 24% of 1560 = $\left(\dfrac{24}{100} \times 1560\right)$ = 374.4.

77. X% of 0.3 = 0.03 $\Rightarrow \dfrac{X}{100} \times 0.3 = 0.03$

$$\Rightarrow X = \left(\dfrac{0.03 \times 100}{0.3}\right) = 10.$$

78. Let the required amount be ₹ x.
Then, 40% of 60% of 32% of x = 432

$$\Rightarrow \dfrac{40}{100} \times \dfrac{60}{100} \times \dfrac{32}{100} \times x = 432$$

$$\Rightarrow x = \dfrac{432 \times 100 \times 100 \times 100}{40 \times 60 \times 32} = 5625.$$

79. Let the required number be x.
Then, 30% of x

$< 100 \Rightarrow \dfrac{30}{100} x < 100 \Rightarrow x < \dfrac{1000}{3} \Rightarrow x < 333.33.$

Hence, greatest possible value of x = 333.

80. Let the worth of the house be ₹ x.

Then, $\dfrac{2}{7}$% of x = 28000 $\Leftrightarrow \left(\dfrac{2}{7} \times \dfrac{1}{100} \times x\right)$ = 2800

$\Leftrightarrow x = \left(\dfrac{2800 \times 100 \times 7}{2}\right) = 9,80,000.$

81. Let 15% of x% of 582 = 17.46.

Then, $\dfrac{15}{100} \times \dfrac{x}{100} \times 582 = \dfrac{1746}{100} \Leftrightarrow x = \left(\dfrac{1746}{100} \times \dfrac{100 \times 100}{15 \times 582}\right)$

$= 20.$

82. Let the required number of chicken be x.
Then, 65% of x = 47775

$$\Rightarrow \dfrac{65}{100} x = 47775$$

$$\Rightarrow x = \dfrac{47775 \times 100}{65} = 73500.$$

83. Let the number be x.
Then, 35% of x = 175

$\Leftrightarrow \left(\dfrac{35}{100} \times x\right) = 175 \Leftrightarrow x = \left(\dfrac{175 \times 100}{35}\right) = 500.$

Now, let y% of 175 = 500.

Then, $\left(\dfrac{y}{100} \times 175\right) = 500 \Leftrightarrow y = \left(\dfrac{500 \times 100}{175}\right) = \dfrac{2000}{7} = 285\dfrac{5}{7}.$

84. Let the amount of the bill be ₹ x.

Then, 4% of x = 13 $\Rightarrow \dfrac{4}{100} x = 13 \Rightarrow x = \dfrac{13 \times 100}{4} = 325.$

85. Marks secured by X = 58% of 700 = $\left(\dfrac{58}{100} \times 700\right)$ = 406.

Marks secured by Y = (406 − 105) = 301.

$\therefore$ Required percentage = $\left(\dfrac{301}{700} \times 100\right)$% = 43%.

86. Let Pooja's monthly salary be ₹ x.

Then, 13% of x = 8554 $\Rightarrow \dfrac{13x}{100}$ = 8554

$$\Rightarrow x = \dfrac{8554 \times 100}{13} = 65800.$$

Total percentage of salary invested = (13 + 23 + 8)%
$= 44\%.$

$\therefore$ Total amount invested monthly = 44% of ₹ 65800

$= ₹ \left(\dfrac{44}{100} \times 65800\right) = ₹ 28952$

87. Let Nupur's annual salary be ₹ x.

Then, 26% of x = 89856 $\Rightarrow \dfrac{26x}{100}$ = 89856

$$\Rightarrow x = \left(\dfrac{89856 \times 100}{26}\right) = 345600.$$

$\therefore$ Nupur's monthly income = ₹ $\left(\dfrac{345600}{12}\right)$ = ₹ 28800.

88. Let David's annual income be ₹ x and his wife's annual income be ₹ y.

Then, 8% of x = 800 $\Rightarrow \dfrac{8}{100} x$ = 800

$$\Rightarrow x = \left(\dfrac{800 \times 100}{8}\right) = 10000.$$

And, 8% of y = 840 $\Rightarrow \dfrac{8}{100} y$ = 840

$$\Rightarrow y = \left(\dfrac{840 \times 100}{8}\right) = 10500.$$

$\therefore$ Required difference = ₹ [(10500 + 840) − (10000 + 800)]
$= ₹ (11340 − 10800) = ₹ 540.$

89. Let the number be x.

Then, $\dfrac{x + 75\% \text{ of } x + 25\% \text{ of } x}{3} = 240$

$\Rightarrow x + \dfrac{75}{100} x + \dfrac{25}{100} x = 240 \times 3 = 720$

$\Rightarrow \quad x + \dfrac{3}{4}x + \dfrac{1}{4}x = 720$

$\Rightarrow \quad 2x = 720 \Rightarrow x = 360.$

90. Let the price of each printer be ₹ x. Then, price of each computer = ₹ $(3x)$.

Total cost of printers = ₹ $(20x)$.

Total cost of purchase = ₹ $(60 \times 3x + 20x)$ = ₹ $(200x)$.

∴ Required percentage = $\left(\dfrac{20x}{200x} \times 100\right)\% = 10\%.$

91. Let his taxable income be ₹ 100.

Then, income tax
= 30% of ₹ 100 = ₹ 30.

Surcharge = 10% of ₹ 30 = ₹ 3.

Total tax paid = ₹ (30 + 3) = ₹ 33.

∴ Net tax rate = $\left(\dfrac{33}{100} \times 100\right)\% = 33\%.$

92. Error = $(45°27' - 45°) = 27'.$

Accurate measure = $45° = (45 \times 60)' = 2700'.$

∴ Percentage error = $\left(\dfrac{27}{2700} \times 100\right)\% = 1\%.$

93. $\dfrac{5}{6} = \left(\dfrac{5}{6} \times 100\right)\% = 83\dfrac{1}{3}\%$

$\dfrac{2}{3} = \left(\dfrac{2}{3} \times 100\right)\% = 66\dfrac{2}{3}\% \; ; \dfrac{2}{5} = \left(\dfrac{2}{5} \times 100\right)\% = 40\% \; ;$

$\dfrac{1}{4} = \left(\dfrac{1}{4} \times 100\right)\% = 25\% \; ; \dfrac{2}{11} = \left(\dfrac{2}{11} \times 100\right)\% = 18\dfrac{2}{11}\% < 20\%.$

94. Let the number be x.
Then,
54% of x – 26% of x = 22526

$\Rightarrow \dfrac{54}{100}x - \dfrac{26}{100}x = 22526 \Rightarrow \dfrac{28}{100}x = 22526$

$\Rightarrow x = \left(\dfrac{22526 \times 100}{28}\right) = 80450.$

∴ 66% of 80450 = $\left(\dfrac{66}{100} \times 80450\right) = 53097.$

95. Let the number be x.
Then,
38% of x – 24% of x = 135.10

$\Rightarrow \dfrac{38}{100}x - \dfrac{24}{100}x = 135.10 \Rightarrow \dfrac{14}{100}x = 135.10$

$\Rightarrow x = \left(\dfrac{135.10 \times 100}{14}\right) = 965.$

∴ 40% of 965 = $\left(\dfrac{40}{100} \times 965\right) = 386.$

96. Let the total number of students be x.

Then, $(100 - 76)\%$ of $x = 204$

$\Rightarrow$ 24% of $x = 204$

$\Rightarrow \dfrac{24}{100}x = 204 \Rightarrow x = \left(\dfrac{204 \times 100}{24}\right) = 850.$

97. Let the total number of examinees be x.
Then, $(100 - 65)\%$ of x

$= 420 \Rightarrow$ 35% of $x = 420 \Rightarrow \dfrac{35}{100}x$

$= 420 \Rightarrow x = \left(\dfrac{420 \times 100}{35}\right) = 1200.$

98. Let the total number of candidates be x.
Then, $(100 - 15)\%$ of $x = 340 \Rightarrow$ 85% of $x = 340$

$\Rightarrow \dfrac{85}{100}x = 340$

$\Rightarrow x = \left(\dfrac{340 \times 100}{85}\right) = 400.$

99. Let the maximum marks be x.
Then, 76% of $x + 480$
$= x \Rightarrow x - 76\%$ of $x = 480 \Rightarrow$ 24% of $x = 480$

$\Rightarrow \dfrac{24x}{100} = 480 \Rightarrow x = \left(\dfrac{480 \times 100}{24}\right) = 2000.$

∴ Marks scored by Rajan = 76% of 2000

$= \left(\dfrac{76}{100} \times 2000\right) = 1520.$

100. Let the capacity of the bucket be x litres.

Then, 80% of $x - 66\dfrac{2}{3}\%$ of $x = 2$

$\Rightarrow \left(80 - 66\dfrac{2}{3}\right)\%$ of $x = 2 \Rightarrow 13\dfrac{1}{3}\%$ of $x = 2$

$\Rightarrow \dfrac{40}{3} \times \dfrac{1}{100} \times x = 2 \Rightarrow x = \left(\dfrac{2 \times 100 \times 3}{40}\right) = 15.$

101. Let Vinay's salary be ₹ x. Then,
75% of 5% of $x = 1687.50$

$\Rightarrow \dfrac{75}{100} \times \dfrac{5}{100} \times x = 1687.50$

$\Rightarrow x = \left(\dfrac{1687.50 \times 100 \times 100}{75 \times 5}\right) = 45000.$

102. Let the first number be x and the second number be y.
Then,

$\dfrac{1}{4}$ of 60% of $x = \dfrac{2}{5}$ of 20% of y

$\Rightarrow \dfrac{1}{4} \times \dfrac{60}{100} \times x = \dfrac{2}{5} \times \dfrac{20}{100} \times y \Rightarrow \dfrac{3x}{20} = \dfrac{2y}{25}$

$\Rightarrow \dfrac{x}{y} = \dfrac{2}{25} \times \dfrac{20}{3} = \dfrac{8}{15}.$

103. Let the numbers be x and $(2490 - x)$. Then,
6.5% of x = 8.5% of $(2490 - x)$

$\Rightarrow \dfrac{65}{10} \times \dfrac{1}{100} \times x = \dfrac{85}{10} \times \dfrac{1}{100} \times (2490 - x)$

$\Rightarrow 13x = 17(2490 - x) \Rightarrow 30x = 2490 \times 17$

$\Rightarrow x = \left(\dfrac{2490 \times 17}{30}\right) = 1411.$

Hence, the numbers are 1411 and 1079.

104. Let the original number of students opting for IT courses be x.

Then, $(100 - 23)\%$ of $x = 1540$

$\Rightarrow 77\%$ of $x = 1540$

$\Rightarrow \dfrac{77}{100}x = 1540 \Rightarrow x = \left(\dfrac{1540 \times 100}{77}\right) = 2000.$

105. Let the monthly salary be ₹ x.

Then, $2\dfrac{2}{3}\%$ of $x = 72$

$\Rightarrow \dfrac{8}{3} \times \dfrac{1}{100} \times x = 72 \Rightarrow x = \left(\dfrac{72 \times 3 \times 100}{8}\right) = 2700.$

106. Let the original price be ₹ x and increased price be ₹ y.

Then, 110% of $x = y \Rightarrow x = \dfrac{100y}{110} = \dfrac{10}{11}y.$

(a) Original price = ₹ $\left(\dfrac{10}{11} \times 5.50\right) = ₹\ 5.$

(b) Original price = ₹ $\left(\dfrac{10}{11} \times 7.60\right) = ₹\left(\dfrac{76}{11}\right) = ₹\ 6.9090\ .....$

which is not possible.

(c) Original price = ₹ $\left(\dfrac{10}{11} \times 11\right) = ₹\ 10.$

(d) Original price = ₹ $\left(\dfrac{10}{11} \times 12.10\right) = ₹\ 11.$

107. Let the number be x.

Then, $\left(100 + 37\dfrac{1}{2}\right)\%$ of $x = 33$

$\Rightarrow 137\dfrac{1}{2}\%$ of $x = 33 \Rightarrow \dfrac{275}{2} \times \dfrac{1}{100} \times x = 33$

$\Rightarrow x = \left(\dfrac{33 \times 2 \times 100}{275}\right) = 24.$

108. Let the numbers be x and $x + 20$. Then,

$\dfrac{3}{4}x = 60\%$ of $(x + 20)$

$\Rightarrow \dfrac{3}{4}x = \dfrac{60}{100}(x + 20) \Rightarrow \dfrac{5}{4}x = x + 20$

$\Rightarrow \dfrac{x}{4} = 20 \Rightarrow x = 20 \times 4 = 80.$

$\therefore$ Required sum = $x + x + 20 = 2x + 20 = 2 \times 80 + 20$

$= 180.$

109. Let the number be x. Then, $x - 16\%$ of $x = 42$

$\Leftrightarrow x - \dfrac{16}{100}x = 42 \Leftrightarrow x - \dfrac{4}{25}x = 42$

$\Leftrightarrow \dfrac{21}{25}x = 42 \Leftrightarrow x = \left(\dfrac{42 \times 25}{21}\right) = 50.$

110. Clearly, the numbers which have 1 or 9 in the unit's digit, have squares that end in the digit 1. Such numbers from 1 to 70 are 1, 9, 11, 19, 21, 29, 31, 39, 41, 49, 51, 59, 61, 69.

Number of such numbers = 14.

$\therefore$ Required percentage = $\left(\dfrac{14}{70} \times 100\right)\% = 20\%.$

111. $\dfrac{4}{5} \times 70 = 56$ and $\dfrac{5}{7} \times 112 = 80.$

$\therefore$ Required percentage = $\left(\dfrac{80 - 56}{80} \times 100\right)\%$

$= \left(\dfrac{24}{80} \times 100\right)\% = 30\%.$

112. $y = 125 + 10\%$ of $125 = 125 + 12.50 = 137.50.$

$\therefore x = 137.50 - 10\%$ of $137.50 = 137.50 - 13.75 = 123.75.$

113. Let the number be x. Then,

75% of $x + 75 = x \Leftrightarrow x - \dfrac{75}{100}x = 75 \Leftrightarrow x - \dfrac{3}{4}x = 75$

$\Leftrightarrow \dfrac{x}{4} = 75 \Leftrightarrow x = 300.$

114. Let the number be x.

Then, $x - 125 = 37\dfrac{1}{2}\%$ of $x \Rightarrow x - 125 = \dfrac{75}{2} \times \dfrac{1}{100} \times x = \dfrac{3x}{8}$

$\Rightarrow x - \dfrac{3x}{8} = 125 \Rightarrow \dfrac{5x}{8} = 125$

$\Rightarrow x = \left(\dfrac{125 \times 8}{5}\right) = 200.$

$\therefore 25\%$ of $200 = \left(\dfrac{25}{100} \times 200\right) = 50.$

115. Let the number be 100 and required multiplier be y.

Then, $100y = 129.7$ or $y = \dfrac{129.7}{100} = 1.297.$

116. Let the numbers be x and y. Then,

$x + y = \dfrac{28}{25}x \Leftrightarrow y = \dfrac{28}{25}x - x$

$\Leftrightarrow y = \dfrac{3}{25}x \Leftrightarrow \dfrac{y}{x} = \left(\dfrac{3}{25} \times 100\right)\% = 12\%.$

117. Let the number be x.

Then, $x - 25\%$ of $x = 225 \Rightarrow x - \dfrac{25}{100}x = 225 \Rightarrow \dfrac{75x}{100} = 225$

$\Rightarrow x = \left(\dfrac{225 \times 100}{75}\right) = 300.$

Required increase = $(390 - 300) = 90.$

$\therefore$ Increase % = $\left(\dfrac{90}{300} \times 100\right)\% = 30\%.$

118. Let the numbers be x and y.

Then, $y - 25\%$ of $x =$

$\dfrac{5}{6}y \Leftrightarrow y - \dfrac{5}{6}y = \dfrac{25}{100}x \Leftrightarrow \dfrac{y}{6} = \dfrac{x}{4} \Leftrightarrow \dfrac{x}{y} = \dfrac{4}{6} = \dfrac{2}{3}.$

119. Let the larger number be x.

Then, $x - 20 = \dfrac{20}{100}x \Leftrightarrow x - \dfrac{1}{5}x = 20$

$\Leftrightarrow \dfrac{4}{5}x = 20 \Leftrightarrow x = \left(20 \times \dfrac{5}{4}\right) = 25.$

120. Let the numbers be x and y. Then, $\dfrac{x}{12} = \dfrac{y}{4} \Leftrightarrow x = 3y.$

$\therefore$ Required percentage = $\left(\dfrac{x - y}{y} \times 100\right)\%$

$= \left(\dfrac{2y}{y} \times 100\right)\% = 200\%.$

121. Let one number = x. Then, other number = 80% of $x = \dfrac{4x}{5}$.

$\therefore 4\left[x^2 + \left(\dfrac{4}{5}x\right)^2\right] = 656 \Leftrightarrow x^2 + \dfrac{16}{25}x^2 = 164 \Leftrightarrow \dfrac{41}{25}x^2 = 164$

$\Leftrightarrow x^2 = \left(\dfrac{164 \times 25}{41}\right) = 100 \Leftrightarrow x = 10.$

So, the numbers are 10 and 8.

122. 5% of A + 4% of B = $\dfrac{2}{3}$ (6% of A + 8% of B)

$\Leftrightarrow \dfrac{5}{100}A + \dfrac{4}{100}B = \dfrac{2}{3}\left(\dfrac{6}{100}A + \dfrac{8}{100}B\right)$

$\Leftrightarrow \dfrac{1}{20}A + \dfrac{1}{25}B = \dfrac{1}{25}A + \dfrac{4}{75}B$

$\Leftrightarrow \left(\dfrac{1}{20} - \dfrac{1}{25}\right)A = \left(\dfrac{4}{75} - \dfrac{1}{25}\right)B$

$\Leftrightarrow \dfrac{1}{100}A = \dfrac{1}{75}B \Leftrightarrow \dfrac{A}{B} = \dfrac{100}{75} = \dfrac{4}{3}.$

123. Total number of votes polled = (1136 + 7636 + 11628)

= 20400.

$\therefore$ Required percentage = $\left(\dfrac{11628}{20400} \times 100\right)\% = 57\%.$

124. Increase in 10 years = (262500 − 175000) = 87500.

Increase% = $\left(\dfrac{87500}{175000} \times 100\right)\% = 50\%.$

$\therefore$ Required average = $\left(\dfrac{50}{10}\right)\% = 5\%.$

125. Let the number be x. Then, error = $\dfrac{5}{3}x - \dfrac{3}{5}x = \dfrac{16}{15}x.$

Error % = $\left(\dfrac{16x}{15} \times \dfrac{3}{5x} \times 100\right)\% = 64\%.$

126. Let the original value of the tempo be ₹ x. Then,

1.3% of $\dfrac{4}{5}$ of $x = 910 \Leftrightarrow \dfrac{13}{10} \times \dfrac{1}{100} \times \dfrac{4}{5} \times x = 910$

$\Leftrightarrow x = \left(\dfrac{910 \times 10 \times 100 \times 5}{13 \times 4}\right) = 87500.$

127. Let the total production be x lakh tons. Then, 15% of x − 10% of x = (40 − 30) lakh tons

$\Leftrightarrow$ 5% of x = 10 lakh tons

$\Leftrightarrow x = \left(\dfrac{10 \times 100}{5}\right) = 200$ lakh tons.

128. Let the number of candidates appeared from each state be x.

Then, 7% of x − 6% of x = 80

$\Leftrightarrow$ 1% of x = 80

$\Leftrightarrow x = 80 \times 100 = 8000.$

129. Amount paid to car owner = 90% of 85% of ₹ 3,25,000

= ₹ $\left(\dfrac{90}{100} \times \dfrac{85}{100} \times 325000\right) = ₹ 2,48,625.$

$\therefore$ Required difference = ₹ (325000 − 248625) = ₹ 76,375.

130. Let the amount of taxable purchases be ₹ x.

Then, 6% of $x = \dfrac{30}{100} \Leftrightarrow x = \left(\dfrac{30}{100} \times \dfrac{100}{6}\right) = 5.$

$\therefore$ Cost of tax free items = ₹ [25 − (5 + 0.30)] = ₹ 19.70.

131. Number of runs made by running

= 110 − (3 × 4 + 8 × 6) = 50.

$\therefore$ Required percentage = $\left(\dfrac{50}{110} \times 100\right)\% = 45\dfrac{5}{11}\%.$

132. Let the marked price be ₹ x.

Then, x − 5% of x = 9595 $\Leftrightarrow$ 95% of x = 9595

$\Leftrightarrow x = \left(\dfrac{9595 \times 100}{95}\right) = 10100.$

133. Let the monthly income be ₹ x. Then,

$\left(100 - 66\dfrac{2}{3}\right)\%$ of x = 1200

$\Leftrightarrow 33\dfrac{1}{3}\%$ of x = 1200

$\Leftrightarrow \dfrac{100}{3} \times \dfrac{1}{100} \times x = 1200$

$\Leftrightarrow x = 1200 \times 3 = 3600.$

$\therefore$ Monthly expenses = ₹ (3600 − 1200) = ₹ 2400.

134. Let Reena's yearly income be ₹ x.

Anubhav's monthly income = ₹ $\left(\dfrac{240000}{12}\right) = ₹ 20000.$

Then, 25% of x = 75% of 20000

$\Rightarrow \dfrac{25}{100}x = \dfrac{75}{100} \times 20000$

$\Rightarrow \dfrac{x}{4} = 15000 \Rightarrow x = 60000.$

$\therefore$ Reena's monthly income = ₹ $\left(\dfrac{60000}{12}\right) = ₹ 5000.$

135. Sonal's annual salary = ₹ 108000. Sonal's monthly salary

= ₹ $\left(\dfrac{108000}{12}\right) = ₹ 9000.$

Nandini's monthly salary = ₹ (9000 × 2) = ₹ 18000.

Let Kaushal's monthly salary be ₹ x. Then,

12% of x = 16% of 18000

$\Rightarrow \dfrac{12}{100}x = \left(\dfrac{16}{100} \times 18000\right) = 2880$

$\Rightarrow x = \left(\dfrac{2880 \times 100}{12}\right) = 24000.$

136. Let Raman's expense be ₹ x. Then, Vimal's expense = 90%

of ₹ x = ₹ $\left(\dfrac{90}{100} \times x\right) = ₹ \dfrac{9}{10}x.$

Aman's expense = 130% of ₹ $\left(\dfrac{9x}{10}\right) = ₹ \left(\dfrac{130}{100} \times \dfrac{9x}{10}\right) = ₹ \dfrac{117x}{100}.$

$\therefore \dfrac{117x}{100} + \dfrac{9x}{10} + x = 6447 \Rightarrow \dfrac{117x + 90x + 100x}{100} = 6447$

$\Rightarrow 307x = 644700$

$\Rightarrow x = \dfrac{644700}{307} = 2100.$

Hence, Aman's expense = ₹ $\left(\dfrac{117 \times 2100}{100}\right) = ₹ 2457.$

137. Let the sum paid to Y per week be ₹ x.

Then, sum paid to X per week

= 120% of ₹ x = ₹ $\left(\dfrac{120}{100} \times x\right)$ = ₹ $\dfrac{6}{5}x$.

∴ $x + \dfrac{6x}{5}$ = 550 ⇒ $\dfrac{11x}{5}$ = 550 ⇒ $x = \dfrac{550 \times 5}{11}$ = 250.

138. Let the total amount be ₹ x. Then, $(100 - 27)$% of x = 89745 + 51291

⇒ 73% of x = 141036

⇒ $\dfrac{73}{100}x$ = 141036

⇒ $x = \left(\dfrac{141036 \times 100}{73}\right)$ = 193200.

139. Let the numbers be x and y respectively.

Then, 60% of $x = \dfrac{2}{3}y$ ⇒ $\dfrac{60}{100}x = \dfrac{2}{3}y$ ⇒ $\dfrac{3}{5}x = \dfrac{2}{3}y$

⇒ $\dfrac{x}{y} = \dfrac{2}{3} \times \dfrac{5}{3} = \dfrac{10}{9}$.

140. Number of cases required to be tested
= 5% of 120 + 10% of 80

= $\left(\dfrac{5}{100} \times 120\right) + \left(\dfrac{10}{100} \times 80\right)$ = 6 + 8 = 14.

∴ Required percentage

= $\left(\dfrac{14}{120 + 80} \times 100\right)$% = $\left(\dfrac{14}{200} \times 100\right)$% = 7%.

141. Let the person's gross income be ₹ x. Then, $(100 - 3)$% of x = 237650 ⇒ 97% of x = 237650

⇒ $\dfrac{97}{100}x$ = 237650

⇒ $x = \left(\dfrac{237650 \times 100}{97}\right)$ = 245000.

∴ When income tax is raised to 7%, we have:
Net income
= $(100 - 7)$% of ₹ 245000 = 93% of ₹ 245000

= ₹ $\left(\dfrac{93}{100} \times 245000\right)$ = ₹ 227850.

142. Let the cost of a single ticket be ₹ x.
Then, cost of monthly return ticket

= 125% of ₹ x = ₹ $\left(\dfrac{125}{100}x\right)$ = ₹ $\dfrac{5x}{4}$.

Cost of monthly return ticket with extension

= 105% of ₹ $\dfrac{5x}{4}$ = ₹ $\left(\dfrac{105}{100} \times \dfrac{5x}{4}\right)$ = ₹ $\dfrac{21x}{16}$.

∴ $\dfrac{21x}{16}$ = 84 ⇒ $x = \left(\dfrac{84 \times 16}{21}\right)$ = 64.

143. Percentage of oxygen = $\left(\dfrac{9.4}{20} \times 100\right)$% = 47%.

∴ Percentage of carbon = $[100 - (40 + 47)]$% = 13%.

144. Let the number of children in each column be x.

Then, number of children in each row = $112\dfrac{1}{2}$% of x

= $\dfrac{225}{2} \times \dfrac{1}{100} \times x = \dfrac{9x}{8}$.

∴ $x \times \dfrac{9x}{8}$ = 72 ⇒ $x^2 = \dfrac{72 \times 8}{9}$ = 64 ⇒ x = 8.

So, number of children in each row = $\dfrac{9x}{8}$ = 9.

145. Let the total number of customers be x.
Then, number of customers who purchase hats = 15% of

40% of x = $\left(\dfrac{15}{100} \times \dfrac{40}{100} \times x\right) = \dfrac{6x}{100}$

= 6% of x.

∴   Required percentage = 6%.

146. Let the total number of respondents be x.
Percentage of uncertain individuals
= $[100 - (20 + 60)]$% = 20%.

∴   60% of x − 20% of x = 720 ⇒ 40% of x = 720

⇒ $\dfrac{40}{100}x = 720 ⇔ x = \left(\dfrac{720 \times 100}{40}\right)$ = 1800.

147. Let the maximum marks be x.

Then, 36% of $x = 198 + 36 ⇒ \dfrac{36x}{100} = 234$ ⇒ $x = \left(\dfrac{234 \times 100}{36}\right)$

= 650.

148. Let the maximum marks be x.
Then, 40% of x = 483 + 117

⇒ $\dfrac{40x}{100} = 600$ ⇒ $x = \left(\dfrac{600 \times 100}{40}\right)$ = 1500.

∴ Minimum passing marks for girls = 35% of 1500

= $\left(\dfrac{35}{100} \times 1500\right)$ = 525.

149. Let the maximum marks be x.
Then, $(40 - 4)$% of x = 261 ⇒ 36% of x = 261

⇒ $\dfrac{36}{100}x = 261$ ⇒ $x = \left(\dfrac{261 \times 100}{36}\right)$ = 725.

150. Let the maximum marks be x.
Then, 33% of x − 25% of x = 40

⇒   8% of x = 40 ⇒ $\dfrac{8x}{100} = 40$

⇒ $x = \left(\dfrac{40 \times 100}{8}\right)$ = 500.

151. Let the maximum marks be x.

Then, 5% of x = 296 − 259 ⇒ $\dfrac{5x}{100} = 37$

⇒ $x = \left(\dfrac{37 \times 100}{5}\right)$ = 740.

152. Let the total number of votes polled be x.
Then, votes polled by other candidate = $(100 - 62)$% of x
= 38% of x.

∴   62% of x − 38% of x = 432

⇒ $\dfrac{24x}{100} = 432$ ⇒ $x = \left(\dfrac{432 \times 100}{24}\right)$ = 1800.

153. Number of valid votes
= $(100 - 15)$% of 15200 = 85% of 15200

= $\left(\dfrac{85}{100} \times 15200\right)$ = 12920.

Valid votes polled by other candidate

$= (100 - 55)\%$ of $12920 = \left(\dfrac{45}{100} \times 12920\right) = 5814.$

154. Let the number of valid votes be x. Then, 52% of x − 48% of x = 98

$\Leftrightarrow 4\%$ of $x = 98 \Leftrightarrow \dfrac{4}{100} x = 98$

$\Leftrightarrow x = 98 \times 25 = 2450.$

$\therefore$ Total number of votes polled $= (2450 + 68) = 2518.$

155. Let the total number of votes be x.

Then, number of votes polled by wining candidate

$= 65\%$ of 80% of x

$= \left(\dfrac{65}{100} \times \dfrac{80}{100} \times x\right) = \dfrac{52x}{100} = 52\%$ of x.

$\therefore$ Required percentage = 52%.

156. Let the number of valid votes be x.

Then, 60% of $x = 255000 \Rightarrow x = \left(\dfrac{255000 \times 100}{60}\right) = 425000.$

Number of invalid votes $= (500000 - 425000) = 75000.$

$\therefore$ Required percentage $= \left(\dfrac{75000}{500000} \times 100\right)\% = 15\%.$

157. Let the total number of voters be x. Then, votes polled = 90% of x.

Valid votes = 90% of (90% of x).

$\therefore$ 54% of [90% of (90% of x)] − 46% of [90% of (90% of x)] = 1620

$\Leftrightarrow$ 8% of [90% of (90% of x)] = 1620

$\Leftrightarrow \dfrac{8}{100} \times \dfrac{90}{100} \times \dfrac{90}{100} \times x = 1620$

$\Leftrightarrow x = \left(\dfrac{1620 \times 100 \times 100 \times 100}{8 \times 90 \times 90}\right) = 25000.$

158. Let the number of persons eligible to vote be x. Then,

Number of eligible persons between 18 and 21 = 8% of x.

Number of persons between 18 and 21, who voted = 85% of (8% of x) $= \left(\dfrac{85}{100} \times \dfrac{8}{100} \times x\right) = \dfrac{68}{1000} x.$

$\therefore$ Required percentage $= \left(\dfrac{68x}{1000} \times \dfrac{1}{x} \times 100\right)\% = 6.8\%.$

159. Let the number of persons eligible to vote be x.

Then, voters who voted for A = 30% of x.

Voters who voted for B = 60% of (70% of x)

$= \left(\dfrac{60}{100} \times \dfrac{70}{100} \times 100\right)\%$ of $x = 42\%$ of x.

Voters who did not vote = [100 − (30 + 42)]% of x = 28% of x.

$\therefore$ 30% of x − 28% of x = 1200

$\Leftrightarrow 2\%$ of $x = 1200 \Leftrightarrow x = \left(\dfrac{1200 \times 100}{2}\right) = 60000.$

160. Total sales tax paid = 7% of ₹ 400 + 9% of ₹ 6400

$= ₹ \left(\dfrac{7}{100} \times 400 + \dfrac{9}{100} \times 6400\right) = ₹ (28 + 576) = ₹ 604.$

Total cost of the items = ₹ (400 + 6400) = ₹ 6800.

$\therefore$ Required percentage $= \left(\dfrac{604}{6800} \times 100\right)\% = 8\dfrac{15}{17}\%.$

161. Total marks secured = (90% of 100 + 60% of 150 + 54% of 200)

$= \left(\dfrac{90}{100} \times 100 + \dfrac{60}{100} \times 150 + \dfrac{54}{100} \times 200\right)$

$= (90 + 90 + 108) = 288.$

Total maximum marks = (100 + 150 + 200) = 450.

$\therefore$ Aggregate percentage $= \left(\dfrac{288}{450} \times 100\right)\% = 64\%.$

162. Total number of students = 1100 + 700 = 1800.

Number of students passed = (42% of 1100 + 30% of 700)

$= (462 + 210) = 672.$

Number of failures = 1800 − 672 = 1128.

$\therefore$ Percentage failure $= \left(\dfrac{1128}{1800} \times 100\right)\% = 62\dfrac{2}{3}\%.$

163. Let the number of students be x. Then,

Number of students of or above 8 years = (100 − 20)% of x = 80% of x.

$\therefore$ 80% of $x = 48 + \dfrac{2}{3}$ of $48 \Leftrightarrow \dfrac{80}{100} x = 80 \Leftrightarrow x = 100.$

164. Let the total number of applicants be x. Number of eligible candidates = 95% of x.

Eligible candidates of other categories = 15% of (95% of x)

$= \left(\dfrac{15}{100} \times \dfrac{95}{100} \times x\right) = \dfrac{57}{400} x.$

$\therefore \dfrac{57}{400} x = 4275 \Leftrightarrow x = \left(\dfrac{4275 \times 400}{57}\right) = 30000.$

165. Let their marks be $(x + 9)$ and x.

Then, $x + 9 = \dfrac{56}{100}(x + 9 + x)$

$\Leftrightarrow 25(x + 9) = 14(2x + 9) \Leftrightarrow 3x = 99 \Leftrightarrow x = 33.$

So, their marks are 42 and 33.

166. Let the original price of each ticket be ₹ 100.

Then, original price of 5 tickets = ₹ 500.

Sale price of 5 tickets = ₹ 300.

Amount saved = ₹ (500 − 300) = ₹ 200.

$\therefore$ Required percentage $= \left(\dfrac{200}{500} \times 100\right)\% = 40\%.$

167. Let the total sales in July 2009 be ₹ x. Then, sales in September 2009 = ₹ $\dfrac{2x}{3}$.

Sales in November 2009 = 105% of ₹ $\dfrac{2x}{3}$

$= ₹ \left(\dfrac{105}{100} \times \dfrac{2x}{3}\right) = ₹ \dfrac{7x}{10}.$

Decrease in sales $= ₹ \left(x - \dfrac{7x}{10}\right) = ₹ \dfrac{3x}{10}$

$\therefore$ Decrease % $= \left(\dfrac{3x}{10} \times \dfrac{1}{x} \times 100\right)\% = 30\%.$

168. Earth takes 1 day or 24 hours to complete one rotation. Let the time taken to complete one rotation with increased speed be x hours.

Since time taken is inversely proportional to speed, we have:

100: 112:: x: 24 or $112x = 2400$ or $x = \dfrac{2400}{112} = \dfrac{150}{7} = 21\dfrac{3}{7}$.

$\therefore$ 1 day = $21\dfrac{3}{7}$ hours.

169.

A   3 cm   C   2 cm   B

Original length of AB = 5 cm.

Original length of AC = 3 cm.

Original length of CB = (5 − 3) cm = 2 cm.

New length of AC = 106% of 3 cm = $\left(\dfrac{106}{100} \times 3\right)$ cm = 3.18 cm.

New length of CB = (5 − 3.18) cm = 1.82 cm.

Decrease in length of CB = (2 − 1.82) cm = 0.18 cm.

$\therefore$ Decrease % = $\left(\dfrac{0.18}{2} \times 100\right)\% = 9\%$.

170. Percentage of delayed flights = (43 + 17 + 12 + 3)% = 75%.

Percentage of on-time flights = (100 − 75)% = 25%.

Let the total number of flights be x.

Then, 75% of x = 1200 $\Rightarrow x = \left(\dfrac{1200 \times 100}{75}\right) = 1600$.

$\therefore$ Number of on-time flights = 25% of 1600 = 400.

171. Let the total number of eggs originally be x.

Then, number of eggs which are intact = (100 − 5)% of x

$= \dfrac{95x}{100} = \dfrac{19x}{20}$.

Number of eggs left unsold = (100 − 93)% of $\dfrac{19x}{20}$

$= \left(\dfrac{7}{100} \times \dfrac{19x}{20}\right)$.

$\therefore \dfrac{7}{100} \times \dfrac{19x}{20} = 266 \Rightarrow x = \left(\dfrac{266 \times 100 \times 20}{7 \times 19}\right) = 4000$.

172. Suppose Ganpat has ₹ x.

Then, cost of 1 orange = ₹ $\left(\dfrac{x}{50}\right)$; cost of 1 mango

$= ₹ \left(\dfrac{x}{40}\right)$.

Money left after paying taxi fare = 90% of ₹ x = ₹ $\dfrac{9x}{10}$.

Money spent in buying 20 mangoes = ₹ $\left(\dfrac{x}{40} \times 20\right) = ₹ \dfrac{x}{2}$.

Money left = ₹ $\left(\dfrac{9x}{10} - \dfrac{x}{2}\right) = ₹ \dfrac{4x}{10} = ₹ \dfrac{2x}{5}$.

$\therefore$ Number of oranges that can be bought

$= \left(\dfrac{2x}{5} \times \dfrac{50}{x}\right) = 20$.

173. Consumption of gas in the smaller burner in 1 hour

$= \left(\dfrac{14.4}{104}\right) \text{kg} = \dfrac{9}{65} \text{kg}$.

Consumption of gas in the larger burner in 1 hour

$= \left(\dfrac{14.4}{80}\right) \text{kg} = \dfrac{9}{50} \text{kg}$.

Difference in consumption = $\left(\dfrac{9}{50} - \dfrac{9}{65}\right) \text{kg} = \dfrac{27}{650} \text{kg}$.

Required percentage difference

$= \left(\dfrac{27}{650} \times \dfrac{50}{9} \times 100\right)\% = \left(\dfrac{300}{13}\right)\% = 23.07\%$.

Questions 174 to 178

Let the number of magazine-readers in city P be x.

Then, (100 − 75)% of x = 6000

$\Leftrightarrow \dfrac{25}{100}x = 6000 \Leftrightarrow x = \left(\dfrac{6000 \times 100}{25}\right) = 24000$.

Number of readers in P, reading only one magazine a week = (24000 − 6000) = 18000.

Similarly, we can find these values in other cases. Thus, we have the following table:

City	No. of magazine-readers	No. of readers reading only one magazine a week
P	24000	18000
Q	17500	14000
R	7500	4500
S	6000	3300
T	5600	1400

174. The lowest number of magazine-readers is 5600 and this is in the case of city T.

175. The highest number of magazine-readers who read only one magazine a week is 18000 and this is in the case of city P.

176. The highest number of magazine-readers is 24000.

177. Number of magazine-readers in city Q reading only one magazine a week = 14000.

178. Total number of magazine-readers reading only one magazine a week

= (18000 + 14000 + 4500 + 3300 + 1400) = 41200.

179. X = $\dfrac{90}{100}$Y $\Rightarrow$ X = $\dfrac{9}{10}$Y $\Rightarrow$ Y = $\dfrac{10}{9}$X $\Rightarrow \dfrac{Y}{X} = \dfrac{10}{9}$.

$\therefore$ Required percentage

$= \left(\dfrac{Y}{X} \times 100\right)\% = \left(\dfrac{10}{9} \times 100\right)\% = 111\dfrac{1}{9}\%$.

180. $x\%$ of $y = \left(\dfrac{x}{100} \times y\right) = \left(\dfrac{y}{100} \times x\right) = y\%$ of x.

181. 20% of $a = b \Rightarrow \dfrac{20}{100}a = b$.

$\therefore b\%$ of 20 $= \left(\dfrac{b}{100} \times 20\right) = \left(\dfrac{20}{100}a \times \dfrac{1}{100} \times 20\right)$

$= \dfrac{4}{100}a = 4\%$ of a.

182. $\dfrac{x}{100} \times y = \dfrac{4}{5} \times 80 \Rightarrow xy = 64 \times 100 = 6400$.

183. Clearly, $y\%$ of $z = 2$ ($x\%$ of y) $\Rightarrow \dfrac{yz}{100} = \dfrac{2xy}{100} \Rightarrow z = 2x$.

184. $x\%$ of $500 = y\%$ of 300

$\Rightarrow \dfrac{x}{100} \times 500 = \dfrac{y}{100} \times 300 \Rightarrow 5x = 3y \Rightarrow y = \dfrac{5}{3}x.$

$x\%$ of $y\%$ of $200 = 60 \Rightarrow \dfrac{x}{100} \times \dfrac{y}{100} \times 200 = 60$

$\Rightarrow xy = 3000 \Rightarrow x \times \dfrac{5}{3}x = 3000$

$\Rightarrow x^2 = 3000 \times \dfrac{3}{5} = 1800 \Rightarrow x = 30\sqrt{2}.$

185. (*a*) $x\%$ of $y = \dfrac{xy}{100}$ and $y\%$ of $z = \dfrac{yz}{100}.$

$x > y, y > z \Rightarrow xy > yz \Rightarrow \dfrac{xy}{100} > \dfrac{yz}{100} \Rightarrow x\%$ of $y > y\%$ of $z.$

(*b*) $y\%$ of $x = \dfrac{xy}{100}$ and $z\%$ of $y = \dfrac{yz}{100}.$

As proved above, $y\%$ of $x > z\%$ of $y.$

(*c*) $z\%$ of $x = \dfrac{xz}{100}$ and $y\%$ of $z = \dfrac{yz}{100}.$

$x > y \Rightarrow xz > yz \Rightarrow \dfrac{xz}{100} > \dfrac{yz}{100} \Rightarrow z\%$ of $x > y\%$ of $z.$

186. 20% of $A = 50\%$ of $B \Rightarrow \dfrac{20}{100} \times A = \dfrac{50}{100} \times B$

$\Rightarrow \dfrac{A}{5} = \dfrac{B}{2} \Rightarrow B = \dfrac{2A}{5}.$

Required percentage $= \left(\dfrac{B}{A} \times 100\right)\%$

$= \left(\dfrac{2A}{5} \times \dfrac{1}{A} \times 100\right)\% = 40\%.$

187. $p\%$ of $p = 36 \Leftrightarrow \left(\dfrac{p}{100} \times p\right) = 36 \Leftrightarrow p^2 = 3600 \Leftrightarrow p = 60.$

188. $x\%$ of $y = z \Rightarrow \dfrac{x}{100}y = z \Rightarrow \dfrac{x}{z} = \dfrac{100}{y}.$

$\therefore$ Required percentage $= \left(\dfrac{x}{z} \times 100\right)\%$

$= \left(\dfrac{100}{y} \times 100\right)\% = \left(\dfrac{100^2}{y}\right)\%.$

189. $x = 80\%$ of $y \Rightarrow x = \dfrac{80}{100}y \Leftrightarrow \dfrac{y}{x} = \dfrac{5}{4} \Leftrightarrow \dfrac{y}{2x} = \dfrac{5}{8}.$

$\therefore$ Required percentage $= \left(\dfrac{y}{2x} \times 100\right)\%$

$= \left(\dfrac{5}{8} \times 100\right)\% = 62\dfrac{1}{2}\%.$

190. Let $x - 6\%$ of $x = xz.$

Then, 94% of $x = xz \Leftrightarrow \dfrac{94}{100}x \times \dfrac{1}{x} = z \Leftrightarrow z = 0.94.$

191. $x\%$ of $y + y\%$ of $x = \dfrac{x}{100}y + \dfrac{y}{100}x = \dfrac{2xy}{100} = 2\%$ of $xy.$

192. Let $x\%$ of $x = 10\%$ of $y.$

Then, $\dfrac{x}{100} \times x = \dfrac{10}{100} \times y \Rightarrow y = \dfrac{x^2}{100} \times 10 = \dfrac{x^2}{10}.$

193. A exceeds b by $x\% \Rightarrow a = b + x\%$ of $b \Rightarrow a = b + \dfrac{bx}{100}.$

194. $A = 150\%$ of $B \Rightarrow A = \dfrac{150}{100}B \Rightarrow \dfrac{A}{B} = \dfrac{3}{2} \Rightarrow \dfrac{A}{B} + 1 = \dfrac{3}{2} + 1$

$\Rightarrow \dfrac{A+B}{B} = \dfrac{5}{2} \Rightarrow \dfrac{B}{A+B} = \dfrac{2}{5}.$

$\therefore$ Required percentage $= \left(\dfrac{B}{A+B} \times 100\right)\%$

$= \left(\dfrac{2}{5} \times 100\right)\% = 40\%.$

195. 8% of $x = 4\%$ of $y \Rightarrow \dfrac{8}{100}x = \dfrac{4}{100}y \Rightarrow x = \dfrac{1}{2}y.$

$\therefore$ 20% of $x = 20\%$ of $\dfrac{1}{2}y = 10\%$ of $y.$

196. $\dfrac{20}{100}A = B$ and $\dfrac{40}{100}B = C \Rightarrow \dfrac{1}{5}A = B$ and $\dfrac{2}{5}B = C$

$\Rightarrow A = 5B$ and $B = \dfrac{5}{2}C \Rightarrow A = \dfrac{25}{2}C$ and $B = \dfrac{5}{2}C.$

$\therefore$ 60% of $(A + B) = \dfrac{60}{100}\left(\dfrac{25}{2}C + \dfrac{5}{2}C\right)$

$= \dfrac{60 \times 15}{100}C = \dfrac{900}{100}C = 900\%$ of $C.$

197. $x\%$ of $a = y\%$ of $b \Rightarrow \dfrac{x}{100}a = \dfrac{y}{100}b \Rightarrow b = \left(\dfrac{x}{y}\right)a.$

$\therefore$ $z\%$ of $b = \left(z\%$ of $\dfrac{x}{y}\right)a = \left(\dfrac{xz}{y \times 100}\right)a = \left(\dfrac{xz}{y}\right)\%$ of $a.$

198. $x\%$ of $y = \left(\dfrac{x}{100} \times y\right) = \left(\dfrac{y}{100} \times x\right) = y\%$ of $x \Rightarrow A = B.$

199. 50% of $(x - y) = 30\%$ of $(x + y)$

$\Rightarrow 5(x - y) = 3(x + y)$

$\Rightarrow 5x - 5y = 3x + 3y \Rightarrow 2x = 8y \Rightarrow y = \dfrac{x}{4}.$

$\therefore$ Required percentage $= \left(\dfrac{y}{x} \times 100\right)\%$

$= \left(\dfrac{x}{4} \times \dfrac{1}{x} \times 100\right)\% = 25\%.$

200. $a = 60\%$ of $b \Rightarrow a = \dfrac{60}{100}b \Rightarrow b = \dfrac{5}{3}a.$

$\therefore$ Required percentage $= \left(\dfrac{5b}{4a} \times 100\right)\%$

$= \left(5 \times \dfrac{5}{3}a \times \dfrac{1}{4a} \times 100\right)\%$

$= \left(\dfrac{625}{3}\right)\%.$

201. $x = 63\%$ of $y \Rightarrow x = \dfrac{63}{100}y \Rightarrow y = \dfrac{100x}{63}.$

$\therefore$ Required percentage $= \left(\dfrac{y^2}{x^2} \times 100\right)\%$

$$= \left[\left(\frac{100x}{63}\right)^2 \times \frac{1}{x^2} \times 100\right]\%$$

$$= \left(\frac{10000}{3969} \times 100\right)\% = 251.96\% \approx 250\%.$$

202. Let B = 110% of b = $\frac{11b}{10}$; C = 110% of c = $\frac{11c}{10}$;

D = 110% of d = $\frac{11d}{10}$.

Then, $A = B \times \frac{D}{C} = \frac{11b}{10} \times \frac{11d}{10} \times \frac{10}{11c} = \frac{11bd}{10c}$

$= \frac{11}{10}a = \frac{110}{100}a = 110\%$ of a.

∴ Increase % = 10%.

203. $a\%$ of $x = b\%$ of $y \Rightarrow \frac{ax}{100} = \frac{by}{100} \Rightarrow y = \frac{ax}{100} \times \frac{100}{b} = \frac{ax}{b}$.

∴   Required percentage = $\left[\frac{c\% \text{ of } y}{x} \times 100\right]\%$

$= \left(\frac{c}{100} \times \frac{ax}{b} \times \frac{1}{x} \times 100\right)\% = \frac{ac}{b}\%$.

204. $PO_{initial}$ = 5.3 C^2 L^{15}

PO_{new} = 5.3 $(1.2C)^2$ L^{15} = 1.44 (5.3 C^2 L^{15}) = 1.44 $PO_{initial}$

Increase in PO = 0.44 $PO_{initial}$

∴   Increase% = (0.44 × 100)% = 44%.

205. Let the total number of ball bearings in the first shipment be x.

Then, total number of ball bearings in the second shipment = $2x$.

∴   1% of x + 4.5% of $2x$ = 100 $\Rightarrow \frac{x}{100} + \frac{9x}{100}$ = 100

$\Rightarrow 10x = 10000$

$\Rightarrow x = 1000$.

206. Number of women = 40% of 200 = 80.

Number of men = 200 − 80 = 120.

Number of women lecturers = $\frac{1}{5}$ of 80 = 16.

Number of men lecturers = 16 × 2 = 32.

∴   Required percentage = $\left(\frac{32}{120} \times 100\right)\% = \frac{80}{3}\%$

$= 26\frac{2}{3}\% \approx 27\%$.

207. Total number of fruits = (14 + 23) = 37.

Let x oranges be removed.

Then, 70% of (37 − x) = 14

$\Rightarrow$ 7(37 − x) = 140

$\Rightarrow$ 37 − x = 20 $\Rightarrow x = 17$.

208. Let the weight of the bucket when it is full, be 1 kg.

Then, weight of empty bucket = 25% of 1 kg = $\frac{1}{4}$kg.

Weight of liquid in the bucket = $\left(1 - \frac{1}{4}\right)$kg = $\frac{3}{4}$kg.

On removing the liquid,

Weight of (bucket + liquid) = $\frac{3}{5}$kg.

Weight of liquid in the bucket = $\left(\frac{3}{5} - \frac{1}{4}\right)$kg = $\frac{7}{20}$kg.

Weigh of liquid removed = $\left(\frac{3}{4} - \frac{7}{20}\right)$kg = $\frac{8}{20}$kg = $\frac{2}{5}$kg.

Hence, required percentage = $\left(\frac{2}{5} \times \frac{4}{3} \times 100\right)\%$

$= \frac{160}{3}\% = 53\frac{1}{3}\%$.

209. Let the sum invested at 5% be ₹ x and that invested at 3% be ₹ (9600 − x).

Then, 5% of x = 3% of (9600 − x)

$\Rightarrow$ $5x$ = 3(9600 − x)

$\Rightarrow$ $8x$ = 28800 $\Rightarrow x$ = 3600.

Hence, total income = 5% of x + 3% of (9600 − x)

$= ₹$ (5% of 3600 + 3% of 6000)

$= ₹$ (180 + 180) = ₹ 360.

210. Let his total sales be ₹ x. Now, Total sales − Commission = ₹ 31100.

∴ x − [5% of 10000 + 4% of (x − 10000)] = 31100

$\Leftrightarrow x - \left[\frac{5}{100} \times 10000 + \frac{4}{100}(x - 10000)\right] = 31100$

$\Leftrightarrow x - 500 - \left(\frac{x - 10000}{25}\right) = 31100$

$\Leftrightarrow x - \frac{x}{25} = 31200 \Leftrightarrow \frac{24x}{25} = 31200$

$\Leftrightarrow x = \left(\frac{31200 \times 25}{24}\right) = 32500$.

211. Let the number of boys be x. Then, number of girls = x + 15.

∴ 110% of (x + 15) − 116% of x = 9

$\Rightarrow \frac{110}{100}(x + 15) - \frac{116}{100}x = 9 \Rightarrow 110x + 1650 - 116x = 900$

$\Rightarrow$ $6x$ = 750 $\Rightarrow x$ = 125.

Hence, number of students in the school

$= x + (x + 15) = (2x + 15) = 2 \times 125 + 15 = 265$.

212. Let the original price of tea be ₹ x per kg and that of sugar be ₹ y per kg.

Then, $5x + 8y = 172 \Rightarrow 15x + 24y = 516$ ...(i)

And, 120% of $5x$ + 110% of $8y$ = 199.20

$\Rightarrow 600x + 880y = 19920 \Rightarrow 15x + 22y = 498$ ...(ii)

Subtracting (ii) from (i), we get: $2y$ = 18 or y = 9.

Putting y = 9 in (i), we get: x = 20.

213. Let the total number of children be x.

Then, $x \times (20\%$ of x) = 605

$\Rightarrow \frac{1}{5}x^2 = 605 \Rightarrow x^2 = 3025 \Rightarrow x = 55$.

∴ Number of sweets received by each child
= 20% of 55 = 11.

214. Let the total number of employees be x.
Then, $(100 - 50)\%$ of $(100 - 40)\%$ of $x = 180 \Rightarrow 50\%$ of 60% of $x = 180$

$$\Rightarrow \left(\frac{50}{100} \times \frac{60}{100} \times x\right) = 180 \Rightarrow x = \left(\frac{180 \times 10}{3}\right) = 600.$$

∴ Number of graduate employees $= 50\%$ of 60% of x

$$= \left(\frac{50}{100} \times \frac{60}{100} \times 600\right) = 180.$$

215. Saving = 50% of $(100 - 40)\%$ of $(100 - 30)\%$ of ₹ 18,400

$$= ₹ \left(\frac{50}{100} \times \frac{60}{100} \times \frac{70}{100} \times 18400\right) = ₹ 3864.$$

216. Height climbed in second hour

$$= 12\frac{1}{2}\% \text{ of } \left(100 - 62\frac{1}{2}\right)\% \text{ of } 192\,\text{m}$$

$$= \left(\frac{25}{2} \times \frac{1}{100} \times \frac{75}{2} \times \frac{1}{100} \times 192\right)\text{m} = 9\,\text{m}.$$

217. Let the total income be x.
Then, income left $= (100 - 80)\%$ of $[100 - (35 + 25)]\%$ of $x = 20\%$ of 40% of x.

$$= \left(\frac{20}{100} \times \frac{40}{100} \times 100\right)\% \text{ of } x = 8\% \text{ of } x.$$

218. Let Mr. More's monthly income be ₹ x.
Then, $[100 - (40 + 30)]\%$ of $[100 - (20 + 15)]\%$ of $x = 8775$

$$\Rightarrow \quad 30\% \text{ of } 65\% \text{ of } x = 8775$$

$$\Rightarrow \quad \left(\frac{30}{100} \times \frac{65}{100} \times x\right) = 8775$$

$$\Rightarrow \quad \frac{39}{200}x = 8775 \Rightarrow x = \left(\frac{8775 \times 200}{39}\right) = 45000.$$

219. Let the total salary be ₹ x.
Then, $(100 - 10)\%$ of $(100 - 20)\%$ of $(100 - 20)\%$ of $(100 - 10)\%$ of $x = 15552$

$$\Leftrightarrow \left(\frac{90}{100} \times \frac{80}{100} \times \frac{80}{100} \times \frac{90}{100} \times x\right) = 15552$$

$$\Leftrightarrow x = \left(\frac{15552 \times 10000}{64 \times 81}\right) = 30000.$$

220. Let the amount with Aman be ₹ x.

Then, amount received by Sahil $= \frac{1}{4}$ of 40% of ₹ $x = 10\%$

of ₹ x.

$$\therefore \quad 10\% \text{ of } x = 600 + 200$$

$$\Rightarrow \quad \frac{10}{100}x = 800 \Rightarrow x = 800 \times 10 = 8000.$$

221. Number of questions answered correctly $= 40\%$ of $125 = 50$.
For 60% grade, number of questions to be answered correctly $= 60\%$ of $250 = 150$.
Remaining number of questions to be answered correctly $= 150 - 50 = 100$.

$$\therefore \text{ Required percentage } = \left(\frac{100}{125} \times 100\right)\% = 80\%.$$

222. Number of games already won = 30% of 60 = 18.
Let the required number of games be x.

Then, $\frac{18 + x}{60 + x} \times 100 = 50 \Rightarrow \frac{18 + x}{60 + x} = \frac{1}{2}$

$$\Rightarrow 36 + 2x = 60 + x \Rightarrow x = 24.$$

223. We have: $x + x\%$ of $150 = 150$

$$\Leftrightarrow x + \frac{x}{100} \times 150 = 150 \Leftrightarrow \frac{5}{2}x = 150 \Leftrightarrow x = \left(\frac{150 \times 2}{5}\right) = 60.$$

224. $15 + \frac{1}{3}(n - 20) = 50\% \text{ of } n = \frac{50}{100}n = \frac{n}{2}$

$$\Leftrightarrow 90 + 2n - 40 = 3n \Leftrightarrow n = 50.$$

225. Let A's salary = ₹ x. Then, B's salary = ₹ $(2000 - x)$.
$(100 - 95)\%$ of A $= (100 - 85)\%$ of B

$$\Rightarrow \frac{5}{100}x = \frac{15}{100}(2000 - x) \Leftrightarrow x = 1500.$$

226. Let B + M + D = x. Then, B = 25% of $x - 20$

$$= \left(\frac{25}{100}x - 20\right) = \left(\frac{x}{4} - 20\right) \text{ and D} = 50.$$

$$\therefore \frac{x}{4} - 20 + M + 50 = x \text{ or } M = \left(\frac{3x}{4} - 30\right).$$

So, marks in Maths cannot be determined.

227. Let the marks required be x. Then, $(62 + 35 + x) = 35\%$ of $(150 + 150 + 180)$

$$\Leftrightarrow 97 + x = \frac{35}{100} \times 480 \Leftrightarrow x = 168 - 97 = 71.$$

228. Let the number of students in the class be 100 and let the required average be x.
Then, $(10 \times 95) + (20 \times 90) + (70 \times x) = (100 \times 80)$

$$\Rightarrow \quad 70x = 8000 - (950 + 1800) = 5250 \Leftrightarrow x = 75.$$

229. Let total marks = x. Then, $(30\%$ of $x) + 15 = (40\%$ of $x) - 35$

$$\Leftrightarrow \frac{30}{100}x + 15 = \frac{40}{100}x - 35 \Leftrightarrow \frac{1}{10}x = 50 \Leftrightarrow x = 500.$$

So, passing marks $= (30\%$ of $500) + 15$

$$= \left(\frac{30}{100} \times 500 + 15\right) = 165.$$

$$\therefore \text{ Pass percentage } = \left(\frac{165}{500} \times 100\right)\% = 33\%.$$

230. Number of women = 40% of 100 = 40.
Number of men = $(100 - 40) = 60$.
Number of coffee-drinkers = 45% of 100 = 45.

Number of male coffee-drinkers $= \frac{1}{3}$ of $60 = 20$.

Number of female coffee-drinkers $= (45 - 20) = 25$.
∴ Number of female non-coffee drinkers $= (40 - 25) = 15$.

231. Number of males = 180000. Number of females
$= (300000 - 180000) = 120000$.
Number of literates = 50% of 300000 = 150000.
Number of literate males = 70% of 180000 = 126000.
Number of literate females $= (150000 - 126000) = 24000$.

$$\therefore \text{ Required percentage } = \left(\frac{24000}{120000} \times 100\right)\% = 20\%.$$

232. Let the total number of workers be x. Then, number of

skilled workers = 75% of $x = \dfrac{3x}{4}$.

Number of unskilled workers = $\left(x - \dfrac{3x}{4}\right) = \dfrac{x}{4}$.

Number of temporary workers

$= (100 - 80)\%$ of $\dfrac{3x}{4} + (100 - 20)\%$ of $\dfrac{x}{4}$

$= 20\%$ of $\dfrac{3x}{4} + 80\%$ of $\dfrac{x}{4} = \left(\dfrac{20}{100} \times \dfrac{3x}{4} + \dfrac{80}{100} \times \dfrac{x}{4}\right) = \dfrac{7x}{20}$.

$\therefore \dfrac{7x}{20} = 126 \Rightarrow x = \left(\dfrac{126 \times 20}{7}\right) = 360$.

233. Number of short-length coats before removal

$= (100 - 15)\%$ of $800 = 85\%$ of $800 = \left(\dfrac{85}{100} \times 800\right) = 680$.

Number of short-length coats after removal = $(680 - 500) = 180$.

Total number of coats after removal = $(800 - 500) = 300$.

Number of full-length coats after removal = $(300 - 180) = 120$.

$\therefore$ Required percentage = $\left(\dfrac{120}{300} \times 100\right)\% = 40\%$.

234. Let the total number of candidates be x.

Number of capable candidates who got admitted to college = 80% of 40% of $x = \left(\dfrac{80}{100} \times \dfrac{40}{100} \times x\right) = \dfrac{8x}{25}$.

Number of incapable college students = 25% of $(100 - 40)\%$ of $x = \left(\dfrac{25}{100} \times \dfrac{60}{100} \times x\right) = \dfrac{3x}{20}$.

Total number of candidates who got admitted to college $= \dfrac{8x}{25} + \dfrac{3x}{20} = \dfrac{47x}{100}$.

$\therefore$ Required percentage $= \left(\dfrac{8x}{25} \times \dfrac{100}{47x} \times 100\right)\%$

$= \left(\dfrac{3200}{47}\right)\% = 68.09\% \approx 68\%$.

235. Let the total strength of the school be x.

Number of girls $= \dfrac{2x}{5}$; Number of boys $= \left(x - \dfrac{2x}{5}\right) = \dfrac{3x}{5}$.

Number of students who are 12 years or more of age

$= \left(1 - \dfrac{1}{5}\right)$ of $\dfrac{2x}{5} + \left(1 - \dfrac{1}{4}\right)$ of $\dfrac{3x}{5}$

$= \left(\dfrac{4}{5} \times \dfrac{2x}{5}\right) + \left(\dfrac{3}{4} \times \dfrac{3x}{5}\right) = \dfrac{8x}{25} + \dfrac{9x}{20} = \dfrac{77x}{100}$.

$\therefore$ Required percentage $= \left(\dfrac{77x}{100} \times \dfrac{1}{x} \times 100\right)\% = 77\%$.

236. Let the total population be x.

Then, migrant population = 35% of $x = \left(\dfrac{35}{100} \times x\right) = \dfrac{7x}{20}$.

Local population $= \left(x - \dfrac{7x}{20}\right) = \dfrac{13x}{20}$.

Number of rural migrants = 20% of $\dfrac{7x}{20} = \left(\dfrac{20}{100} \times \dfrac{7x}{20}\right) = \dfrac{7x}{100}$.

Number of urban migrants $= \left(\dfrac{7x}{20} - \dfrac{7x}{100}\right) = \dfrac{28x}{100} = \dfrac{7x}{25}$.

Female population = 48% of $\dfrac{13x}{20} + 30\%$ of $\dfrac{7x}{100} + 40\%$ of $\dfrac{7x}{25}$

$= \left(\dfrac{48}{100} \times \dfrac{13x}{20}\right) + \left(\dfrac{30}{100} \times \dfrac{7x}{100}\right) + \left(\dfrac{40}{100} \times \dfrac{7x}{25}\right)$

$= \dfrac{39x}{125} + \dfrac{21x}{1000} + \dfrac{14x}{125} = \dfrac{445x}{1000}$.

$\therefore$ Required percentage $= \left(\dfrac{445x}{1000} \times \dfrac{1}{x} \times 100\right)\% = 44.5\%$.

237. Let the total number of houses be x. Then,

Number of houses having one female only = $(100 - 25)\%$

of $(100 - 40)\%$ of $x = \left(\dfrac{75}{100} \times \dfrac{60}{100} \times x\right) = \dfrac{9}{20}x$.

$\therefore$ Required percentage $= \left(\dfrac{9x}{20} \times \dfrac{1}{x} \times 100\right)\% = 45\%$.

238. Let the total number of candidates be x.

Then, $\left(100 - 62\dfrac{1}{2}\right)\%$ of $37\dfrac{1}{2}\%$ of $x = 342$

$\Leftrightarrow \dfrac{75}{2} \times \dfrac{1}{100} \times \dfrac{75}{2} \times \dfrac{1}{100} \times x = 342$

$\Leftrightarrow \dfrac{9x}{64} = 342 \Leftrightarrow x = \left(\dfrac{342 \times 64}{9}\right) = 2432$.

Number of boys failed = $(100 - 75)\%$ of $\left(100 - 37\dfrac{1}{2}\right)\%$ of $2432 = \left(\dfrac{25}{100} \times \dfrac{125}{2} \times \dfrac{1}{100} \times 2432\right) = 380$.

239. Let total population = x. Then, number of males $= \dfrac{5}{9}x$.

Married males = 30% of $\dfrac{5}{9}x = \left(\dfrac{30}{100} \times \dfrac{5}{9}x\right) = \dfrac{x}{6}$.

Married females $= \dfrac{x}{6}$;

Number of females $= \left(x - \dfrac{5}{9}x\right) = \dfrac{4x}{9}$.

Unmarried females $= \left(\dfrac{4x}{9} - \dfrac{x}{6}\right) = \dfrac{5x}{18}$.

$\therefore$ Required percentage $= \left(\dfrac{5x}{18} \times \dfrac{1}{x} \times 100\right)\% = 27\dfrac{7}{9}\%$.

240. Let the number of boys and girls be $3x$ and $2x$ respectively. Then,

No. of students who are not adults $= \left(\dfrac{80}{100} \times 3x\right) + \left(\dfrac{75}{100} \times 2x\right)$

$= \left(\dfrac{12x}{5} + \dfrac{3x}{2}\right) = \dfrac{39x}{10}$.

$\therefore$ Required percentage $= \left(\dfrac{39x}{10} \times \dfrac{1}{5x} \times 100\right)\% = 78\%$.

241. Let total debt = x. Asset = $\dfrac{87}{100}x$.

After paying 20% of the debt, he is left with 80% of the debt plus ₹ 42.

∴   80% of $x + 42 = \dfrac{87}{100}x \Leftrightarrow \dfrac{87}{100}x - \dfrac{80}{100}$

$x = 42 \Leftrightarrow x = 600$.

So, debt = ₹ 600 and assets = ₹ $\left(\dfrac{87}{100}\times 600\right) = ₹\, 522$.

242. Number of researchers who prefer Team A = 70% of 50 = 35.
Number of researchers who prefer Team B = (50 − 35) = 15.
Number of researchers assigned to Team A = 40% of 50 = 20.
Number of researchers assigned to Team B = (50 − 20) = 30.
To find the least possible number of researchers who will not be assigned to the team they prefer, we assume that the maximum number of researchers get the team they prefer.
So, number of researchers who are assigned to the team they prefer
= 20 (Team A) + 15 (Team B) = 35.
∴   Required number = (50 − 35) = 15.

243. Let the number of passengers who boarded the train at station A be x. Then,
Number of passengers after the train left station B

= (100 − 10)% of $x + 100 = 90\%$ of $x + 100 = \left(\dfrac{9x}{10}+100\right)$.

Number of passengers after the train left station C

= (100 − 50)% of $\left(\dfrac{9x}{10}+100\right)+25 = \dfrac{50}{100}\left(\dfrac{9x}{10}+100\right)+25$

$= \left(\dfrac{9x}{20}+75\right)$.

Number of passengers after the train left station D

= (100 − 50)% of $\left(\dfrac{9x}{20}+75\right)+50$

$= \dfrac{50}{100}\left(\dfrac{9x}{20}+75\right)+50=\left(\dfrac{9x}{40}+\dfrac{175}{2}\right)$.

∴ $\dfrac{9x}{40}+\dfrac{175}{2}=200 \Rightarrow \dfrac{9x}{40}=200-\dfrac{175}{2}=\dfrac{225}{2}$

$\Rightarrow x = \left(\dfrac{225}{2}\times\dfrac{40}{9}\right)=500$.

244. Let the fare for a full ticket be ₹ x and the boarding charges be ₹ y per ticket.

Then, fare for a half-ticket = 75% of ₹ $x = ₹\,\dfrac{3x}{4}$.

∴ $(x + y) + \left(\dfrac{3}{4}x+y\right)=1440 \Rightarrow \dfrac{7x}{4}+2y=1440$

$\Rightarrow 7x + 8y = 5760$ ...(i)

And, $2(x+y)+\left(\dfrac{3}{4}x+y\right)=2220$

$\Rightarrow \dfrac{11x}{4}+3y=2220$

$\Rightarrow 11x + 12y = 8880$ ...(ii)

Solving (i) and (ii), we have: $x = 480$, $y = 300$.

245. Asha's monthly income = 60% of ₹ 78000

$= ₹\left(\dfrac{60}{100}\times 78000\right)=₹\,46800$.

Let Maya's monthly income be ₹ x.

Then, 120% of $x = 46800 \Rightarrow x = \left(\dfrac{46800\times 100}{120}\right)=39000$.

246. Let Anuj's monthly salary be ₹ x. Then, Raju's monthly salary = 120% of ₹ $x = ₹\,\dfrac{6x}{5}$.

Ravi's monthly salary = ₹ $(x + 1500)$.

∴ $\dfrac{6x}{5}+(x+1500)+x=\dfrac{325200}{12}=27100$

$\Rightarrow 16x + 7500 = 135500$

$\Rightarrow 16x = 128000 \Rightarrow x = 8000$.

Hence, sum of Raju's and Anuj's monthly salaries

$= ₹\left(\dfrac{6x}{5}+x\right)=₹\,\dfrac{11x}{5}=₹\left(\dfrac{11\times 8000}{5}\right)=₹\,17600$.

247. Let the amount received by B be ₹ x.

Then, amount received by C = 75% of ₹ $x = ₹\,\dfrac{3x}{4}$.

And, amount received by A = 125% of ₹ $\dfrac{3x}{4}=₹\,\dfrac{15x}{16}$.

∴ $\dfrac{15x}{16}+x+\dfrac{3x}{4}=2236 \Rightarrow \dfrac{43x}{16}=2236$

$\Rightarrow x = \left(\dfrac{2236\times 16}{43}\right)=832$.

Hence, A's share = ₹ $\left(\dfrac{15}{16}\times 832\right)=₹\,780$.

248. Let the amount received by each child be ₹ x.
Then, amount received by each woman = 125% of ₹ x

$= ₹\,\dfrac{5x}{4}$.

Amount received by each man = 125% of ₹ $\dfrac{5x}{4}=₹\,\dfrac{25x}{16}$.

∴ $8\times\dfrac{25x}{16}+10\times\dfrac{5x}{4}+12x$

$= 6100 \Rightarrow \dfrac{25x}{2}+\dfrac{25x}{2}+12x=6100 \Rightarrow 74x=6100\times 2$

$\Rightarrow x = \left(\dfrac{6100\times 2}{74}\right)$.

Hence, amount received by each woman

$= ₹\left(\dfrac{5}{4}\times\dfrac{6100\times 2}{74}\right)=₹\,\dfrac{7625}{37}=₹\,206.08$.

249. $A = \dfrac{120}{100}B, B=\dfrac{120}{100}C$ and $C=\dfrac{85}{100}D$.

∴ $B = \dfrac{5}{6}A, C=\dfrac{5}{6}B$ and $D=\dfrac{20}{17}C$.

$B = \dfrac{5}{6}\times 576=480; C=\dfrac{5}{6}\times 480=400; D=\dfrac{20}{17}\times 400=\dfrac{8000}{17}$.

So, required percentage = $\left(\dfrac{8000}{17}\times\dfrac{1}{800}\times100\right)\% = 58.82\%$.

250. Let number of students appeared from school A = 100.
Then, number of students qualified from school A = 70.
Number of students appeared from school B = 120.
Number of students qualified from school B

$$= \left(\dfrac{150}{100}\times70\right) = 105.$$

∴   Required percentage = $\left(\dfrac{105}{120}\times100\right)\% = 87.5\%$.

251. Let the original price be ₹ 100.
New final price = 120% of (75% of ₹ 100)

$$= ₹\left(\dfrac{120}{100}\times\dfrac{75}{100}\times100\right) = ₹\,90.$$

∴   Decrease = 10%.

252. Let the original price be ₹ 100.
New final price = 85% of (115% of ₹ 100)

$$= ₹\left(\dfrac{85}{100}\times\dfrac{115}{100}\times100\right) = ₹\,97.75.$$

∴   Decrease = (100 − 97.75)% = 2.25%.

253. Let the original number be x.
Final number obtained = 110% of (90% of x)

$$= \left(\dfrac{110}{100}\times\dfrac{90}{100}\times x\right) = \dfrac{99}{100}x.$$

∴ $x - \dfrac{99}{100}x = 50 \Leftrightarrow \dfrac{1}{100}x = 50 \Leftrightarrow x = 50\times100 = 5000.$

254. Let the original price be ₹ 100.
New final price = 120% of (125% of ₹ 100)

$$= ₹\left(\dfrac{120}{100}\times\dfrac{125}{100}\times100\right) = ₹\,150.$$

∴   Increase = (150 − 100)% = 50%.

255. Let the original price be ₹ 100.
New final price = 110% of (110% of ₹ 100)

$$= ₹\left(\dfrac{110}{100}\times\dfrac{110}{100}\times100\right) = ₹\,121.$$

∴   Total increase = (121 − 100)% = 21%.

256. Let the original price be ₹ x.
New final price = 120% of (110% of ₹ x)

$$= ₹\left(\dfrac{120}{100}\times\dfrac{110}{100}\times x\right) = ₹\,\dfrac{132x}{100}.$$

∴ $\dfrac{132x}{100} = 33 \Rightarrow x = \left(\dfrac{33\times100}{132}\right) = 25.$

257. Let the original price be ₹ x.
∴ $(100 - r)\%$ of $(100 + r)\%$ of $x = 1$

$\Rightarrow \dfrac{(100-r)}{100}\times\dfrac{(100+r)}{100}\times x = 1$

$\Rightarrow x = \dfrac{100\times100}{(100-r)(100+r)} = \dfrac{10000}{(10000-r^2)}.$

258. Let the number of parts before the quality checks be 100.
Then, number of parts passed after quality checks

= (100 − 2)% of (100 − 5)% of (100 − 10)% of 100
= 98% of 95% of 90% of 100

$$= \left(\dfrac{98}{100}\times\dfrac{95}{100}\times\dfrac{90}{100}\times100\right) = \left(\dfrac{8379}{100}\right) = 83.79.$$

∴   Effective rejection rate = (100 − 83.79)% = 16.21%.

259. Let original income = ₹ 100. Then, saving = ₹ 10 and expenditure = ₹ 90.
New income = ₹ 120, New saving = ₹ 10. New expenditure = ₹ (120 − 10) = ₹ 110.
Increase in expenditure = ₹ (110 − 90) = ₹ 20.

∴ Increase % = $\left(\dfrac{20}{90}\times100\right)\% = 22\dfrac{2}{9}\%.$

260. Let original income = ₹ 100. Then, saving = ₹ 20 and expenditure = ₹ 80.

New income = ₹ $116\dfrac{2}{3}$ = ₹ $\left(\dfrac{350}{3}\right)$.

New expenditure = $137\dfrac{1}{2}\%$ of ₹ 80

$$= ₹\left(\dfrac{275}{2}\times\dfrac{1}{100}\times80\right) = ₹\,110.$$

New saving = ₹ $\left(\dfrac{350}{3} - 110\right) = ₹\,\dfrac{20}{3}.$

∴ Required percentage = $\left(\dfrac{20}{3}\times\dfrac{3}{350}\times100\right)\%$

$$= \dfrac{40}{7}\% = 5\dfrac{5}{7}\%.$$

261. Let original income = ₹ 100. Then, saving = ₹ 25 and expenditure = ₹ 75.
New income = ₹ 120.

New expenditure = 115% of ₹ 75 = ₹ $\left(\dfrac{115}{100}\times75\right) = ₹\,\dfrac{345}{4}.$

New saving = ₹ $\left(120 - \dfrac{345}{4}\right) = ₹\,\dfrac{135}{4}.$

Increase in saving = ₹ $\left(\dfrac{135}{4} - 25\right) = ₹\,\dfrac{35}{4}.$

∴ Percentage increase = $\left(\dfrac{35}{4}\times\dfrac{1}{25}\times100\right)\% = 35\%.$

262. Let Madan's income be ₹ x.

Then, Net income = (100 − 10)% of ₹ x = 90% of ₹ x = ₹ $\dfrac{9x}{10}$.

New net income = 85% of 110% of ₹ x

$$= ₹\left(\dfrac{85}{100}\times\dfrac{110}{100}\times x\right) = ₹\,\dfrac{187}{200}x.$$

∴ $\dfrac{187}{200} - \dfrac{9x}{10} = 350 \Leftrightarrow \dfrac{7x}{200} = 350$

$$\Leftrightarrow x = \left(\dfrac{350\times200}{7}\right) = 10000.$$

263. Let his investment in the year 2000 be ₹ x.

Then, income in 2010 = ₹ [x + 20% of x] = ₹ $\dfrac{120}{100}x.$

Income in 2011 = ₹ $\left[\dfrac{126}{100}(x-5000)\right]$.

$\therefore \dfrac{120}{100}x = \dfrac{126}{100}(x-5000) \Leftrightarrow 120x = 126(x-5000)$

$\Leftrightarrow 6x = 630000 \Leftrightarrow x = 105000.$

264. Let X and Y denote the new values of x and y respectively.

Then, X = 80% of $x = \dfrac{4x}{5}$; Y = 80% of $y = \dfrac{4y}{5}$.

$\therefore XY^2 = \dfrac{4x}{5} \times \left(\dfrac{4y}{5}\right)^2 = \dfrac{4x}{5} \times \dfrac{16y^2}{25} = \dfrac{64}{125}xy^2.$

Decrease in the value = $\left(xy^2 - \dfrac{64}{125}xy^2\right) = \dfrac{61}{125}xy^2.$

$\therefore$ Decrease % = $\left(\dfrac{61xy^2}{125} \times \dfrac{1}{xy^2} \times 100\right)\% = 48.8\%.$

265. Let V denote the volume of 1 c.c. of water.

Then, volume of ice formed from it = 109% of V = $\dfrac{109}{100}$ V.

When this ice changes into water, decrease in volume

= $\left(\dfrac{109}{100}V - V\right) = \dfrac{9}{100}V.$

$\therefore$ Decrease% = $\left(\dfrac{9V}{100} \times \dfrac{100}{109\,V} \times 100\right)\% = \dfrac{900}{109}\% = 8\dfrac{28}{109}\%.$

266. Let original consumption = 100 units and original price = ₹ 100 per unit.
Original expenditure = ₹ (100 × 100) = ₹ 10000.
New expenditure = ₹ (120 × 80) = ₹ 9600.

$\therefore$ Decrease in expenditure = $\left(\dfrac{400}{10000} \times 100\right)\% = 4\%.$

267. Let the original taxed amount be ₹ x and new taxed amount be ₹ y.
Let original revenue be ₹ 100.

Then, 4% of x = 100 or $x = \left(\dfrac{100 \times 100}{4}\right)$ = ₹ 2500.

New revenue = 110% of ₹ 100 = ₹ 110.

Then, 5% of y = 110 or $y = \left(\dfrac{110 \times 100}{5}\right)$ = ₹ 2200.

Decrease in taxed amount = ₹ (2500 – 2200) = ₹ 300.

$\therefore$ Decrease % = $\left(\dfrac{300}{2500} \times 100\right)\% = 12\%.$

268. Let the total original sale be ₹ 100. Then, original number

of visitors = $\dfrac{100}{5} = 20.$

Reduced price of ticket = 80% of ₹ 5 = ₹ 4. New sale
= 144% of ₹ 100 = ₹ 144.

New number of visitors = $\dfrac{144}{4} = 36.$

$\therefore$ Increase % = $\left(\dfrac{16}{20} \times 100\right)\% = 80\%.$

269. Suppose the business value changes from x to y.

4% of x = 5% of y $\Rightarrow$ $\dfrac{4}{100}x = \dfrac{5}{100}y$ $\Rightarrow$ $y = \dfrac{4}{5}x.$

$\therefore$ Change in business = $\left(x - \dfrac{4}{5}x\right) = \dfrac{x}{5}.$

Percentage slump = $\left(\dfrac{x}{5} \times \dfrac{1}{x} \times \dfrac{1}{100}\right)\% = 20\%.$

270. Let the distance be x km and the original time taken be y hours. Then,

Original speed = $\left(\dfrac{x}{y}\right)$ km/hr.

New speed = $\left(\dfrac{x}{80\% \text{ of } y}\right)$ km/hr = $\left(\dfrac{5}{4} \cdot \dfrac{x}{y}\right)$ km/hr.

Increase in speed = $\left(\dfrac{5x}{4y} - \dfrac{x}{y}\right) = \dfrac{x}{4y}.$

$\therefore$ Increase% = $\left(\dfrac{x}{4y} \times \dfrac{y}{x} \times 100\right)\% = 25\%.$

271. Let original salary = ₹ 100. New salary = ₹ 120.
Decrease on 120 = 20.

Decrease on 100 = $\left(\dfrac{20}{120} \times 100\right)\% = 16\dfrac{2}{3}\%.$

272. Let original price = ₹ 100. New price = ₹ 75.
Increase on 75 = 25. Increase on 100

$= \left(\dfrac{25}{75} \times 100\right)\% = \dfrac{100}{3}\% = 33\dfrac{1}{3}\%.$

273. Let original number = 100.
New number = 120% of 120% of 100

$= \left(\dfrac{120}{100} \times \dfrac{120}{100} \times 100\right) = 144.$

Decrease on 144 = 44. Decrease on 100

$= \left(\dfrac{44}{144} \times 100\right)\% = 30\dfrac{5}{9}\%.$

274. Let original salary = ₹ 100.
New salary = 90% of 85% of 80% of ₹ 100

$= ₹ \left(\dfrac{90}{100} \times \dfrac{85}{100} \times \dfrac{80}{100} \times 100\right) = ₹ \dfrac{306}{5}.$

Increase on $\dfrac{306}{5} = \left(100 - \dfrac{306}{5}\right) = \dfrac{194}{5}.$

Increase on 100 = $\left(\dfrac{194}{5} \times \dfrac{5}{306} \times 100\right)\% = \dfrac{9700}{153}\%$

$= 63.39\% \approx 63\%.$

275. Let the original fraction be $\dfrac{x}{y}$. Then, new fraction

$= \dfrac{140\% \text{ of } x}{180\% \text{ of } y} = \dfrac{140x}{180y} = \dfrac{7x}{9y}.$

$\therefore \dfrac{\text{New fraction}}{\text{Original fraction}} = \left(\dfrac{7x}{9y} \times \dfrac{y}{x}\right) = \dfrac{7}{9}.$

276. Let the original fraction be $\dfrac{x}{y}$.

Then, new fraction = $\dfrac{(100+240)\% \text{ of } x}{(100-50)\% \text{ of } y} = \dfrac{340\% \text{ of } x}{50\% \text{ of } y}$

$$= \frac{34x}{5y}.$$

$$\therefore \quad \frac{34x}{5y} = 2\frac{5}{6} = \frac{17}{6} \implies \frac{x}{y} = \frac{17}{6} \times \frac{5}{34} = \frac{5}{12}.$$

277. Reduction in consumption $= \left[\frac{R}{(100+R)} \times 100\right]\%$

$$= \left(\frac{15}{115} \times 100\right)\%$$

$$= \frac{300}{23}\% = 13\frac{1}{23}\%.$$

278. Decrease in consumption $= \left[\frac{R}{(100+R)} \times 100\right]\%$

$$= \left(\frac{30}{130} \times 100\right)\% = 23\frac{1}{13}\%.$$

279. Increase in consumption $= \left[\frac{R}{(100-R)} \times 100\right]\%$

$$= \left(\frac{16}{84} \times 100\right)\%$$

$$= \frac{400}{21}\% = 19.04\% \approx 19\%.$$

280. Let original consumption be 1 unit costing ₹ 100.

New cost $= ₹\,125$. New consumption $= \left(\frac{1}{125} \times 100\right) = \frac{4}{5}$ unit.

$$\therefore \quad \frac{\text{Reduction in consumption}}{\text{Original consumption}} = \frac{\left(1 - \frac{4}{5}\right)}{1} = \frac{1}{5}, i.e., 1:5.$$

281. Let original consumption = 100 kg and new consumption = x kg.

So, $100 \times 16 = x \times 20 \Leftrightarrow x = 80.$

∴ Reduction in consumption = 20%.

282. Let the original price of sugar be ₹ 10 per kg.

Then, original expenditure $= ₹ (10 \times 10) = ₹ 100.$

New expenditure = 110% of ₹ 100 = ₹ 110.

New price of sugar = 132% of ₹ 10 = ₹ 13.20.

New consumption $= \left(\frac{110}{13.20}\right)$ kg $= \frac{25}{3}$ kg $= 8\frac{1}{3}$ kg.

283. Let expenditures on food and other items be ₹ $2x$ and ₹ $5x$.

Then, $2x + 5x = 2590$ or $x = 370.$

So, expenditure on food $= ₹ (2 \times 370) = ₹ 740.$

Expenditure on other items $= ₹ (5 \times 370) = ₹ 1850.$

New expenditure = 110% of ₹ 740 + 115% of ₹ 1850

$$= ₹ \left(\frac{110}{100} \times 740 + \frac{115}{100} \times 1850\right)$$

$$= ₹ (814 + 2127.50) = ₹ 2941.50.$$

∴ Desired increase $= ₹ (2941.50 - 2590) = ₹ 351.50.$

284. Number of students admitted in 2012

$$= 5000 \left(1 + \frac{24}{100}\right)^2 = \left(5000 \times \frac{31}{25} \times \frac{31}{25}\right) = 7688.$$

285. Salary after 4 years $= ₹ \left[10000\left(1 + \frac{50}{100}\right)^4\right]$

$$= ₹ \left(10000 \times \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2}\right) = ₹ 50625.$$

286. Population after 3 years $= 64000 \times \left(1 + \frac{5}{2 \times 100}\right)^3$

$$= \left(64000 \times \frac{41}{40} \times \frac{41}{40} \times \frac{41}{40}\right) = 68921.$$

287. Cost after 2 years $= ₹ \left[20 \times \left(1 + \frac{8}{100}\right)^2\right]$

$$= ₹ \left(20 \times \frac{27}{25} \times \frac{27}{25}\right) = ₹ 23.33.$$

288. Percentage annual increase $= \left(\frac{75}{1000} \times 100\right)\% = 7\frac{1}{2}\% = \frac{15}{2}\%.$

Population after 2 years $= 4200000 \left(1 + \frac{15}{2 \times 100}\right)^2$

$$= \left(4200000 \times \frac{43}{40} \times \frac{43}{40}\right) = 4853625.$$

289. Population after 2 years $= 8500 \left(1 + \frac{20}{100}\right)\left(1 + \frac{25}{100}\right)$

$$= \left(8500 \times \frac{6}{5} \times \frac{5}{4}\right) = 12750.$$

290. Present population

$$= 160000 \times \left(1 + \frac{3}{100}\right)\left(1 + \frac{5}{2 \times 100}\right)\left(1 + \frac{5}{100}\right)$$

$$= \left(160000 \times \frac{103}{100} \times \frac{41}{40} \times \frac{21}{20}\right) = 177366.$$

291. Present population

$$= 62500 \times \left(1 - \frac{4}{100}\right)^2 = \left(62500 \times \frac{24}{25} \times \frac{24}{25}\right) = 57600.$$

292. Let the present value be ₹ 100.

Value after 3 years $= ₹ \left[100 \times \left(1 - \frac{20}{100}\right)^3\right]$

$$= ₹ \left(100 \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5}\right) = ₹ 51.20.$$

∴ Reduction in value = (100 − 51.20)% = 48.8%.

293. Height of the tree 2 years ago $= \dfrac{540}{\left(1 + \frac{20}{100}\right)^2}$ cm

$$= \left(540 \times \frac{5}{6} \times \frac{5}{6}\right) \text{cm} = 375 \text{ cm}.$$

294. Amount invested $= ₹ \left[\dfrac{10000}{\left(1 + \frac{25}{100}\right)^3}\right] = ₹ \left(10000 \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5}\right)$

$$= ₹ 5120.$$

295. Population 6 years ago $= \left[\dfrac{1771561}{\left(1 + \frac{10}{100}\right)^6}\right]$

$$= 1771561 \times \left(\frac{10}{11}\right)^6 = \frac{1771561 \times 1000000}{1771561}$$

$$= 1000000.$$

296. Purchase price $= ₹ \left[\dfrac{29644.032}{\left(1 - \dfrac{12}{100}\right)^3}\right]$

$$= ₹ \left(29644.032 \times \frac{25}{22} \times \frac{25}{22} \times \frac{25}{22}\right) = ₹ 43500.$$

297. Let the present value of the asset be $₹ x$. Then,

$$\frac{x}{\left(1 - \dfrac{10}{100}\right)^2} - \frac{x}{\left(1 - \dfrac{10}{100}\right)} = 12000 \Rightarrow \frac{x - x\left(1 - \dfrac{10}{100}\right)}{\left(1 - \dfrac{10}{100}\right)^2} = 12000$$

$$\Rightarrow \quad \frac{x}{10} = 12000 \times \frac{9}{10} \times \frac{9}{10} \Rightarrow x = 97200.$$

298. Percentage annual increase $= \left(\dfrac{1}{8} \times 100\right)\% = \dfrac{25}{2}\%.$

Height after $2\dfrac{1}{2}$ years

$$= \left[8\left(1 + \frac{25}{2 \times 100}\right)^2 \left(1 + \frac{25}{4 \times 100}\right)\right] m$$

$$= \left(8 \times \frac{9}{8} \times \frac{9}{8} \times \frac{17}{16}\right) m = \left(\frac{1377}{128}\right) m = 10.75 \text{ m}.$$

299. Population at the end of 2 years

$$= 189000\left(1 - \frac{8}{100}\right)\left(1 + \frac{5}{100}\right) = \left(189000 \times \frac{23}{25} \times \frac{21}{20}\right)$$

$$= 182574.$$

300. Final value $= ₹ \left[500000\left(1 - \dfrac{4}{100}\right)\left(1 + \dfrac{5}{100}\right)\left(1 + \dfrac{10}{100}\right)\right]$

$$= ₹ \left[500000 \times \frac{24}{25} \times \frac{21}{20} \times \frac{11}{10}\right] = ₹ 554400.$$

$\therefore$ Net profit $= ₹ (554400 - 500000) = ₹ 54400.$

301. Value after 3 years $= ₹ \left[20000\left(1 - \dfrac{5}{100}\right)\left(1 - \dfrac{4}{100}\right)\left(1 - \dfrac{2}{100}\right)\right]$

$$= ₹ \left(20000 \times \frac{95}{100} \times \frac{96}{100} \times \frac{98}{100}\right) = ₹ 17875.2.$$

302. Number of bushes in the beginning

$$= \frac{26730}{\left(1 + \dfrac{10}{100}\right)\left(1 + \dfrac{8}{100}\right)\left(1 - \dfrac{10}{100}\right)}$$

$$= \left(26730 \times \frac{10}{11} \times \frac{25}{27} \times \frac{10}{9}\right) = 25000.$$

303. Let the production in 2008 be 100 units. Then,

Production in 2012 $= 100 \times \left(1 + \dfrac{15}{100}\right)^2 \left(1 - \dfrac{10}{100}\right)\left(1 + \dfrac{15}{100}\right)$

$$= \left(100 \times \frac{23}{20} \times \frac{23}{20} \times \frac{9}{10} \times \frac{23}{20}\right) = 136.88.$$

$\therefore$ Increase in production $= (136.88 - 100)\% = 36.88\% \approx 37\%.$

304. 10 crores $\times \left(1 + \dfrac{R}{100}\right)^3 = 13.31$ crores.

$$\therefore \left(1 + \frac{R}{100}\right)^3 = \frac{13.31 \text{ crores}}{10 \text{ crores}} = \frac{13.31}{10} = \frac{1331}{1000} = \left(\frac{11}{10}\right)^3.$$

So, $\left(1 + \dfrac{R}{100}\right) = \dfrac{11}{10} \Leftrightarrow \left(1 + \dfrac{R}{100}\right)$

$$= \left(1 + \frac{1}{10}\right) \Leftrightarrow \frac{R}{100} = \frac{1}{10} \Leftrightarrow R = 10.$$

305. $250\left(1 + \dfrac{R}{100}\right)^3 = 2000 \Rightarrow \left(1 + \dfrac{R}{100}\right)^3 = \dfrac{2000}{250} = 8 = (2)^3$

$$\Rightarrow \left(1 + \frac{R}{100}\right) = 2 \Rightarrow \frac{R}{100} = 1 \Rightarrow R = 100.$$

306. Let the initial output be x and let the rate of increase be R% per year.

Then, $x\left(1 + \dfrac{R}{100}\right)^2 = 2x \Rightarrow \left(1 + \dfrac{R}{100}\right)^2 = 2 = (\sqrt{2})^2$

$$\Rightarrow \left(1 + \frac{R}{100}\right) = \sqrt{2} \Rightarrow R = 100\,(\sqrt{2} - 1).$$

307. Let the rate of growth be R% per annum.

Then, $3600\left(1 + \dfrac{R}{100}\right)^3 = 4800 \Rightarrow \left(1 + \dfrac{R}{100}\right)^3 = \dfrac{4}{3}.$

$\therefore$ Population after 3 years $= 4800\left(1 + \dfrac{R}{100}\right)^3$

$$= 4800 \times \frac{4}{3} = 6400.$$

308. Let the required time be n years.

Then, $500000\left(1 - \dfrac{10}{100}\right)^n = 364500$

$$\Rightarrow \left(\frac{9}{10}\right)^n = \frac{364500}{500000} = \frac{729}{1000}$$

$$\Rightarrow \left(\frac{9}{10}\right)^n = \left(\frac{9}{10}\right)^3 \Rightarrow n = 3.$$

309. Let the required time be n years. Then,

$$72900 \times \left(1 + \frac{10}{100}\right)^n = 133100 \times \left(1 - \frac{10}{100}\right)^n \Leftrightarrow \left(\frac{11}{10}\right)^n \times \left(\frac{10}{9}\right)^n$$

$$= \frac{133100}{72900} \Leftrightarrow \left(\frac{11}{9}\right)^n = \frac{1331}{729} = \left(\frac{11}{9}\right)^3 \Leftrightarrow n = 3.$$

310. Let T denote the required number of 5568 year-intervals.

Then, $x\left(1 - \dfrac{50}{100}\right)^T = 12.5\%$ of $x \Rightarrow \left(1 - \dfrac{50}{100}\right)^T$

$$= \frac{x}{8} \times \frac{1}{x} = \frac{1}{8} \Rightarrow \left(\frac{1}{2}\right)^T = \left(\frac{1}{2}\right)^3 \Rightarrow T = 3.$$

311. Let original population $= 100.$

Population after 3 years

$$= 100 \times \left(1 + \frac{3\frac{1}{2}}{100}\right)^3 = 100 \times \frac{207}{200} \times \frac{207}{200} \times \frac{207}{200} = 110.87.$$

$\therefore$ Increase $= (110.87 - 100)\% = 10.87\% \approx 10.8\%.$

312. Net growth on 1000 = (32 − 11) = 21. Net growth on 100

$= \left(\frac{21}{1000} \times 100\right)\% = 2.1\%.$

313. Annual gross salary in 2007 = ₹ 1000000.

Expenditure on food items in 2007 = 40% of ₹ 1000000 = ₹ 400000.

Annual gross salary in 2008 = 90% of ₹ 1000000 = ₹ 900000.

Expenditure on food items in 2008 = 105% of ₹ 400000

= ₹ 420000.

∴ Required percentage $= \left(\frac{420000}{900000} \times 100\right)\% = \frac{140}{3}\%$

$= 46.6\% \approx 47\%.$

314. Let the man's original income be ₹ x.

Then, original tax paid = ₹ [12% of (80% of x)]

$= ₹ \left(\frac{12}{100} \times \frac{80}{100} \times x\right) = ₹ \frac{12x}{125}.$

New income = ₹ (x + 1200).

New tax paid = ₹ [10% of {80% of (x + 1200)}]

$= ₹ \left[\frac{10}{100} \times \frac{80}{100} \times (x + 1200)\right]$

$= ₹ \left[\frac{2}{25}(x + 1200)\right] = ₹ \left(\frac{2x}{25} + 96\right).$

∴ $\frac{12x}{125} = \frac{2x}{25} + 96 \Rightarrow \frac{2x}{125} = 96 \Rightarrow x = \frac{96 \times 125}{2} = 6000.$

Hence, increased income = ₹ (6000 + 1200) = ₹ 7200.

315. B's income is less than A's by

$\left[\frac{10}{(100+10)} \times 100\right]\%$, i.e. $\frac{100}{11}\% = 9\frac{1}{11}\%.$

316. A = 125% of B

$\Rightarrow A = \frac{125}{100}B \Rightarrow B = \frac{100}{125}A = \left(\frac{4}{5} \times 100\right)\%$ of A = 80% of A.

317. B's wage is less than A's by

$\left[\frac{20}{(100+20)} \times 100\right]\%$ i.e, $\frac{50}{3}\% = 16\frac{2}{3}\%.$

318. B's income is more than A's by $\left[\frac{50}{(100-50)} \times 100\right]\%$, i.e. 100%.

319. y is more than x by $\left[\frac{25}{(100-25)} \times 100\right]\%$, i.e. $\frac{100}{3}\% = 33\frac{1}{3}\%.$

320. $p = 6q$. So, q is less than p by $5q$.

∴ Required percentage

$= \left(\frac{5q}{p} \times 100\right)\% = \left(\frac{5q}{6q} \times 100\right)\% = 83\frac{1}{3}\%.$

321. Let the third number be x.

Then, first number = 80% of $x = \left(\frac{80}{100} \times x\right) = \frac{4x}{5}.$

Second number = 75% of $x = \left(\frac{75}{100} \times x\right) = \frac{3x}{4}.$

Difference $= \left(\frac{4x}{5} - \frac{3x}{4}\right) = \frac{x}{20}.$

∴ Required percentage $= \left(\frac{x}{20} \times \frac{5}{4x} \times 100\right)\% = \frac{25}{4}\% = 6\frac{1}{4}\%.$

322. Let third number be x.

Then, first number $= 112\frac{1}{2}\%$ of $x = \frac{9x}{8};$

Second number = 125% of $x = \frac{5}{4}x.$

∴ Required percentage $= \left(\frac{9x}{8} \times \frac{4}{5x} \times 100\right)\% = 90\%.$

323. A = 40% of B = 40% of (25% of C) $= \left(\frac{40}{100} \times \frac{25}{100} \times 100\right)\%$

of C = 10% of C.

324. P $= \frac{140}{100}A = \frac{140}{100}\left(\frac{80}{100}M\right)$

$= \left(\frac{140}{100} \times \frac{80}{100} \times 100\right)\%$ of M = 112% of M.

∴ Peter earned 12% more than Michael

325. Quantity of pulp in 100 kg of fresh fruits = (100 − 68)% of 100 kg = 32 kg.

Let the quantity of dry fruit obtained be x kg.

Then, (100 − 20)% of x = 32

$\Leftrightarrow \frac{80}{100}x = 32 \Leftrightarrow x = \left(\frac{32 \times 100}{80}\right) = 40.$

326. Let the reduced weight be x kg.

Clearly, the quantity of pulp remains the same in both the cases.

So, (100 − 96)% of 20 kg = (100 − 95)% of x kg

$\Leftrightarrow$ 4% of 20 kg = 5% of x kg $\Rightarrow x = \left(\frac{4}{5} \times 20\right)$ kg = 16 kg.

327. Quantity of pulp in fresh grapes = Quantity of pulp in dry grapes

= (100 − 10)% of 250 kg = 90% of 250 kg = 225 kg.

Let the total weight of fresh grapes be x kg.

Then, (100 − 80)% of x

= 225 $\Rightarrow$ 20% of x = 225 $\Rightarrow \frac{x}{5}$ = 225

$\Rightarrow x = 225 \times 5 = 1125.$

Hence, total weight of fresh grapes = 1125 kg.

328. Quantity of gold in the alloy = 80% of 50 g

$= \left(\frac{80}{100} \times 50\right)$ g = 40 g.

Let x g of gold be added.

Then, $\frac{40+x}{50+x} = \frac{90}{100} = \frac{9}{10} \Rightarrow 400 + 10x = 450 + 9x \Rightarrow x = 50.$

329. Weight of water in 60 gms mixture = 75% of 60 gm

$= \left(\frac{75}{100} \times 60\right)$ gm = 45 gm.

Weight of water in 75 gms mixture = (45 + 15) gm = 60 gm.

∴ Required percentage $= \left(\frac{60}{75} \times 100\right)\% = 80\%.$

330. Quantity of sugar $= \left(\dfrac{4}{100} \times 6\right)$ kg $= 0.24$ kg.

∴ New percentage $= \left(\dfrac{0.24}{5} \times 100\right)\% = 4\dfrac{4}{5}\%$.

331. Quantity of alcohol in 9 ml lotion $= \left(\dfrac{50}{100} \times 9\right)$ ml $= 4.5$ ml.

Let the water to be added be x ml.

Then, $\dfrac{4.5}{9+x} = \dfrac{30}{100} \iff 270 + 30x = 450 \iff x = 6$ ml.

332. Quantity of alcohol $= \left(\dfrac{40}{100} \times 5\right)$ litres $= 2$ litres.

∴ New strength $= \left(\dfrac{2}{6} \times 100\right)\% = 33\dfrac{1}{3}\%$.

333. Quantity of alcohol in 400 ml solution = 15% of 400 ml
= 60 ml.
Let x ml of alcohol be added.

Then, $\dfrac{60+x}{400+x} = \dfrac{32}{100} \Rightarrow 6000 + 100x = 12800 + 32x$

$\Rightarrow 68x = 6800 \Rightarrow x = 100$.

334. Quantity of alcohol in 10 c.c. solution

= (20% of 6 + 60% of 4) c.c. $= \left(\dfrac{20}{100} \times 6 + \dfrac{60}{100} \times 4\right)$ c.c.

= (1.2 + 2.4) c.c. = 3.6 c.c.

∴ Required strength $= \left(\dfrac{3.6}{10} \times 100\right)\% = 36\%$.

335. Required percentage $= \left(\dfrac{20\% \text{ of } 10 + 35\% \text{ of } 4}{10+4} \times 100\right)\%$

$= \left(\dfrac{3.4}{14} \times 100\right)\% = 24\dfrac{2}{7}\%$.

336. Let the original quantity be x kg. Vanaspati ghee in x kg

$= \left(\dfrac{40}{100}x\right)$ kg $= \left(\dfrac{2x}{5}\right)$ kg.

Now, $\dfrac{\frac{2x}{5}}{x+10} = \dfrac{20}{100} \iff \dfrac{2x}{5x+50} = \dfrac{1}{5} \iff 5x = 50 \iff x = 10$.

337. Quantity of alcohol in 5 litres solution = 20% of 5 litres
= 1 litres.
Quantity of alcohol removed = 20% of 2 litres = 400 ml.
Quantity of alcohol in new solution = (1000 − 400) ml
= 600 ml.
∴ Strength of alcohol in new solution

$= \left(\dfrac{600}{5000} \times 100\right)\% = 12\%$.

338. Let the weight of the original solution be x kg.

Weight of salt in x kg of solution = 15% of x kg $= \dfrac{3x}{20}$ kg.

∴ $\dfrac{\frac{3x}{20}}{(x-30)} = \dfrac{20}{100} \Rightarrow \dfrac{3x}{20(x-30)} = \dfrac{1}{5}$

$\Rightarrow 15x = 20(x-30) \Rightarrow 15x = 20x - 600$

$\Rightarrow 5x = 600 \Rightarrow x = 120$.

339. Let x litres of the first and $(35 - x)$ litres of the second solution be mixed together.
Then, 85% of x + 92% of $(35 - x)$ = 89% of 35
$\Rightarrow 85x + 92(35 - x) = 89 \times 35$
$\Rightarrow 85x + 3220 - 92x = 3115 \Rightarrow 7x = 105 \Rightarrow x = 15$.
Hence, quantity of first solution = 15 litres ; quantity of second solution = 20 litres.

340. Let x litres of 30% alcohol solution be added.
Then, 30% of x + 60% of 40 = 50% of $(x + 40)$
$\Rightarrow 30x + 60 \times 40 = 50(x + 40)$
$\Rightarrow 30x + 2400 = 50x + 2000$
$\Rightarrow 20x = 400$
$\Rightarrow x = 20$.

341. Let x quartz of the first solution be drained and replaced by x quartz of the second solution.
Then, 18% of $(27 - x)$ + 90% of x = 42% of 27
$\Rightarrow 18(27 - x) + 90x = 42 \times 27$
$\Rightarrow 486 - 18x + 90x = 1134$
$\Rightarrow 72x = 648$
$\Rightarrow x = 9$.

342. Let each vessel contain 100 litres of 40% alcohol.
Suppose Sachin added x litres of pure alcohol.

Then, $\dfrac{40+x}{100+x} = \dfrac{50}{100} = \dfrac{1}{2} \Rightarrow 80 + 2x = 100 + x \Rightarrow x = 20$.

Suppose Vivek replaced y litres.

Then, alcohol in y litres = 40% of y = $\dfrac{2y}{5}$ litres.

∴ $\dfrac{40 - \frac{2y}{5} + y}{100} = \dfrac{50}{100} = \dfrac{1}{2} \Rightarrow 80 + \dfrac{6y}{5} = 100$

$\Rightarrow y = \dfrac{20 \times 5}{6} = \dfrac{50}{3}$.

Required percentage $= \left[\dfrac{\left(20 - \frac{50}{3}\right)}{\left(\frac{50}{3}\right)} \times 100\right]\%$

$= \left(\dfrac{10}{3} \times \dfrac{3}{50} \times 100\right)\% = 20\%$.

343. Let total quantity of original milk = 1000 gm.
Milk after first operation = 80% of 1000 = 800 gm.
Milk after second operation = 80% of 800 = 640 gm.
Milk after third operation = 80% of 640 = 512 gm.
∴ Strength of final mixture = 51.2%.

344. Let the capacity of the tank be 100 litres. Then,
Initially: A type petrol = 100 litres.
After first operation:

A type petrol $= \left(\dfrac{100}{2}\right) = 50$ litres ; B type petrol = 50 litres.

After second operation:

A type petrol $= \left(\dfrac{50}{2} + 50\right) = 75$ litres ;

B type petrol $=\left(\dfrac{50}{2}\right)=25$ litres.

After third operation:

A type petrol $=\left(\dfrac{75}{2}\right)=37.5$ litres ;

B type petrol $=\left(\dfrac{25}{2}+50\right)=62.5$ litres.

∴ Required percentage = 37.5%.

345. Total money $=₹\left(600\times\dfrac{25}{100}+1200\times\dfrac{50}{100}\right)=₹750.$

25 paise coins removed $=\left(\dfrac{12}{100}\times600\right)=72.$ 50 paise coins

removed $=\left(\dfrac{24}{100}\times1200\right)=288.$

Money removed $=₹\left(72\times\dfrac{25}{100}+288\times\dfrac{50}{100}\right)=₹162.$

∴ Required percentage $=\left(\dfrac{162}{750}\times100\right)\%=21.6\%.$

346. Let the original price be ₹ 100 per kg.
Money required to buy 49 kg of rice = ₹ (100 × 49)
$\qquad\qquad\qquad\qquad\qquad\qquad = ₹\,4900.$
New price = ₹ 98 per kg.

∴ Quantity of rice bought $=\left(\dfrac{4900}{98}\right)\text{kg}=50\,\text{kg}.$

347. Let the original price of an eraser be ₹ x.

Reduced price = 75% of ₹ x = ₹ $\dfrac{3x}{4}.$

∴ $\dfrac{1}{\left(\dfrac{3x}{4}\right)}-\dfrac{1}{x}=2$

⇒ $\dfrac{4}{3x}-\dfrac{1}{x}=2 \Rightarrow \dfrac{1}{3x}=2 \Rightarrow 6x=1 \Rightarrow x=\dfrac{1}{6}.$

Hence, number of erasers available for a rupee = 6.

348. Let original price = ₹ x per kg. Reduced price = ₹ $\left(\dfrac{79x}{100}\right)$

per kg.

∴ $\dfrac{100}{\dfrac{79x}{1000}}-\dfrac{100}{x}=10.5 \Leftrightarrow \dfrac{10000}{79x}-\dfrac{100}{x}=10.5$

⇔ $10000-7900=10.5\times79x \Leftrightarrow x=\dfrac{2100}{10.5\times79}.$

∴ Reduced price $=₹\left(\dfrac{79}{100}\times\dfrac{2100}{10.5\times79}\right)$ per kg

$\qquad\qquad\qquad = ₹\,2$ per kg.

349. Let the original price per egg be ₹ x. Then, increased price

$=₹\left(\dfrac{130}{100}x\right).$

∴ $\dfrac{7.80}{x}-\dfrac{7.80}{\dfrac{130}{100}x}=3 \Leftrightarrow \dfrac{7.80}{x}-\dfrac{780}{130x}=3$

⇔ $1014-780=3\times130x \Rightarrow 390x=234 \Leftrightarrow x=0.6.$

So, present price per dozen $=₹\left(12\times\dfrac{130}{100}\times0.6\right)=₹9.36.$

350. Let original price = ₹ x per kg. Reduced price

$\qquad\qquad =₹\left(\dfrac{90x}{100}\right)$ per kg.

∴ $\dfrac{279}{\left(\dfrac{90x}{100}\right)}-\dfrac{279}{x}=6.2 \Leftrightarrow \dfrac{27900}{90x}-\dfrac{279}{x}=6.2$

$\qquad\qquad\qquad\Leftrightarrow 27900-25110=6.2\times90x$
$\qquad\qquad\qquad\Leftrightarrow 558x=2790 \Leftrightarrow x=5.$
∴ Required difference = 10% of ₹ 5 = ₹ 0.50.

351. Let the original price of sugar be ₹ x per kg.

Then, reduced price $=97\dfrac{1}{2}\%$ of ₹ x

$\qquad\qquad = ₹\left(\dfrac{195}{2}\times\dfrac{1}{100}\times x\right)=₹\dfrac{39x}{40}.$

∴ $\dfrac{1260}{\left(\dfrac{39x}{40}\right)}-\dfrac{1260}{x}=9 \Rightarrow \dfrac{16800}{13x}-\dfrac{1260}{x}=9$

⇔ $13x=\dfrac{420}{9} \Rightarrow x=\dfrac{140}{39}.$

Increased price $=112\dfrac{1}{2}\%$ of ₹ $\dfrac{140}{39}$

$\qquad = ₹\left(\dfrac{225}{2}\times\dfrac{1}{100}\times\dfrac{140}{39}\right)=₹\dfrac{105}{26}.$

∴ Quantity of sugar bought for ₹ 1260

$\qquad\qquad =\left(1260\times\dfrac{26}{105}\right)\text{kg}=312\,\text{kg}.$

352. $n\,(A)=90,\,n\,(B)=15,\,n\,(A\cup B)=100.$
So, $n\,(A\cap B)=n\,(A)+n\,(B)-n\,(A\cup B)$
$\qquad\qquad = 90+15-100=5.$
∴ Percentage of people who own both = 5%.

353. $n\,(A)=34,\,n\,(B)=42,\,n\,(A\cap B)=20.$
So, $n\,(A\cup B)=n\,(A)+n\,(B)-n\,(A\cap B)$
$\qquad\qquad = 34+42-20=56.$
∴ Percentage failed in either or both the subjects = 56.
Hence, percentage passed = (100 − 56)% = 44%.

354. $n\,(A)=40,\,n\,(B)=50,\,n\,(A\cap B)=10.$
$n\,(A\cup B)=n\,(A)+n\,(B)-n\,(A\cap B)$
$\qquad\qquad = 40+50-10=80.$
∴ Percentage reading either or both newspapers = 80%.
Hence, percentage reading neither newspaper
$\qquad\qquad = (100-80)\%=20\%.$

355. $n\,(A)=325,\,n\,(B)=175,\,n\,(A\cup B)=450-50=400.$
Required number = $n\,(A\cap B)$
$\qquad\qquad = n\,(A)+n\,(B)-n\,(A\cup B)$
$\qquad\qquad = 325+175-400=100.$

356. $n\,(A)=\left(\dfrac{60}{100}\times96\right)=\dfrac{288}{5},\,n\,(B)$

$\qquad = \left(\dfrac{30}{100}\times96\right)=\dfrac{144}{5},\,n\,(A\cap B)=\left(\dfrac{15}{100}\times96\right)=\dfrac{72}{5}.$

∴ $n\,(A\cup B)=n\,(A)+n\,(B)-n\,(A\cap B)$

$$= \frac{288}{5} + \frac{144}{5} - \frac{72}{5} = \frac{360}{5} = 72.$$

So, people who had either or both types of lunch = 72.

Hence, people who had neither type of lunch = (96 − 72) = 24.

357. $n(A) = \left(\frac{75}{100} \times 600\right) = 450$, $n(B) = \left(\frac{45}{100} \times 600\right) = 270$,

$$n(A \cup B) - 600.$$

∴ $n(A \cap B) = n(A) + n(B) - n(A \cup B)$

$$= (450 + 270 - 600) = 120.$$

358. Let total number be x. Then,

$$n(A) = \frac{72}{100}x = \frac{18x}{25}, n(B) = \frac{44}{100}x = \frac{11x}{25} \text{ and } n(A \cap B) = 40.$$

$n(A \cup B) = n(A) + n(B) - n(A \cap B)$

⇒ $x = \frac{18x}{25} + \frac{11x}{25} - 40 \Rightarrow \frac{29x}{25} - x = 40$

⇒ $\frac{4x}{25} = 40 \Rightarrow x = 250.$

359. Percentage of failed candidates = (30 + 35 − 27)% = 38%.

Percentage of passed candidates = (100 − 38)% = 62%.

Let the total number of students appeared be x.

Then, 62% of $x = 248 \Rightarrow x = \frac{248 \times 100}{62} = 400.$

360. Failed in 1st subject = $\left(\frac{35}{100} \times 2500\right) = 875.$

Failed in 2nd subject = $\left(\frac{42}{100} \times 2500\right) = 1050.$

Failed in both = $\left(\frac{15}{100} \times 2500\right) = 375.$

Failed in 1st subject only = (875 − 375) = 500.

Failed in 2nd subject only = (1050 − 375) = 675.

∴   Passed in 2nd only + Passed in 1st only

$$= (675 + 500) = 1175.$$

361. Suppose he ordered n pairs of blue socks.

Let the price of each pair of blue socks be ₹ x.

Then, price of each pair of black socks = ₹ $2x$.

Actual bill = ₹ $(4 \times 2x + nx)$ = ₹ $(8x + nx)$.

Bill made on interchange = ₹ $(2nx + 4x)$.

∴ $2nx + 4x = 150\%$ of $(8x + nx)$

⇒ $2nx + 4x = \frac{3}{2}(8x + nx)$

⇒ $2(2nx + 4x) = 3(8x + nx)$

⇒ $nx = 16x \Rightarrow n = 16.$

Hence, required ratio = 4 : 16 = 1 : 4.

362. Suppose the man ordered x feet y inches of the rope. Since x and y represent inches in the miswritten and actual order respectively, so each one of x and y is less than 12.

[∵ 1 feet = 12 inches]

Actual order = x feet y inches = $(12x + y)$ inches.

Miswritten order = y feet x inches = $(12y + x)$ inches.

∴ $(12y + x) = 30\%$ of $(12x + y) = \frac{3}{10}(12x + y)$

⇒ $10(12y + x) = 3(12x + y)$

⇒ $26x = 117y \Rightarrow x = \frac{117}{26} = \frac{9}{2}.$

Since $x < 12$, $y < 12$, so $x = 9$, $y = 2$.

Hence the man ordered 9 feet 2 inches of rope.

363. Let the quantity of fertilizer A required be x kg and that of fertilizer B be y kg. Then,

10% of x + 5% of $y = 14 \Rightarrow 0.1x + 0.05y = 14$ ...(i)

6% of x + 10% of $y = 14 \Rightarrow 0.06x + 0.1y = 14$ ...(ii)

Subtracting (ii) from (i), we get: $0.04x - 0.05y = 0$

⇒ $x = \frac{5}{4}y.$

Substituting $x = \frac{5}{4}y$ in (i), we get: $0.5y + 0.2y = 56$

⇒ $0.7y = 56 \Rightarrow y = 80.$

Putting $y = 80$ in (ii), we get: $x = 100.$

∴   Required cost = ₹ (100 × 10.60 + 80 × 8.40) = ₹ 1732.

364. Let the individual cost of 1 pen, 1 pencil and 1 eraser be ₹ x, ₹ y and ₹ z respectively.

Then, $5x + 7y + 4z = p$ (say)   ...(i)

And, $6x + 14y + 8z = 1.5p$ ...(ii)

Multiplying (i) by 2 and subtracting (ii) from it, we get: $4x = 0.5p$ or $x = 0.125p.$

∴   Required percentage = $\left(\frac{0.625p}{p} \times 100\right)\% = 62.5\%.$

365. Let the number of votes for the motion be F and those against the motion be A.

Let the total number of votes be x.

Then, (F + 14) − (A − 14) = 4 ⇒ A − F = 24.

∴   8% of $x = 24 \Rightarrow x = \frac{24 \times 100}{8} = 300.$

So, F + A = 300 ⇒ F + (F + 24) = 300

$$\Rightarrow 2F = 276 \Rightarrow F = 138.$$

∴   A = (300 − 138) = 162.

366. Let x be the number of votes not cast for the Praja Party in the previous polls.

So, number of votes not cast for the party this year = 1.25 x.

Then, number of votes cast for Praja party in the previous polls = (260000 − x).

Number of votes cast for the party this year = (260000 − 1.25x).

Margin of victory in previous polls = (Votes cast in favour) − (Votes not cast in favour)

$$= (260000 - x) - x = (260000 - 2x).$$

Margin of loss in this year's polls = (Votes not cast in favour) − (Votes cast in favour)

$$= 1.25x - (260000 - 1.25x) = 2.5x - 260000.$$

∴ $2.5x - 260000$

$$= 2(260000 - 2x) \Rightarrow 6.5x = 780000 \Rightarrow x = 120000.$$

Hence, number of people who voted for Praja Party in previous polls = 260000 − 120000 = 140000.

367. Given (180 % of ?) ÷ 2 = 504

$$\Rightarrow \left(? \times \frac{180}{100}\right) \div 2 = 504$$

$$\Rightarrow ? \times \frac{180}{100} = 504 \times 2$$

$$\Rightarrow ? \times \frac{180}{100} = 1008$$

$$= ? = \frac{1008 \times 100}{180} = 560$$

368. x % of $y = \dfrac{xy}{100}$ ...(i)

and y% of $x = \dfrac{xy}{100}$ ... (ii)

from *(i) & (ii)*

x% of $y = y$ % of x

369. $66\dfrac{2}{3}$% of ₹ 312/- exceeds ₹ 200 by ₹ x

According to the question, required difference

$$= ₹ \left(312 \times \frac{200}{3}\% - 200\right) = \left(312 \times \frac{200}{3 \times 100} - 200\right)$$

$$= ₹ \left(312 \times \frac{200}{300} - 200\right)$$

$$\Rightarrow ₹ x = ₹ (208 - 200) = ₹ 8/-$$

370. 105.27% of 1200.11 + 11.80% of 2360.85 = 21.99% of (?) + 1420.99

105 % of 1200 + 12% of 2360 = 22 % of (?) + 1421

$$\frac{105 \times 1200}{100} + \frac{12 \times 2360}{100} = \frac{22 \times ?}{100} + 1421$$

or, $\dfrac{22 \times (?)}{100} = 1260 + 283.20 - 1421$

$$\Rightarrow \frac{22 \times (?)}{100} = 1543 - 1421 \Rightarrow \frac{22 \times (?)}{100} = 121$$

$$\therefore ? = \frac{122 \times 100}{22} = \frac{122 \times 50}{11} = \frac{6100}{11} = 554.5 \approx 550$$

371. Let the amount of actual bill be ₹ x.

According to the question, 15% of x = ₹ 54

$$= \frac{x \times 15}{100} = 54$$

$$x = \frac{54 \times 100}{15} = ₹ \ 360$$

372. Given (550 % of 250) ÷ 275 = (?)

$$(?) = \frac{550 \times 250}{100} \div 275$$

$$\Rightarrow (?) = (\ 55 \times 25) \div 275$$

$$\Rightarrow (?) = \frac{55 \times 25}{275} = 5$$

373. Statement I

Let maximum marks for test be x

Raman scored marks = 288 − 128 = 160 marks

According to question 25% of x = 160

$$\Rightarrow x = \frac{160 \times 100}{25} = 640$$

Statement II : let minimum passing percentage be y marks

Marks score by Raman = 460

Minimum passing marks = 160 + 64 = 224

According to question y% of 640 = 224

$$y = \frac{224 \times 100}{640} = 35\%$$

Both Statement I and II together are necessary to answer the question

Hence option (*e*) is correct

374. Given 32% of 825 + 25% of 1440 = 1025 − (?)

(?) = [1025 − (32% of 825) − (25% of 1440)]

$$\Rightarrow 1025 - \left(\frac{32 \times 825}{100}\right) - \left(\frac{25 \times 1440}{100}\right)$$

= (1025 − 264 − 360)

= 401

375. Let the number of recognized voters in the village be x.

A won election by votes = 600

B got 40% more votes

For candidate B

∵ 40% = 300

$$\therefore 100\% = \frac{300}{40} \times 100 = 750$$

Votes got by B = 750

∴ Votes got by A = 750 + 600 = 1350

According to the question,

Number of votes cost in election 60% of

x = 1350 + 750 = 2100

$$\Rightarrow \frac{60x}{100} = 2100$$

$$\Rightarrow x = \frac{2100 \times 100}{60} = 3500$$

376. Given (?) + (30.01% of 651) ÷ (25.05% of 59.98) = 135

$$\Rightarrow (?) + (30\% \text{ of } 650) \div (25\% \text{ of } 60) = 135$$

$$\Rightarrow (?) + \left(\frac{30 \times 650}{100}\right) \div \left(\frac{25 \times 60}{100}\right) = 135$$

$$\Rightarrow (?) + (195 \div 15) = 135$$

$$\Rightarrow (?) + 13 = 135$$

$$\Rightarrow (?) = (135 - 13) = 122$$

377. Given

$\dfrac{4}{3}$ of 25% of $\dfrac{18}{19}$ of 57 = ?

$$? = \left[\left(\frac{25}{100} \times \frac{4}{3}\right) \times \left(\frac{18}{19} \times 57\right)\right]$$

$$= \left(\frac{1}{4} \times \frac{4}{3}\right) \times \left(\frac{18}{19} \times 57\right)$$

$$= 18$$

378. Given

[(?) % of 1239.96] + [59.87% of 449.95] = 579.05

$$\Rightarrow [(?) \% \text{ of } 1240] + [60\% \text{ of } 450] = 580$$

$$\Rightarrow \left(\frac{(?) \times 1240}{100}\right) + \left(\frac{60 \times 450}{100}\right) = 580$$

$$\Rightarrow \left(\frac{(?)\times1240}{100}\right)+270=580$$

$$\Rightarrow \left(\frac{(?)\times1240}{100}\right)=(580-270)$$

$$\Rightarrow \left(\frac{(?)\times1240}{100}\right)=310$$

$$\Rightarrow (?) = \left(\frac{310\times100}{1240}\right)$$

$$\Rightarrow (?) = 25\%$$

379. Let number of students who appeared at the examination be x

Passed percentage = 96%

Failed percentage = 4%

According to given information we get

Unsuccessful students $\Rightarrow$ 4%

$\therefore$ 4% of x = 500

$$\Rightarrow \left(\frac{x\times4}{100}\right)=500$$

$$\Rightarrow x=\left(\frac{500\times100}{4}\right)=12500$$

380. $\because$ Krishna's present Salary = ₹ 3500

Salary Increase by 10%

Increased salary of Krishna

$$=\left(\frac{3500\times110}{100}\right)= ₹ 3,850$$

381. Given 12% of 555 + 15% of 666

$$\Rightarrow (?) = \left(\frac{12}{100}\times555\right)+\left(\frac{15}{100}\times666\right)$$

$$= (66.6 + 99.9)$$

$$= 166.5$$

382. Given

(85% of 420) + (?% of 1080) = 735

$$\Rightarrow \left(\frac{85\times420}{100}\right)+\left(\frac{(?)\times1080}{100}\right)=735$$

$$\Rightarrow 357+\left(\frac{(?)+1080}{100}\right)=735$$

$$\Rightarrow \left(\frac{(?)\times1080}{100}\right)=(735-357)=378$$

$$\Rightarrow (?) = \frac{378\times100}{1080}=35$$

383. Given 30% of 1225 − 64% of 555 = (?)

$$\left(\frac{30}{100}\times1225\right)-\left(\frac{64}{100}\times555\right)$$

$$= (367.5 - 355.2)$$

$$= 12.3$$

384. Let, his income be ₹ 100

Saving = ₹ 10

Expenditure = ₹ 90

Increased income = ₹ 120

Increased expenditure = ₹ 110

Increased in expenditure

$$=\frac{110-90}{90}\times100$$

$$=\frac{200}{9}=22\frac{2}{9}\%$$

385. It is given that,

(14% of 14) + (28% of 28) + (92% of 96) − (15% of 85) = (?)

$$(?) = \left(\frac{14\times14}{100}\right)+\left(\frac{28\times28}{100}\right)+\left(\frac{92\times96}{100}\right)-\left(\frac{15\times85}{100}\right)$$

$$= (1.96 + 7.84 + 88.32 - 12.75)$$

$$= (98.12 - 12.75)$$

$$= 85.37$$

386. Marked price of an article = ₹ 2400

According to given information

2400 × (100 − x)% of 85% = 1876.80

$$\Rightarrow 2400\times\frac{100-x}{100}\times\frac{85}{100}$$

$$= 1876.80$$

$$\Rightarrow (100 - x)$$

$$= \frac{1876.80\times100\times100}{2400\times85}$$

$$= (100-x)=\frac{18768000}{204000}$$

$$\Rightarrow (100 - x) = 92$$

$$\Rightarrow x = 100 - 92 = 8\%$$

387. Boys: Girls − 10 : 7

$$\therefore \text{Boys} = \frac{10}{17}\times85=50$$

Girls = (85 − 50) = 35

Boys who play only badminton 50 % of 50 = $\frac{50\times50}{100}=25$

Boys who play badminton

$$= \frac{60\times50}{100}=30$$

Children who play only table

Tennis = $\frac{85\times40}{100}=34$

Children who play badminton and table tennis = 12

Boys who play only table tennis = 50 − 30 = 20

$\therefore$ Girls who play only table tennis = 34 − 20 = 14

Girls who play badminton and table tennis

$$= 12 - (30 - 25) = 12 - 30 + 25 = 37 - 30 = 7$$

$\therefore$ Girls who play only badminton

$$= 35 - 14 - 7 = 35 - 21 = 14$$

388. Actual Cost price of an article

$$= ₹ (5844 + 156)$$

$$= ₹ 6000$$

S.P. = ₹ 5700

Loss = ₹ (6000 − 5700) = ₹ 300

Loss per cent

$$=\frac{300}{6000}\times100=5\%$$

389. Cost price of wrist watch = ₹ 1250
Sale price of wrist watch = ₹ 1500
Profit percent

$$= \left(\frac{1500 - 1250}{1250}\right) \times 100$$

$$= \frac{250}{1250} \times 100$$

$$= \frac{25000}{1250} = 20\%$$

390. Let total votes in village = 100
Losing candidate got votes = 30% of 100 = 30 votes
Winner's and nearer rival's votes

$$= 100 - \frac{30}{100} \times 100 = 70$$

∴ If both get equal votes then, it should be, 35.
∴ Minimum difference between winner and nearer rival
= (36 − 34) = 2

EXERCISE

(DATA–SUFFICIENCY TYPE QUESTIONS)

Directions *(Questions 1 to 18): Each of the questions given below consists of a statement and/or a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statement(s) is/are sufficient to answer the question. Read both the statements and*

Give answer (a) if the data in statement I alone are sufficient to answer the question while the data in statement II alone are not sufficient to answer the question;

Give answer (b) if the data in statement II alone are sufficient to answer the question while the data in statement I alone are not sufficient to answer the question ;

Give answer (c) if the data either in statement I or in statement II alone are sufficient to answer the question ;

Give answer (d) if the data even in both statements I and II together are not sufficient to answer the question ;

Give answer (e) if the data in both statements I and II together are necessary to answer the question.

1. What percentage of families in the city have telephones?

I. 50% of the families of the city possess television.

II. 30% of the television owners of the city have telephones.

2. If a certain factory has filled 120 orders, then what percent of the total number of orders has been filled?

I. The total number of orders on file is 300.

II. The number of orders that the factory has already filled represents two-fifths of the total number of orders.

3. By what percent is the salary of the elder son more than that of the younger son?

I. The father's salary is less than that of the elder son by 37%.

II. His salary is less than that of the younger son by 30%.

4. 55% of all teachers in a school are females. If 8% of the female teachers in that school teach 5 classes a day, what is the number of female teachers who do not teach 5 classes a day?　　**(N.I.F.T., 2007)**

I. There are 135 male teachers in the school.

II. There are 27 male teachers in the school who do not teach 5 classes a day.

5. What are the pass marks in an examination?

I. A student secures 30% marks but fails by 10 marks.

II. The total marks is 200.

6. How much minimum marks will be required to pass an examination?　　**(M.A.T., 2005)**

I. Student A secured 32% marks in that examination and he failed by 1 mark. Student B secured 36% marks in the same examination and his marks were 1 more than the minimum pass marks.

II. Student A secured 30% of full marks in the examination and he failed by 2 marks. If he had secured 5 more marks his percentage of marks would have been 40%.

7. Are at least 20% of the people in City X who are 30 years old or older bilingual?　　**(M.A.T., 2006)**

I. In City X, 30% of the population is at least 30 years old.

II. In City X, of the population 30 years old or older, 18 percent of the women and 17 percent of the men are bilingual.

8. What is the net effect on gross receipts?

I. Prices are reduced by 25%.

II. Sales increase by 20%.

9. What was Altaf's income in 2010?

I. His income for 2008, 2009 and 2010 was ₹ 3,00,000.

II. He earned 20% more in 2009 than what he did in 2008.

10. For a Lata Mangeshkar show, a total of 10000 tickets were sold in VIP area, sitting and standing categories. How many VIP area tickets were sold?

I. The number of sitting category tickets was half the number of tickets sold in standing category.

II. The total of sitting and standing category tickets were 150% greater than the number of tickets sold in the VIP area category.

11. How many chocolates can Sheetal buy if she has to spend 20% of her budget on vegetables and 30% on groceries?

    I. Sheetal has ₹ 50 with her.

    II. Each chocolate costs 25 paise.

12. What is the value of 20 percent of x? **(M.B.A., 2002)**

    I. One-fourth of 20 percent of x is 5.

    II. $4x = S$, $5y = S$ and $y = 80$.

13. What is the ratio of two numbers x and y?

    (Bank P.O., 2010)

    I. 40% of x is 20% of 50.

    II. 30% of y is 25% of 72.

14. What is the ratio of the total number of girls to the total number of boys in the school? **(SIDBI, 2006)**

    I. There are 680 students in the school out of which 45% are girls.

    II. 55% of the total number of students are boys.

15. What is the population of State A? **(Bank P.O., 2005)**

    I. Population of State B is 80% of the population of State A.

    II. Average population of States A and B is 18 lakhs.

16. What is Mr. Roy's annual income for the year April 2011 to March 2012?

    I. Annual income of Mr. Roy is 70% of his boss' annual income.

    II. Mr. Roy's income for April 2011 was ₹ 12000 and his income increased every month by 10%.

17. How many students are there in the class?

    I. There are 40 girls in the class.

    II. The boys are 80% of the total number of students in the class.

18. Is (60% of a) + (40% of b) greater than 50% of $(a + b)$?

    I. $a > b$ **II.** $b > 0$

Directions (*Questions 19 to 25*): *Each of the following questions consists of a question followed by three statements I, II and III. You have to study the question and the statements and decide which of the statement(s) is/are necessary to answer the question.*

19. What is Ritu's present salary?

    I. The salary increases every year by 15%.

    II. Her salary at the time of joining was ₹ 10000.

    III. She had joined exactly 5 years ago.

    (*a*) I and II only   (*b*) II and III only

    (*c*) I and III only   (*d*) All I, II and III

    (*e*) None of these

20. A, B and C secured 45%, 50% and 60% marks respectively in Biology. D's marks in Biology are 10 more than A's marks and 20 less than C's marks. Find out the total marks of the four students.

    (M.A.T., 2006)

    I. Maximum marks for Biology are 200.

    II. Total of D's and A's marks is 190.

    III. C has obtained 120 marks.

    (*a*) I and II

    (*b*) III only

    (*c*) Either I and II together or III alone

    (*d*) Any one of the three

    (*e*) All the three together

21. What is the overall percentage of marks obtained by Sangeeta in all five subjects? **(S.B.I.P.O., 2005)**

    I. Sangeeta scored 75% marks in Maths and Science together.

    II. Her aggregate marks in History and Science are 72%.

    III. She has scored 85% marks in Sanskrit.

    (*a*) Any two of the three

    (*b*) All I, II and III

    (*c*) I and either II or III

    (*d*) III and either I or II

    (*e*) Question cannot be answered even with the information in all three statements

22. How many children are there in the class?

    I. 20% children in the class can speak only Hindi.

    II. 44 children can speak languages other than Hindi.

    III. There are 30 boys in the class.

    (*a*) I and II only   (*b*) II and either I or III

    (*c*) All I, II and III   (*d*) Any two of the three

    (*e*) None of these

23. How much profit did the company earn in the year 2011?

    I. The company earned 40% more profit in the year 2012 than that in the year 2010.

    II. The company earned a total profit of ₹ 20 crores in the years 2010 and 2011 taken together.

    III. In the year 2012, the company earned 80 percent profit of that in 2011.

    (*a*) I and II or III

    (*b*) Any two of the three

    (*c*) Either I and II or II and III

    (*d*) All I, II and III

    (*e*) Question cannot be answered even with all I, II and III

24. What was the total number of candidates appeared at the examination?

    I. 30% of appeared candidates succeeded in the examination.

    II. The number of unsuccessful candidates was 1000 more than the successful candidates.

    III. 1750 candidates were unsuccessful.

    (*a*) Any two of the three

    (*b*) Only I and II

    (*c*) Only I and either II or III

(*d*) All I, II and III

(*e*) Even with all the three statements answer cannot be given.

25. What is Sumit's present salary?

  I. The salary increases every year by 12%.

  II. His salary at the time of joining was ₹ 3500.

  III. He had joined exactly 7 years ago.

  (*a*) I and II only   (*b*) II and III only

  (*c*) I and III only   (*d*) All I, II and III

  (*e*) None of these

Directions (*Questions 26-27*): *Each of these questions is followed by three statements. You have to study the question and all the three statements given and decide whether any information provided in the statement(s) is/ are redundant and can be dispensed with while answering the questions.*

26. A 25 m long wire is cut into 3 pieces. How long is the longest piece?   **(S.B.I.P.O., 2005)**

  I. Two pieces are each 1 m shorter that the longest piece.

  II. Two pieces of the wire are of the same length.

  III. The longest piece of the wire is 12.5% more than the smallest piece.

  (*a*) I only

  (*b*) Either I alone or II alone or II and III together

  (*c*) Only II and III together

  (*d*) II and either I or III

27. What is the monthly income of Mr. X? **(R.B.I., 2009)**

  I. Mr. X spends 85% of his income on various items and the remaining amount is saved.

  II. The monthly savings of Mr. X are ₹ 4500.

  III. Out of the total money spent by Mr. X in a month, one-fifth is spent on food and an amount of ₹ 20400 on other items.

  (*a*) Only II

  (*b*) Only III

  (*c*) Only either II or III

  (*d*) Question cannot be answered even with the information in all the three statements

  (*e*) None of these

ANSWERS

1. (*e*)	**2.** (*c*)	**3.** (*e*)	**4.** (*a*)	**5.** (*e*)	**6.** (*c*)	**7.** (*b*)	**8.** (*e*)	**9.** (*d*)	**10.** (*b*)
11. (*e*)	**12.** (*c*)	**13.** (*e*)	**14.** (*c*)	**15.** (*e*)	**16.** (*b*)	**17.** (*e*)	**18.** (*a*)	**19.** (*d*)	**20.** (*d*)
21. (*e*)	**22.** (*a*)	**23.** (*d*)	**24.** (*a*)	**25.** (*d*)	**26.** (*b*)	**27.** (*e*)			

SOLUTIONS

1. Let the total number of families be x.

Then, from I and II, we have

Number of families which have telephones

$$= 30\% \text{ of } 50\% \text{ of } x = \left(\frac{30}{100} \times \frac{50}{100} \times x\right)$$

$$= \frac{15}{100}x = 15\% \text{ of } x.$$

∴   Required percentage = 15%.

So, both I and II are required to answer the question.

∴   Correct answer is (*e*).

2. From I, we have

Required percentage $= \left(\frac{120}{300} \times 100\right)\% = 40\%$.

Thus, I alone gives the answer.

From II, we have: Required percentage

$$= \left(\frac{2}{5}x \times \frac{1}{x} \times 100\right)\% = 40\%.$$

So, I alone as well as II alone gives the answer.

∴ Correct answer is (*c*).

3. Let the father's salary be ₹ x.

From I, we have: $x = (100 - 37)\%$ of elder son's salary

$\Rightarrow$ elder son's salary $= ₹ \left(\frac{100x}{63}\right)$.

From II, we have: $x = (100 - 30)\%$ of younger son's salary

$\Rightarrow$ younger son's salary $= ₹ \left(\frac{100x}{70}\right) = ₹ \left(\frac{10x}{7}\right)$.

Difference $= ₹ \left(\frac{100x}{63} - \frac{10x}{7}\right) = ₹ \left(\frac{10x}{63}\right)$.

∴ Required percentage $= \left(\frac{10x}{63} \times \frac{7}{10x} \times 100\right)\% = 11\frac{1}{9}\%$.

So, both I and II together give the answer.

∴ Correct answer is (*e*).

4. Let the total number of teachers in the school be x.

From I, we have

$(100 - 55)\%$ of $x = 135 \Rightarrow x = \frac{135 \times 100}{45} = 300$.

∴   Reqd. number of teachers $= (100 - 8)\%$ of 55% of $300 = \left(\frac{92}{100} \times \frac{55}{100} \times 300\right)$.

So, I alone gives the answer while II alone is insufficient.

∴ Correct answer is (*a*).

5. From both I and II, we have

Pass marks = 30% of 200 + 10 = 60 + 10 = 70.

So, both I and II together are needed to get the answer.

∴   Correct answer is (*e*).

6. Let the maximum marks be x.

From I, we have: 32% of x + 1 = 36% of x − 1

$\Rightarrow \quad \dfrac{4}{100}\ x = 2 \Rightarrow x = 50.$

∴ Pass marks = 32% of 50 + 1 = 17.

From II, we have: 30% of x + 2 = 40% x − 3

$\Rightarrow \quad \dfrac{10}{100}x = 5 \Rightarrow x = 50.$

∴ Pass marks = 30% of 50 + 2 = 17.

So, I alone as well as II alone gives the answer.

∴ Correct answer is (*c*).

7. From II, it is clear that less than 20 percent of the population of age 30 years or more is bilingual.

So, II alone gives the answer while I alone does not.

∴ Correct answer is (*b*).

8. Clearly, gross receipts are affected by change in both price and sale of products.

So, from I and II, we have:

Let the original price be ₹ 100 per unit and original sale be 100 units.

Original gross receipts = ₹ (100 × 100) = ₹ 10000.

New price = ₹ 75, New sale = 120 units.

New gross receipts = ₹ (75 × 120) = ₹ 9000.

∴ Net decrease = $\left(\dfrac{1000}{10000}\times 100\right)\% = 10\%.$

Thus, both I and II together are needed to get the answer.

∴ Correct answer is (*e*).

9. From both I and II, we have

Let Altaf's income in 2008 be ₹ x.

Then, his income in 2009 = 120% of ₹ x = ₹ $\dfrac{6x}{5}$.

∴ Income in 2010 = ₹ $\left[300000 - \left(x + \dfrac{6x}{5}\right)\right]$

= ₹ $\left(300000 - \dfrac{11x}{5}\right)$ which cannot be determined.

So, even I and II together cannot give the answer.

∴ Correct answer is (*d*).

10. From II, we have:

Let the number of tickets in VIP area category be x.

Then, total number of tickets in standing and sitting categories

= (100 + 150)% of x = 250% of x = $\dfrac{5x}{2}$.

∴ $x + \dfrac{5x}{2} = 10000 \Rightarrow \dfrac{7x}{2} = 10000 \Rightarrow x = \dfrac{10000 \times 2}{7}.$

So, II alone gives the answer while I alone is insufficient.

∴ Correct answer is (*b*).

11. To find the number of chocolates that Sheetal can buy, we need to know the total amount available with her for chocolates and the cost of each chocolate.

From I, we have

Amount available with Sheetal for chocolates

= [100 − (20 + 30)]% of ₹ 50 = ₹ 25.

From II, we have

Required number of chocolates = ₹ $\left(\dfrac{25}{0.25}\right) = 100.$

So, both I and II together are needed to get the answer.

∴ Correct answer is (*e*).

12. From I, we have 20% of x = 5 × 4 = 20.

From II, we have: $4x = S = 5y = 5 \times 80 = 400$ or $x = 100$.

So, 20% of x = 20.

Thus, either I alone or II alone gives the answer.

∴ Correct answer is (*c*).

13. From I, we have 40% of x = 20% of 50 = 10

or $x = \dfrac{10 \times 100}{40} = 25$ ...(*i*)

From II, we have 30% of y = 25% of 72 = 18

or $y = \dfrac{18 \times 100}{30} = 60.$ ...(*ii*)

From (*i*) and (*ii*), we have: x: y = 25: 60 = 5: 12.

Thus, both I and II together are needed together the answer.

∴ Correct answer is (*e*).

14. From I, we have

Number of girls = 45% of 680 = 306.

Number of boys = (680 − 306) = 374.

∴ Required ratio = 306: 374 = 9: 11.

From II, we have

Required ratio = (100 − 55)% of x: 55% of x = 45: 55

= 9: 11.

Thus, either I alone or II alone gives the answer.

∴ Correct answer is (*c*).

15. From I we have

Let population of State A be x.

Then, population of State B = 80% of x = $\dfrac{4x}{5}$.

From II, we have

Sum of population of States A and B = (18 × 2) lakhs = 3600000.

From I and II, we have:

$x + \dfrac{4x}{5} = 3600000 \Rightarrow \dfrac{9x}{5} = 3600000$

$\Rightarrow x = \dfrac{3600000 \times 5}{9} = 2000000.$

∴ Population of State A = 2000000.

Thus, both I and II together are needed to get the answer.

∴ Correct answer is (*e*).

16. From II, we may calculate Mr. Roy's income for each month by calculating a 10% increase on previous month's income. The monthly incomes may then be added to get the annual income.

So, II alone gives the answer while I alone is insufficient.

∴ Correct answer is (*b*).

17. Let the total number of students in the class be x.

From II, we have: Percentage of girls = (100 − 80)%

= 20%.

So, from I and II, we have: 20% of x = 40

$\Rightarrow$ $x = \dfrac{40 \times 100}{20} = 200$.

Thus, both I and II together are needed to get the answer.

∴ Correct answer is (e).

18. We have

(60% of a) + (40% of b) = 50% of $(a + b)$, when $a = b$.

(60% of a) + (40% of b) > 50% of $(a + b)$, when $a > b$.

(60% of a) + (40% of b) < 50% of $(a + b)$, when $a < b$.

So, I alone gives the answer while II alone does not.

∴ Correct answer is (a).

19. From I, II and III, we have

Ritu's present salary = ₹ $\left[10000\left(1 + \dfrac{15}{100}\right)^5\right]$.

So, all I, II and III are needed to get the answer.

∴ Correct answer is (d).

20. I. A's marks = 45% of 200 = 90 ; B's marks

= 50% of 200 = 100;

C's marks = 60% of 200 = 120 ; D's marks

= 90 + 10 = 100.

II. Let maximum marks = x.

Then, (45% of x) + (45% of x + 10) = 190

$\Rightarrow$ $\dfrac{90}{100}x = 180$ $\Rightarrow$ $x = \dfrac{180 \times 100}{90} = 200$.

We may calculate the marks of each student as above.

III. Let maximum marks = x.

Then, 60% of x = 120 $\Rightarrow$ $x = \dfrac{120 \times 100}{60} = 200$.

We may again calculate the marks of each student as above.

Thus, any one of I, II and III alone is sufficient.

∴ Correct answer is (d).

21. Let maximum marks in each subject be 100.

I. M + Sc = 75% of 200 $\Rightarrow$ M + Sc = 150 ...(i)

II. H + Sc = 72% of 200 $\Rightarrow$ H + Sc = 144 ...(ii)

III. S = 85% of 100 $\Rightarrow$ S = 85 ...(iii)

Adding (i), (ii) and (iii), we get: M + H + 2Sc + S = 379.

Since marks in Science are not known, the total score of all the subjects cannot be calculated. Thus the question cannot be answered even with the information in all the three statements.

∴ Correct answer is (e).

22. Let the total number of children in the class be x.

I. Percentage of children speaking Hindi = 20%.

II. (100 − 20)% of x = 44 $\Rightarrow$ 80% of x = 44

$\Rightarrow$ $x = \dfrac{44 \times 100}{80} = 55$.

Thus, both I and II together give the answer.

∴ Correct answer is (a).

23. Let the profit earned in 2012 be ₹ x.

I. 140% of (profit in 2010) = x $\Rightarrow$ Profit in 2010

= $\dfrac{x \times 100}{140} = \dfrac{5x}{7}$.

II. 80% of (profit in 2011) = x $\Rightarrow$ Profit in 2011

= $\dfrac{x \times 100}{80} = \dfrac{5x}{4}$.

III. $\dfrac{5x}{7} + \dfrac{5x}{4}$ = 20 crore $\Rightarrow$ $\dfrac{55x}{28}$ = 20 crore

$\Rightarrow x = \left(\dfrac{20 \times 28}{55}\right)$ crore.

∴ Profit earned in 2011 = ₹ $\left(\dfrac{5}{4} \times \dfrac{20 \times 28}{55}\right)$ crore.

Thus, all the three statements together are needed.

∴ Correct answer is (d).

24. Let the total number of candidates be x.

I and II. We have: 70% of x − 30% of x = 1000

$\Rightarrow$ 40% of x = 1000 $\Rightarrow$ $x = \left(\dfrac{1000 \times 100}{40}\right) = 2500$.

II and III. Number of unsuccessful candidates = 1750.

Number of successful candidates = 1750 − 1000 = 750.

∴ Total number of candidates = 1750 + 750 = 2500.

I and III. Percentage of unsuccessful candidates = (100 − 30)% = 70%.

So, 70% of x = 1750 $\Rightarrow$ $x = \left(\dfrac{1750 \times 100}{70}\right) = 2500$.

Thus, any two of the three is sufficient to answer the question.

∴ Correct answer is (a).

25. Sumit's present salary = ₹ $\left[3500\left(1 + \dfrac{12}{100}\right)^7\right]$.

Thus, all the three statements are needed to answer the question.

∴ Correct answer is (d).

26. I. Let the length of the longest piece be x metres and that of each shorter piece be $(x − 1)$ metres.

Then, $2(x − 1) + x = 25 \Rightarrow 3x = 27 \Rightarrow x = 9$.

So, length of the longest piece = 9 m.

II and III. Let the length of each of the two smaller pieces be l metres.

Then, length of the longest piece = $112\dfrac{1}{2}\%$ of $l = \dfrac{9l}{8}$ m.

∴ $2l + \dfrac{9l}{8}$ = 25 $\Rightarrow 25l = 25 \times 8 \Rightarrow l = 8$.

So, length of the longest piece = $\left(\dfrac{9 \times 8}{8}\right)$ m = 9 m.

I and III. Let the length of each of the two smaller pieces be l metres.

Then, $12\dfrac{1}{2}\%$ of $l = 1$ $\Rightarrow$ $l = 8$.

So, length of the longest piece = (8 + 1) m = 9 m.

Thus, (I alone) or (II and III together) or (I and III together) are needed to answer the question *i.e.*, either (II or III

together) or (I alone) or (II alone) is redundant.

∴ Correct answer is (b).

27. I and II. Let the monthly income of Mr. X be ₹ p.

Then, $(100 - 85)\%$ of $p = 4500$

⇒ 15% of $p = 4500$

⇒ $p = \left(\dfrac{4500 \times 100}{15}\right) = 30000.$

II and III. Let the monthly expenditure be ₹ x.

Then, $x = \dfrac{x}{5} + 20400 \Rightarrow \dfrac{4x}{5} = 20400$

$\Rightarrow x = \dfrac{20400 \times 5}{5} = 25500$

So, monthly income of Mr. X = ₹ (25500 + 4500) = ₹ 30000.

I and III. Let the monthly income of Mr X be ₹ p.

Then, $\left(1 - \dfrac{1}{5}\right)$ of 85% of $p = 20400$

⇒ $\dfrac{4}{5} \times \dfrac{85}{100} \times p = 20400$

⇒ $p = \left(\dfrac{20400 \times 5 \times 100}{4 \times 85}\right) = 30000.$

Thus, any one of the three is redundant.

∴ Correct answer is (e).