

48. Let the number be x . Then,

$$75\% \text{ of } x + 75 = x \Leftrightarrow x - \frac{75}{100}x = 75 \Leftrightarrow x - \frac{3}{4}x = 75 \Leftrightarrow \frac{x}{4} = 75 \Leftrightarrow x = 300.$$

49. Let the number be x .

$$\text{Then, } x - 35 = \frac{80}{100}x \Leftrightarrow x - \frac{80}{100}x = 35 \Leftrightarrow x = \frac{35 \times 100}{20} = 175 \Leftrightarrow \frac{4}{5}x = 140.$$

50. Let the number be 100 and required multiplier be y .

$$\text{Then, } 100y = 129.7 \text{ or } y = \frac{129.7}{100} = 1.297.$$

51. Let the numbers be x and y . Then, 6.5% of x = 8.5% of y $\Leftrightarrow x = \frac{85}{65}y = \frac{17}{13}y$.

$$\text{Now, } x + y = 2490 \Rightarrow \frac{17}{13}y + y = 2490 \Rightarrow \frac{30}{13}y = 2490 \Rightarrow y = \left(\frac{2490 \times 13}{30} \right) = 1079.$$

\therefore One number = $y = 1079$, other number = $\frac{17}{13}y = 1411$.

52. Let the numbers be x and y . Then,

$$x + y = \frac{28}{25}x \Leftrightarrow y = \frac{28}{25}x - x \Leftrightarrow y = \frac{3}{25}x \Leftrightarrow \frac{y}{x} = \left(\frac{3}{25} \times 100 \right)\% = 12\%.$$

53. Let the numbers be x and y .

$$\text{Then, } y - 25\% \text{ of } x = \frac{5}{6}y \Leftrightarrow y - \frac{5}{6}y = \frac{25}{100}x \Leftrightarrow \frac{y}{6} = \frac{x}{4} \Leftrightarrow \frac{x}{y} = \frac{4}{6} = \frac{2}{3}.$$

54. Let the larger number be x .

$$\text{Then, } x - 20 = \frac{20}{100}x \Leftrightarrow x - \frac{1}{5}x = 20 \Leftrightarrow \frac{4}{5}x = 20 \Leftrightarrow x = \left(20 \times \frac{5}{4} \right) = 25.$$

55. Let the numbers be x and y . Then, $\frac{x}{12} = \frac{y}{4} \Leftrightarrow x = 3y$.

$$\therefore \text{Required percentage} = \left(\frac{x - y}{y} \times 100 \right)\% = \left(\frac{2y}{y} \times 100 \right)\% = 200\%.$$

56. Let one number = x . Then, other number = 80% of $x = \frac{4}{5}x$

$$\therefore 4 \left[x^2 + \left(\frac{4}{5}x \right)^2 \right] = 656 \Leftrightarrow x^2 + \frac{16}{25}x^2 = 164 \Leftrightarrow \frac{41}{25}x^2 = 164 \Leftrightarrow x^2 = \left(\frac{164 \times 25}{41} \right) = 100 \Leftrightarrow x = 100.$$

So, the numbers are 10 and 8.

57. 5% of A + 4% of B = $\frac{2}{3}$ (6% of A + 8% of B)

$$\Leftrightarrow \frac{5}{100}A + \frac{4}{100}B = \frac{2}{3} \left(\frac{6}{100}A + \frac{8}{100}B \right)$$

$$\Leftrightarrow \frac{1}{20}A + \frac{1}{25}B = \frac{1}{25}A + \frac{4}{75}B \Leftrightarrow \left(\frac{1}{20} - \frac{1}{25} \right)A = \left(\frac{4}{75} - \frac{1}{25} \right)B$$

$$\Leftrightarrow \frac{1}{100}A = \frac{1}{75}B \Leftrightarrow \frac{A}{B} = \frac{100}{75} = \frac{4}{3}$$

58. Total number of votes polled = $(1136 + 7636 + 11628) = 20400$.

$$\therefore \text{Required percentage} = \left(\frac{11628}{20400} \times 100 \right)\% = 57\%$$

59. Increase in 10 years = $(262500 - 175000) = 87500$.

$$\text{Increase \%} = \left(\frac{87500}{175000} \times 100 \right)\% = 50\%$$

$$\therefore \text{Required average} = \left(\frac{50}{10} \right)\% = 5\%$$

60. Let the number be x . Then, error = $\frac{5}{3}x - \frac{3}{5}x = \frac{16}{15}x$

$$\text{Error \%} = \left(\frac{16x}{15} \times \frac{3}{5x} \times 100 \right)\% = 64\%$$

61. Let the original value of the tempo be Rs. x . Then,

$$1.3\% \text{ of } \frac{4}{5} \text{ of } x = 910 \Leftrightarrow \frac{13}{10} \times \frac{1}{100} \times \frac{4}{5} \times x = 910$$

$$\text{dots} = \left(\frac{910 \times 10 \times 100 \times 5}{13 \times 4} \right) = 87500.$$

62. Let the total production be x lakh tons. Then, $15\% \text{ of } x - 10\% \text{ of } x = (40 - 30)$ lakh tons

$$\Leftrightarrow 5\% \text{ of } x = 10 \text{ lakh tons} \Leftrightarrow x = \left(\frac{10 \times 100}{5} \right) = 200 \text{ lakh tons.}$$

63. Let the number of candidates appeared from each state be x .

$$\text{Then, } 7\% \text{ of } x - 6\% \text{ of } x = 80 \Leftrightarrow 1\% \text{ of } x = 80 \Leftrightarrow x = 80 \times 100 = 8000.$$

64. Amount paid to car owner = $90\% \text{ of } 85\% \text{ of } \text{Rs. } 3,25,000$

$$= \text{Rs. } \left(\frac{90}{100} \times \frac{85}{100} \times 325000 \right) = \text{Rs. } 2,48,625.$$

$$\therefore \text{Required difference} = \text{Rs. } (325000 - 248625) = \text{Rs. } 76,375.$$

65. Let the amount of taxable purchases be Rs. x .

$$\text{Then, } 6\% \text{ of } x = \frac{30}{100} \Leftrightarrow x = \left(\frac{30}{100} \times \frac{100}{6} \right) = 5.$$

$$\therefore \text{Cost of tax free items} = \text{Rs. } [25 - (5 + 0.30)] = \text{Rs. } 19.70.$$

66. Number of runs made by running = $110 - (3 \times 4 + 8 \times 6) = 50$.

$$\therefore \text{Required percentage} = \left(\frac{50}{110} \times 100 \right)\% = 45\frac{5}{11}\%.$$

67. Let the marked price be x .

$$\text{Then, } x - 5\% \text{ of } x = 9595 \Leftrightarrow 95\% \text{ of } x = 9595 \Leftrightarrow x = \left(\frac{9595 \times 100}{95} \right) = 10100.$$

68. Suppose originally he had x apples.

$$\text{Then, } (100 - 40)\% \text{ of } x = 420 \Leftrightarrow \frac{60}{100} \times x = 420 \Leftrightarrow x = \left(\frac{420 \times 100}{60} \right) = 700.$$

69. Let the monthly income be Rs. x .

$$\text{Then, } \left(100 - 66\frac{2}{3}\% \right) \text{ of } x = 1200 \Leftrightarrow 33\frac{1}{3}\% \text{ of } x = 1200$$

$$\Leftrightarrow \frac{100}{3} \times \frac{1}{100} \times x = 1200 \Leftrightarrow x = 1200 \times 3 = 3600.$$

$$\therefore \text{Monthly expenses} = \text{Rs. } (3600 - 1200) = \text{Rs. } 2400.$$

70. Let the number of students appeared be x .

$$\text{Then, } 65\% \text{ of } x = 455 \Leftrightarrow \frac{65}{100}x = 455 \Leftrightarrow x = \left(\frac{455 \times 100}{65}\right) = 700.$$

71. Percentage of uncertain individuals $= [100 - (20 + 60)]\% = 20\%$.

$$\therefore 60\% \text{ of } x - 20\% \text{ of } x = 720 \Leftrightarrow 40\% \text{ of } x = 720$$

$$\Leftrightarrow \frac{40}{100}x = 720 \Leftrightarrow x = \left(\frac{720 \times 100}{40}\right) = 1800.$$

72. Let the maximum marks be x .

$$\text{Then, } 33\% \text{ of } x = 125 + 40 \Leftrightarrow \frac{33}{100}x = 165 \Leftrightarrow x = \left(\frac{165 \times 100}{33}\right) = 500.$$

73. Let the total number of votes polled be x .

$$\text{Then, votes polled by other candidate} = (100 - 84)\% \text{ of } x = 16\% \text{ of } x$$

$$\therefore 84\% \text{ of } x - 16\% \text{ of } x = 476 \Leftrightarrow \frac{68}{100}x = 476 \Leftrightarrow x = \left(\frac{476 \times 100}{68}\right) = 700.$$

74. Number of valid votes $= 80\% \text{ of } 7500 = 6000$.

$$\text{Valid votes polled by other candidate} = 45\% \text{ of } 6000 = \left(\frac{45}{100} \times 6000\right) = 2700.$$

75. Let the number of valid votes be x .

$$\text{Then, } 52\% \text{ of } x - 48\% \text{ of } x = 98 \Leftrightarrow 4\% \text{ of } x = 98$$

$$\Leftrightarrow \frac{4}{100}x = 98 \Leftrightarrow x = 98 \times 25 = 2450.$$

- ∴ Total number of votes polled $= (2450 + 68) = 2518$.

76. Let the total number of voters be x . Then, Votes polled $= 90\% \text{ of } x$.

$$\text{Valid votes} = 90\% \text{ of } (90\% \text{ of } x).$$

$$\therefore 54\% \text{ of } [90\% \text{ of } (90\% \text{ of } x)] - 46\% \text{ of } [90\% \text{ of } (90\% \text{ of } x)] = 1620$$

$$\Leftrightarrow 8\% \text{ of } [90\% \text{ of } (90\% \text{ of } x)] = 1620$$

$$\Leftrightarrow \frac{8}{100} \times \frac{90}{100} \times \frac{90}{100} \times x = 1620 \Leftrightarrow x = \left(\frac{1620 \times 100 \times 100 \times 100}{8 \times 90 \times 90}\right) = 25000.$$

77. Let the number of persons eligible to vote be x . Then,

$$\text{Number of eligible persons between 18 and 21} = 8\% \text{ of } x.$$

$$\text{Number of persons between 18 and 21, who voted} = 85\% \text{ of } (8\% \text{ of } x)$$

$$= \left(\frac{85}{100} \times \frac{8}{100} \times x\right) = \frac{68}{1000}x.$$

$$\therefore \text{Required percentage} = \left(\frac{68x}{1000} \times \frac{1}{x} \times 100\right)\% = 6.8\%.$$

78. Let the number of persons eligible to vote be x .

$$\text{Then, voters who voted for A} = 30\% \text{ of } x.$$

$$\text{Voters who voted for B} = 60\% \text{ of } (70\% \text{ of } x).$$

$$= \left(\frac{60}{100} \times \frac{70}{100} \times 100\right)\% \text{ of } x = 42\% \text{ of } x.$$

$$\text{Voters who did not vote} = [100 - (30 + 42)]\% \text{ of } x = 28\% \text{ of } x.$$

$$\therefore 30\% \text{ of } x - 28\% \text{ of } x = 1200 \Leftrightarrow 2\% \text{ of } x = 1200 \Leftrightarrow x = \left(\frac{1200 \times 100}{2}\right) = 60000.$$

79. Let the sum paid to Y per week be Rs. z. Then, $z + 120\% \text{ of } z = 550$
- $$\Leftrightarrow z + \frac{120}{100} z = 550 \Leftrightarrow \frac{11}{5} z = 550 \Leftrightarrow z = \left(\frac{550 \times 5}{11} \right) = 250.$$
80. Total sales tax paid = 7% of Rs. 400 + 9% of Rs. 6400
- $$= \text{Rs.} \left(\frac{7}{100} \times 400 + \frac{9}{100} \times 6400 \right) = \text{Rs.} (28 + 576) = \text{Rs.} 604.$$
- Total cost of the items = Rs. $(400 + 6400) = \text{Rs.} 6800.$
- $$\therefore \text{Required percentage} = \left(\frac{604}{6800} \times 100 \right)\% = 8\frac{15}{17}\%.$$
81. Total marks secured = $(90\% \text{ of } 100 + 60\% \text{ of } 150 + 54\% \text{ of } 200)$
- $$= \left(\frac{90}{100} \times 100 + \frac{60}{100} \times 150 + \frac{54}{100} \times 200 \right) = (90 + 90 + 108) = 288.$$
- Total maximum marks = $(100 + 150 + 200) = 450.$
- $$\therefore \text{Aggregate percentage} = \left(\frac{288}{450} \times 100 \right)\% = 64\%.$$
82. Total number of students = $1100 + 700 = 1800.$
- Number of students passed = $(42\% \text{ of } 1100 + 30\% \text{ of } 700) = (462 + 210) = 672.$
- Number of failures = $1800 - 672 = 1128.$
- $$\therefore \text{Percentage failure} = \left(\frac{1128}{1800} \times 100 \right)\% = 62\frac{2}{3}\%.$$
83. Let the number of students be $x.$ Then,
- Number of students of or above 8 years = $(100 - 20)\% \text{ of } x = 80\% \text{ of } x.$
- $$\therefore 80\% \text{ of } x = 48 + \frac{2}{3} \text{ of } 48 \Leftrightarrow \frac{80}{100} x = 80 \Leftrightarrow x = 100.$$
84. Let the total number of applicants be $x.$ Number of eligible candidates = $95\% \text{ of } x.$
- Eligible candidates of other categories = $15\% \text{ of } (95\% \text{ of } x)$
- $$= \left(\frac{15}{100} \times \frac{95}{100} \times x \right) = \frac{57}{400} x.$$
- $$\therefore \frac{57}{400} x = 4275 \Leftrightarrow x = \left(\frac{4275 \times 400}{57} \right) = 30000.$$
85. Let their marks be $(x + 9)$ and $x.$
- Then, $x + 9 = \frac{56}{100} (x + 9 + x) \Leftrightarrow 25(x + 9) = 14(2x + 9) \Leftrightarrow 3x = 99 \Leftrightarrow x = 33.$
- So, their marks are 42 and 33.
86. $X = \frac{90}{100} Y \Rightarrow X = \frac{9}{10} Y \Rightarrow Y = \frac{10}{9} X \Rightarrow \frac{Y}{X} = \frac{10}{9}.$
- $$\therefore \text{Required percentage} = \left(\frac{Y}{X} \times 100 \right)\% = \left(\frac{10}{9} \times 100 \right)\% = 111\frac{1}{9}\%.$$
87. $x\% \text{ of } y = \left(\frac{x}{100} \times y \right) = \left(\frac{y}{100} \times x \right) = y\% \text{ of } x.$
88. $20\% \text{ of } a = b \Rightarrow \frac{20}{100} a = b.$
- $$\therefore b\% \text{ of } 20 = \left(\frac{b}{100} \times 20 \right) = \left(\frac{20}{100} a \times \frac{1}{100} \times 20 \right) = \frac{4}{100} a = 4\% \text{ of } a.$$

89. $\frac{x}{100} \times y = \frac{4}{5} \times 80 \Rightarrow xy = 64 \times 100 = 6400.$

90. Clearly, $y\% \text{ of } z = 2 (x\% \text{ of } y) \Rightarrow \frac{yz}{100} = \frac{2xy}{100} \Rightarrow z = 2x.$

91. $p\% \text{ of } p = 36 \Leftrightarrow \left(\frac{p}{100} \times p\right) = 36 \Leftrightarrow p^2 = 3600 \Leftrightarrow p = 60.$

92. $x\% \text{ of } y = z \Rightarrow \frac{x}{100}y = z \Rightarrow \frac{x}{z} = \frac{100}{y}.$

$\therefore \text{Required percentage} = \left(\frac{x}{z} \times 100\right)\% = \left(\frac{100}{y} \times 100\right)\% = \left(\frac{100^2}{y}\right)\%.$

93. $x = 80\% \text{ of } y \Leftrightarrow x = \frac{80}{100}y \Leftrightarrow \frac{y}{x} = \frac{5}{4} \Leftrightarrow \frac{y}{2x} = \frac{5}{8}.$

$\therefore \text{Required percentage} = \left(\frac{y}{2x} \times 100\right)\% = \left(\frac{5}{8} \times 100\right)\% = 62\frac{1}{2}\%.$

94. Let $x = 6\% \text{ of } x = xx.$ Then, $94\% \text{ of } x = xx \Leftrightarrow \frac{94}{100}x \times \frac{1}{x} = z \Leftrightarrow z = 0.94.$

95. $x\% \text{ of } y + y\% \text{ of } x = \frac{x}{100}y + \frac{y}{100}x = \frac{2xy}{100} = 2\% \text{ of } xy.$

96. $A = 150\% \text{ of } B \Rightarrow A = \frac{150}{100}B \Rightarrow \frac{A}{B} = \frac{3}{2} \Rightarrow \frac{A}{B} + 1 = \frac{3}{2} + 1$

$\Rightarrow \frac{A+B}{B} = \frac{5}{2} \Rightarrow \frac{B}{A+B} = \frac{2}{5}$

$\therefore \text{Required percentage} = \left(\frac{B}{A+B} \times 100\right)\% = \left(\frac{2}{5} \times 100\right)\% = 40\%.$

97. $8\% \text{ of } x = 4\% \text{ of } y \Rightarrow \frac{8}{100}x = \frac{4}{100}y \Rightarrow x = \frac{1}{2}y.$

$\therefore 20\% \text{ of } x = 20\% \text{ of } \frac{1}{2}y = 10\% \text{ of } y.$

98. $\frac{20}{100}A = B \text{ and } \frac{40}{100}B = C \Rightarrow \frac{1}{5}A = B \text{ and } \frac{2}{5}B = C \Rightarrow A = 5B \text{ and } B = \frac{5}{2}C$

$\Rightarrow A = \frac{25}{2}C \text{ and } B = \frac{5}{2}C.$

$\therefore 60\% \text{ of } (A+B) = \frac{60}{100} \left(\frac{25}{2}C + \frac{5}{2}C \right) = \frac{60 \times 15}{100}C = \frac{900}{100}C = 900\% \text{ of } C.$

99. $x\% \text{ of } a = y\% \text{ of } b \Rightarrow \frac{x}{100}a = \frac{y}{100}b \Rightarrow b = \left(\frac{x}{y}\right)a \Rightarrow Y \frac{98}{100} = X$

$\therefore z\% \text{ of } b = \left(z\% \text{ of } \frac{x}{y}\right)a = \left(\frac{xz}{y \times 100}\right)a = \left(\frac{xz}{y}\right)\% \text{ of } a.$

100. $x\% \text{ of } y = \left(\frac{x}{100} \times y\right) = \left(\frac{y}{100} \times x\right) = y\% \text{ of } x \Rightarrow A = B.$

101. Let the first man's output be $x.$

Then, $33\frac{1}{3}\% \text{ of } x = 50\% \text{ of } 1500 \Leftrightarrow \left(\frac{100}{300} \times \frac{1}{100} \times x\right) = 750 \Leftrightarrow x = 750 \times 3 = 2250.$

Questions 102-106

Let the number of magazine-readers in city P be x .

$$\text{Then, } (100 - 75)\% \text{ of } x = 6000 \Leftrightarrow \frac{25}{100}x = 6000 \Leftrightarrow x = \left(\frac{6000 \times 100}{25}\right) = 24000.$$

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

102. The lowest number of magazine-readers is 5600 and this is in the case of city T.
103. The highest number of magazine-readers who read only one magazine a week is 18000 and this is in the case of city P.
104. The highest number of magazine-readers is 24000.
105. Number of magazine-readers in city Q reading only one magazine a week = 14000.
106. Total number of magazine-readers reading only one magazine a week
 $= (18000 + 14000 + 4500 + 3300 + 1400) = 41200$.
107. Saving = $[100 - (40 + 20 + 10 + 10)]\% = 20\%$. Let the monthly salary be Rs. x .
 $\text{Then, } 20\% \text{ of } x = 1500 \Leftrightarrow \frac{20}{100}x = 1500 \Leftrightarrow x = 1500 \times 5 = 7500$.
108. Let the total amount be Rs. x . Then, $(100 - 20)\% \text{ of } x = 35000 + 40000$
 $\Leftrightarrow 80\% \text{ of } x = 75000 \Leftrightarrow \frac{80}{100}x = 75000 \Leftrightarrow x = \left(\frac{75000 \times 5}{4}\right) = 93750$.
109. Saving = $50\% \text{ of } (100 - 40)\% \text{ of } (100 - 30)\% \text{ of } \text{Rs. } 18,400$
 $= \text{Rs. } \left(\frac{50}{100} \times \frac{60}{100} \times \frac{70}{100} \times 18400\right) = \text{Rs. } 3864$.
110. Height climbed in second hour = $12\frac{1}{2}\% \text{ of } \left(100 - 62\frac{1}{2}\%\right) \text{ of } 192 \text{ m}$
 $= \left(\frac{25}{2} \times \frac{1}{100} \times \frac{75}{2} \times \frac{1}{100} \times 192\right) \text{ m} = 9 \text{ m.}$
111. Let the total income be x .
 $\text{Then, income left} = (100 - 80)\% \text{ of } [100 - (35 + 25)]\% \text{ of } x = 20\% \text{ of } 40\% \text{ of } x$
 $= \left(\frac{20}{100} \times \frac{40}{100} \times 100\right)\% \text{ of } x = 8\% \text{ of } x$.
112. Let the total salary be Rs. x .
 $\text{Then, } (100 - 10)\% \text{ of } (100 - 20)\% \text{ of } (100 - 20)\% \text{ of } (100 - 10)\% \text{ of } x = 15552$
 $\Leftrightarrow \left(\frac{90}{100} \times \frac{80}{100} \times \frac{80}{100} \times \frac{90}{100} \times x\right) = 15552 \Leftrightarrow x = \left(\frac{15552 \times 10000}{64 \times 81}\right) = 30000$.
113. Let the amount with Aman be Rs. x .
 $\text{Then, amount received by Sahil} = \frac{1}{4} \text{ of } 40\% \text{ of } \text{Rs. } x = 10\% \text{ of } \text{Rs. } x$.

$$\therefore 10\% \text{ of } x = 600 + 200 \Leftrightarrow \frac{10}{100}x = 800 \Leftrightarrow x = 800 \times 10 = 8000.$$

114. Let the monthly salary of Sameer be Rs. x .

$$\text{Then, } [100 - (25 + 20)]\% \text{ of } [100 - (24 + 15)]\% \text{ of } x = 10736 \Leftrightarrow 55\% \text{ of } 61\% \text{ of } x = 10736$$

$$\Leftrightarrow \frac{55}{100} \times \frac{61}{100} \times x = 10736 \Leftrightarrow x = \left(\frac{10736 \times 100 \times 100}{55 \times 61} \right) = 32000.$$

115. Let the total number of children be x .

$$\text{Then, } x \times (20\% \text{ of } x) = 405 \Leftrightarrow \frac{1}{5}x^2 = 405 \Leftrightarrow x^2 = 2025 \Leftrightarrow x = 45.$$

$$\therefore \text{Number of sweets received by each child} = 20\% \text{ of } 45 = 9.$$

116. We have : $x + x\% \text{ of } 150 = 150$

$$\Leftrightarrow x + \frac{x}{100} \times 150 = 150 \Leftrightarrow \frac{5}{2}x = 150 \Leftrightarrow x = \left(\frac{150 \times 2}{5} \right) = 60.$$

$$117. 15 + \frac{1}{3}(n - 20) = 50\% \text{ of } n = \frac{50}{100}n = \frac{n}{2} \Leftrightarrow 90 + 2n - 40 = 3n \Leftrightarrow n = 50.$$

118. Let A's salary = Rs. x . Then, B's salary = Rs. $(2000 - x)$.

$$(100 - 95)\% \text{ of } A = (100 - 85)\% \text{ of } B \Leftrightarrow \frac{5}{100}x = \frac{15}{100}(2000 - x) \Leftrightarrow x = 1500.$$

$$119. \text{Let } B + M + D = x. \text{ Then, } B = 25\% \text{ of } x - 20 = \left(\frac{25}{100}x - 20 \right) = \left(\frac{x}{4} - 20 \right) \text{ and } D = 50.$$

$$\therefore \frac{x}{4} - 20 + M + 50 = x \text{ or } M = \left(\frac{3x}{4} - 30 \right).$$

So, marks in Maths cannot be determined.

$$120. \text{Let the total sales be Rs. } x. \text{ Then, } 5\frac{1}{2}\% \text{ of } x + \frac{1}{2}\% \text{ of } (x - 10000) = 1990$$

$$\Leftrightarrow \frac{11}{2} \times \frac{1}{100} \times x + \frac{1}{2} \times \frac{1}{100} \times (x - 10000) = 1990$$

$$\Leftrightarrow 12x - 10000 = 398000 \Leftrightarrow 12x = 408000 \Leftrightarrow x = 34000.$$

$$121. \text{Let the marks required be } x. \text{ Then, } (62 + 35 + x) = 35\% \text{ of } (150 + 150 + 180)$$

$$\Leftrightarrow 97 + x = \frac{35}{100} \times 480 \Leftrightarrow x = 168 - 97 = 71.$$

122. Let the number of students in the class be 100 and let the required average be x .

$$\text{Then, } (10 \times 95) + (20 \times 90) + (70 \times x) = (100 \times 80)$$

$$\Leftrightarrow 70x = 8000 - (950 + 1800) = 5250 \Leftrightarrow x = 75.$$

123. Let total marks = x . Then, $(30\% \text{ of } x) + 15 = (40\% \text{ of } x) - 35$

$$\Leftrightarrow \frac{30}{100}x + 15 = \frac{40}{100}x - 35 \Leftrightarrow \frac{1}{10}x = 50 \Leftrightarrow x = 500.$$

$$\text{So, passing marks} = (30\% \text{ of } 500) + 15 = \left(\frac{30}{100} \times 500 + 15 \right) = 165.$$

$$\therefore \text{Pass percentage} = \left(\frac{165}{500} \times 100 \right)\% = 33\%.$$

124. Let the price of a chair be Rs. x . Then, price of a table = Rs. $(x + 400)$.

$$\text{So, } 6(x + 400) + 6x = 4800 \Leftrightarrow 12x = 2400 \Leftrightarrow x = 200.$$

$$\therefore \text{Price of a table} = \text{Rs. } 600; \text{ Price of a chair} = \text{Rs. } 200.$$

$$\text{Required percentage} = \left(\frac{400}{600} \times 100 \right)\% = 66\frac{2}{3}\%.$$

125. Let the total number of houses be x . Then,

$$\therefore \text{Number of houses having one female only} = (100 - 25)\% \text{ of } (100 - 40)\% \text{ of } x \\ = \left(\frac{75}{100} \times \frac{60}{100} \times x \right) = \frac{9}{20} x.$$

$$\therefore \text{Required percentage} = \left(\frac{9x}{20} \times \frac{1}{x} \times 100 \right)\% = 45\%.$$

126. Let the total population be x . Then,

$$\text{Poor population} = \frac{60}{100} x = \frac{3}{5} x. \text{ Illiterate population} = \frac{40}{100} x = \frac{2}{5} x.$$

$$\text{Illiterate rich} = 10\% \text{ of } (100 - 60)\% \text{ of } x = \left(\frac{10}{100} \times \frac{40}{100} \times x \right) = \frac{x}{25}.$$

$$\text{Illiterate poor} = \left(\frac{2}{5} x - \frac{x}{25} \right) = \frac{9x}{25}.$$

$$\therefore \text{Required percentage} = \left(\frac{9x}{25} \times \frac{5}{3x} \times 100 \right)\% = 60\%.$$

127. Number of males = 60% of 1000 = 600. Number of females = $(1000 - 600) = 400$.

$$\text{Number of literates} = 25\% \text{ of } 1000 = 250.$$

$$\text{Number of literate males} = 20\% \text{ of } 600 = 120.$$

$$\text{Number of literate females} = (250 - 120) = 130.$$

$$\therefore \text{Required percentage} = \left(\frac{130}{400} \times 100 \right)\% = 32.5\%.$$

128. Let the total number of candidates be x . Then, $\left(100 - 62\frac{1}{2}\right)\% \text{ of } 37\frac{1}{2}\% \text{ of } x = 342$

$$\Leftrightarrow \frac{75}{2} \times \frac{1}{100} \times \frac{75}{2} \times \frac{1}{100} \times x = 342 \Leftrightarrow \frac{9x}{64} = 342 \Leftrightarrow x = \left(\frac{342 \times 64}{9} \right) = 2432.$$

$$\text{Number of boys failed} = (100 - 75)\% \text{ of } \left(100 - 37\frac{1}{2}\right)\% \text{ of } 2432$$

$$= \left(\frac{25}{100} \times \frac{125}{2} \times \frac{1}{100} \times 2432 \right) = 380.$$

129. Let total population = x . Then, number of males = $\frac{5}{9} x$.

$$\text{Married males} = 30\% \text{ of } \frac{5}{9} x = \left(\frac{30}{100} \times \frac{5}{9} x \right) = \frac{x}{6}.$$

$$\text{Married females} = \frac{x}{6}; \text{ Number of females} = \left(x - \frac{5}{9} x \right) = \frac{4x}{9}.$$

$$\text{Unmarried females} = \left(\frac{4x}{9} - \frac{x}{6} \right) = \frac{5x}{18}.$$

$$\therefore \text{Required percentage} = \left(\frac{5x}{18} \times \frac{1}{x} \times 100 \right)\% = 27\frac{7}{9}\%.$$

130. Migrants = 35% of 728400 = $\left(\frac{35}{100} \times 728400 \right) = 254940$.

$$\text{Local population} = (728400 - 254940) = 473460.$$

Rural population = 20% of 473460 = 94692.

Urban population = $(254940 - 94692) = 160248$.

\therefore Female population = 48% of 473460 + 30% of 94692 + 40% of 160248

$$\begin{aligned} &= \left(\frac{48}{100} \times 473460 + \frac{30}{100} \times 94692 + \frac{40}{100} \times 160248 \right) \\ &= 227260.8 + 28407.6 + 64099.2 = 896660. \end{aligned}$$

131. Let the number of boys and girls be $3x$ and $2x$ respectively. Then,

$$\text{No. of students who are not adults} = \left(\frac{80}{100} \times 3x \right) + \left(\frac{75}{100} \times 2x \right) = \left(\frac{12x}{5} + \frac{3x}{2} \right) = \frac{39x}{10}.$$

$$\therefore \text{Required percentage} = \left(\frac{39x}{10} \times \frac{1}{5x} \times 100 \right)\% = 78\%.$$

132. Suppose monthly rent = Rs. x . Then, $12x - \frac{25}{2}\% \text{ of } 12x - 1660 = 10\% \text{ of } 500000$

$$\Leftrightarrow 12x - \frac{25}{200} \times 12x - 1660 = 50000 \Leftrightarrow \frac{21x}{2} = 51660 \Leftrightarrow x = \left(51660 \times \frac{2}{21} \right) = 4920.$$

133. Let total debt = x . Asset = $\frac{87}{100}x$.

After paying 20% of the debt, he is left with 80% of the debt plus Rs. 42.

$$\therefore 80\% \text{ of } x + 42 = \frac{87}{100}x \Leftrightarrow \frac{87}{100}x - \frac{80}{100}x = 42 \Leftrightarrow x = 600.$$

$$\text{So, debt} = \text{Rs. } 600 \text{ and assets} = \text{Rs. } \left(\frac{87}{100} \times 600 \right) = \text{Rs. } 522.$$

134. Let the original price be Rs. 100.

$$\text{New final price} = 120\% \text{ of } (75\% \text{ of Rs. } 100) = \text{Rs. } \left(\frac{120}{100} \times \frac{75}{100} \times 100 \right) = \text{Rs. } 90.$$

\therefore Decrease = 10%.

135. Let the original price be Rs. 100.

$$\text{New final price} = 85\% \text{ of } (115\% \text{ of Rs. } 100) = \text{Rs. } \left(\frac{85}{100} \times \frac{115}{100} \times 100 \right) = \text{Rs. } 97.75.$$

\therefore Decrease = $(100 - 97.75)\% = 2.25\%$.

136. Let the original number be x .

$$\text{Final number obtained} = 110\% \text{ of } (90\% \text{ of } x) = \left(\frac{110}{100} \times \frac{90}{100} \times x \right) = \frac{99}{100}x.$$

$$\therefore x - \frac{99}{100}x = 10 \Leftrightarrow \frac{1}{100}x = 10 \Leftrightarrow x = 10 \times 100 = 1000.$$

137. Let the original price be Rs. x .

$\therefore (100 - r)\% \text{ of } (100 + r)\% \text{ of } x = 1$

$$\Rightarrow \frac{(100 - r)}{100} \times \frac{(100 + r)}{100} \times x = 1 \Rightarrow x = \frac{100 \times 100}{(100 - r)(100 + r)} = \frac{10000}{(10000 - r^2)}.$$

138. Let original income = Rs. 100. Then, saving = Rs. 10 and expenditure = Rs. 90.

New income = Rs. 120, New saving = Rs. 10.

New expenditure = Rs. $(120 - 10) = \text{Rs. } 110$.

Increase in expenditure = Rs. $(110 - 90) = \text{Rs. } 20$.

$$\therefore \text{Increase\%} = \left(\frac{20}{90} \times 100 \right)\% = 22\frac{2}{9}\%.$$

139. Let Madan's income be Rs. x .

Then, Net income = $(100 - 10)\%$ of Rs. x = 90% of Rs. x = Rs. $\frac{9x}{10}$.

New net income = 85% of 110% of Rs. x = Rs. $\left(\frac{85}{100} \times \frac{110}{100} \times x\right)$ = Rs. $\frac{187}{200}x$.

$$\therefore \frac{187x}{200} - \frac{9x}{10} = 350 \Leftrightarrow \frac{7x}{200} = 350 \Leftrightarrow x = \left(\frac{350 \times 200}{7}\right) = 10000.$$

140. Let his investment in the year 2000 be Rs. x .

Then, income in 2000 = Rs. $[x + 20\% \text{ of } x]$ = Rs. $\frac{120}{100}x$.

Income in 2001 = Rs. $\left[\frac{126}{100}(x - 5000)\right]$.

$$\therefore \frac{120}{100}x = \frac{126}{100}(x - 5000) \Leftrightarrow 120x = 126(x - 5000) \Leftrightarrow 6x = 630000 \Leftrightarrow x = 105000.$$

141. Let original salary = Rs. 100. New salary = Rs. 120.

Decrease on 120 = 20. Decrease on 100 = $\left(\frac{20}{120} \times 100\right)\% = 16\frac{2}{3}\%$.

142. Let original number = 100.

New number = 120% of 120% of 100 = $\left(\frac{120}{100} \times \frac{120}{100} \times 100\right)$ = 144.

Decrease on 144 = 44. Decrease on 100 = $\left(\frac{44}{144} \times 100\right)\% = 30\frac{5}{9}\%$.

143. Let original price per T.V. = Rs. 100 and original sale = 100 T.V.s.

Then, total revenue = Rs. (100×100) = Rs. 10,000.

New revenue = Rs. (75×120) = Rs. 9000.

$$\therefore \text{Decrease in revenue} = \left(\frac{1000}{10000} \times 100\right)\% = 10\%.$$

144. Let original consumption = 100 units and original price = Rs. 100 per unit.

Original expenditure = Rs. (100×100) = Rs. 10000.

New expenditure = Rs. (120×80) = Rs. 9600.

$$\therefore \text{Decrease in expenditure} = \left(\frac{400}{10000} \times 100\right)\% = 4\%.$$

145. Let the total original sale be Rs. 100. Then, original number of visitors = 100.

$$\text{New number of visitors} = \frac{120}{0.75} = 160.$$

\therefore Increase% = 60%.

146. Suppose the business value changes from x to y .

$$4\% \text{ of } x = 5\% \text{ of } y \Rightarrow \frac{4}{100}x = \frac{5}{100}y \Rightarrow y = \frac{4}{5}x.$$

$$\therefore \text{Change in business} = \left(x - \frac{4}{5}x\right) = \frac{x}{5}.$$

$$\text{Percentage slump} = \left(\frac{x}{5} \times \frac{1}{x} \times \frac{1}{100}\right)\% = 20\%.$$

147. Let the original fraction be $\frac{x}{y}$. Then, new fraction = $\frac{140\% \text{ of } x}{180\% \text{ of } y} = \frac{140x}{180y} = \frac{7x}{9y}$.

$$\therefore \frac{\text{New fraction}}{\text{Original fraction}} = \left(\frac{7x}{9y} \times \frac{y}{x} \right) = \frac{7}{9}.$$

148. Decrease in consumption = $\left[\frac{R}{(100 + R)} \times 100 \right] \% = \left(\frac{30}{130} \times 100 \right) \% = 23\frac{1}{13}\%$.

149. Increase in consumption = $\left[\frac{R}{(100 - R)} \times 100 \right] \% = \left(\frac{16}{84} \times 100 \right) \% = \frac{400}{21}\% = 19.04\% \approx 19\%$.

150. Let original consumption be 1 unit costing Rs. 100.

New cost = Rs. 125. New consumption = $\left(\frac{1}{125} \times 100 \right) = \frac{4}{5}$ unit.

$$\therefore \frac{\text{Reduction in consumption}}{\text{Original consumption}} = \frac{\left(1 - \frac{4}{5} \right)}{1} = \frac{1}{5}, \text{ i.e., } 1 : 5.$$

151. Let original consumption = 100 kg and new consumption = x kg.

$$\text{So, } 100 \times 6 = x \times 7.50 \Leftrightarrow x = 80 \text{ kg.}$$

\therefore Reduction in consumption = 20%.

152. Let expenditures on food and other items be Rs. $2x$ and Rs. $5x$.

$$\text{Then, } 2x + 5x = 2590 \text{ or } x = 370.$$

So, expenditure on food = Rs. (2×370) = Rs. 740.

Expenditure on other items = Rs. (5×370) = Rs. 1850.

New expenditure = 110% of Rs. 740 + 115% of Rs. 1850

$$= \text{Rs.} \left(\frac{110}{100} \times 740 + \frac{115}{100} \times 1850 \right) = \text{Rs.} (814 + 2127.50) = \text{Rs.} 2941.50.$$

\therefore Desired increase = Rs. $(2941.50 - 2590)$ = Rs. 351.50.

153. Population after 3 years = $64000 \times \left(1 + \frac{5}{2 \times 100} \right)^3 = \left(64000 \times \frac{41}{40} \times \frac{41}{40} \times \frac{41}{40} \right) = 68921$.

154. Cost after 2 years = Rs. $\left[20 \times \left(1 + \frac{8}{100} \right)^2 \right] = \text{Rs.} \left(20 \times \frac{27}{25} \times \frac{27}{25} \right) = \text{Rs.} 23.33$.

155. Present population = $160000 \times \left(1 + \frac{3}{100} \right) \left(1 + \frac{5}{2 \times 100} \right) \left(1 + \frac{5}{100} \right)$
 $= \left(160000 \times \frac{103}{100} \times \frac{41}{40} \times \frac{21}{20} \right) = 177366$.

156. Present population = $62500 \times \left(1 - \frac{4}{100} \right)^2 = \left(62500 \times \frac{24}{25} \times \frac{24}{25} \right) = 57600$.

157. Let the present value be Rs. 100.

Value after 3 years = Rs. $\left[100 \times \left(1 - \frac{20}{100} \right)^3 \right] = \text{Rs.} \left(100 \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5} \right) = \text{Rs.} 51.20$.

\therefore Reduction in value = $(100 - 51.20)\% = 48.8\%$.

158. Population in 1998 = $\frac{138915}{\left(1 + \frac{5}{100}\right)^3} = \left(138915 \times \frac{20}{21} \times \frac{20}{21} \times \frac{20}{21}\right) = 120000.$

159. Purchase price = Rs. $\left[\frac{8748}{\left(1 - \frac{10}{100}\right)^3} \right] = \text{Rs.} \left(8748 \times \frac{10}{9} \times \frac{10}{9} \times \frac{10}{9} \right) = \text{Rs.} 12000.$

160. Number of ticketless travellers in April
 $= 4000 \times \left(1 + \frac{5}{100}\right) \left(1 - \frac{5}{100}\right) \left(1 - \frac{10}{100}\right) = \left(4000 \times \frac{21}{20} \times \frac{19}{20} \times \frac{9}{10}\right) = 3591.$

161. Number of bushes in the beginning
 $= \frac{26730}{\left(1 + \frac{10}{100}\right) \left(1 + \frac{8}{100}\right) \left(1 - \frac{10}{100}\right)} = \left(26730 \times \frac{10}{11} \times \frac{25}{27} \times \frac{10}{9}\right) = 25000.$

162. Let the production in 1998 be 100 units. Then,

Production in 2002 = $100 \times \left(1 + \frac{15}{100}\right)^2 \left(1 - \frac{10}{100}\right) \left(1 + \frac{15}{100}\right)$
 $= \left(100 \times \frac{23}{20} \times \frac{23}{20} \times \frac{9}{10} \times \frac{23}{20}\right) = 136.88.$

∴ Increase in production = $(136.88 - 100)\% = 36.88\% \approx 37\%.$

163. $10 \text{ crores} \times \left(1 + \frac{R}{100}\right)^3 = 13.31 \text{ crores.}$
 $\therefore \left(1 + \frac{R}{100}\right)^3 = \frac{13.31 \text{ crores}}{10 \text{ crores}} = \frac{13.31}{10} = \frac{1331}{1000} = \left(\frac{11}{10}\right)^3.$
 So, $\left(1 + \frac{R}{100}\right) = \frac{11}{10} \Leftrightarrow \left(1 + \frac{R}{100}\right) = \left(1 + \frac{1}{10}\right) \Leftrightarrow \frac{R}{100} = \frac{1}{10} \Leftrightarrow R = 10.$

164. Let the required time be n years. Then, $72900 \times \left(1 + \frac{10}{100}\right)^n = 133100 \times \left(1 - \frac{10}{100}\right)^n$

$\Leftrightarrow \left(\frac{11}{10}\right)^n \times \left(\frac{10}{9}\right)^n = \frac{133100}{72900} \Leftrightarrow \left(\frac{11}{9}\right)^n = \frac{1331}{729} = \left(\frac{11}{9}\right)^3 \Leftrightarrow n = 3.$

165. Let original population = 100.

Population after 3 years = $100 \times \left(1 + \frac{\frac{3}{2}}{100}\right)^3 = 100 \times \frac{207}{200} \times \frac{207}{200} \times \frac{207}{200} = 110.87.$

∴ Increase = $(110.87 - 100)\% = 10.87\% \approx 10.8\%.$

166. Net growth on 1000 = $(32 - 11) = 21.$ Net growth on 100 = $\left(\frac{21}{1000} \times 100\right)\% = 2.1\%.$

167. Let the number of males be $x.$ Then, number of females = $(5000 - x).$

∴ 10% of $x + 15\%$ of $(5000 - x) = (5600 - 5000)$

$\Leftrightarrow \frac{10}{100}x + \frac{15}{100}(5000 - x) = 600 \Leftrightarrow 10x + 75000 - 15x = 60000$

$\Leftrightarrow 5x = 15000 \Leftrightarrow x = 3000.$

168. $A = 125\% \text{ of } B \Rightarrow A = \frac{125}{100} B \Rightarrow B = \frac{100}{125} A = \left(\frac{4}{5} \times 100\right)\% \text{ of } A = 80\% \text{ of } A.$

169. B's salary is less than A's by $\left[\frac{50}{(100+50)} \times 100\right]\% \text{ i.e., } \frac{100}{3}\% = 33\frac{1}{3}\%.$

170. Excess of B's height over A's $= \left[\frac{40}{(100-40)} \times 100\right]\% = \frac{200}{3}\% = 66\frac{2}{3}\%.$

171. $p = 6q$. So, q is less than p by $5q$.

$$\therefore \text{Required percentage} = \left(\frac{5q}{p} \times 100\right)\% = \left(\frac{5q}{6q} \times 100\right)\% = 83\frac{1}{3}\%.$$

172. Let third number be x .

Then, first number $= 70\% \text{ of } x = \frac{7x}{10}$; second number $= 63\% \text{ of } x = \frac{63x}{100}$.

Difference $= \left(\frac{7x}{10} - \frac{63x}{100}\right) = \frac{7x}{100}$.

$$\therefore \text{Required percentage} = \left(\frac{7x}{100} \times \frac{10}{7x} \times 100\right)\% = 10\%.$$

173. Let third number be x .

Then, first number $= 112\frac{1}{2}\% \text{ of } x = \frac{9x}{8}$; second number $= 125\% \text{ of } x = \frac{5}{4}x$.

$$\therefore \text{Required percentage} = \left(\frac{9x}{8} \times \frac{4}{5x} \times 100\right)\% = 90\%.$$

174. $A = 40\% \text{ of } B = 40\% \text{ of } (25\% \text{ of } C) = \left(\frac{40}{100} \times \frac{25}{100} \times 100\right)\% \text{ of } C = 10\% \text{ of } C.$

175. $\frac{5}{100}A = \frac{15}{100}B$ and $\frac{10}{100}B = \frac{20}{100}C \Rightarrow A = 3B$ and $B = 2C \Rightarrow 2 \times 2000 = 4000$.

$\therefore A = 3 \times 4000 = 12000$.

Hence, $A + B + C = (12000 + 4000 + 2000) = 18000$.

176. $P = \frac{140}{100}A = \frac{140}{100} \left(\frac{80}{100}M\right) = \left(\frac{140}{100} \times \frac{80}{100} \times 100\right)\% \text{ of } M = 112\% \text{ of } M.$

177. Let Deepak's monthly income = Rs. 100. Then, Raunaq's monthly income = Rs. 80.

Amit's monthly income = Rs. $\left(\frac{130}{100} \times 80\right)$ = Rs. 104.

If difference between Amit's and Deepak's income is Rs. 4, then Raunaq's income = Rs. 80.

If difference is Rs. 800, Raunaq's income = Rs. $\left(\frac{80}{4} \times 800\right)$ = Rs. 16000.

178. $A = \frac{120}{100}B$, $B = \frac{120}{100}C$ and $C = \frac{85}{100}D$.

$\therefore B = \frac{5}{6}A$, $C = \frac{5}{6}B$ and $D = \frac{20}{17}C$.

$B = \frac{5}{6} \times 576 = 480$; $C = \frac{5}{6} \times 480 = 400$; $D = \frac{20}{17} \times 400 = \frac{8000}{17}$.

So, required percentage $= \left(\frac{8000}{17} \times \frac{1}{800} \times 100\right)\% = 58.82\%$.

179. 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.

$$\text{Number of students qualified from school B} = \left(\frac{150}{100} \times 70 \right) = 105.$$

$$\therefore \text{Required percentage} = \left(\frac{105}{120} \times 100 \right)\% = 87.5\%.$$

180. 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.

$$\text{Then, } (100 - 20)\% \text{ of } x = 32 \Leftrightarrow \frac{80}{100}x = 32 \Leftrightarrow x = \left(\frac{32 \times 100}{80} \right) = 40.$$

181. 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

$$\Leftrightarrow 4\% \text{ of } 20 \text{ kg} = 5\% \text{ of } x \text{ kg} \Leftrightarrow x = \left(\frac{4}{5} \times 20 \right) \text{ kg} = 16 \text{ kg.}$$

182. Quantity of alcohol in 400 ml solution = $\left(\frac{15}{100} \times 400 \right)$ ml = 60 ml.

Quantity of water = $(400 - 60)$ ml = 340 ml.

Let x ml of alcohol be added.

$$\text{Then, } \frac{60+x}{400+x} = \frac{32}{100} \Leftrightarrow 6000 + 100x = 12800 + 32x \Leftrightarrow 68x = 6800 \Leftrightarrow x = 100.$$

183. Quantity of water in 10 litres = 5% of 10 litres = 0.5 litres.

$$\text{Let } x \text{ litres of pure milk be added. Then, } \frac{0.5}{10+x} = \frac{2}{100} \Leftrightarrow 2x = 30 \Leftrightarrow x = 15.$$

184. Quantity of alcohol in 9 ml lotion = $\left(\frac{50}{100} \times 9 \right)$ ml = 4.5 ml.

Let the water to be added be x ml.

$$\text{Then, } \frac{4.5}{9+x} = \frac{30}{100} \Leftrightarrow 270 + 30x = 450 \Leftrightarrow x = 6 \text{ ml.}$$

185. Quantity of sugar = $\left(\frac{40}{100} \times 3 \right)$ kg = 1.2 kg.

$$\therefore \text{New percentage} = \left(\frac{1.2}{4} \times 100 \right)\% = 30\%.$$

186. Required percentage = $\left(\frac{20\% \text{ of } 10 + 35\% \text{ of } 4}{10+4} \times 100 \right)\% = \left(\frac{3.4}{14} \times 100 \right)\% = 24\frac{2}{7}\%.$

187. Let the original quantity be x kg. Vanaspati ghee in x kg = $\left(\frac{40}{100}x \right)$ kg = $\left(\frac{2x}{5} \right)$ kg.

$$\text{Now, } \frac{\frac{2x}{5}}{x+10} = \frac{20}{100} \Leftrightarrow \frac{2x}{5x+50} = \frac{1}{5} \Leftrightarrow 5x = 50 \Leftrightarrow x = 10.$$

188. Let the original total weight be x . Weight of container = $\frac{25}{100}x = \frac{x}{4}$.

$$\text{Original weight of fluid} = \left(x - \frac{x}{4}\right) = \frac{3x}{4}.$$

$$\text{New weight of (container + fluid)} = \frac{50}{100}x = \frac{x}{2}. \text{ New weight of fluid} = \left(\frac{x}{2} - \frac{x}{4}\right) = \frac{x}{4}.$$

$$\therefore \text{Required fraction} = \frac{\left(\frac{3x}{4} - \frac{x}{4}\right)}{\frac{3x}{4}} = \frac{x}{2} \times \frac{4}{3x} = \frac{2}{3}.$$

189. Let total quantity of original milk = 1000 gm.

$$\text{Milk after first operation} = 80\% \text{ of } 1000 = 800 \text{ gm.}$$

$$\text{Milk after second operation} = 80\% \text{ of } 800 = 640 \text{ gm.}$$

$$\text{Milk after third operation} = 80\% \text{ of } 640 = 512 \text{ gm.}$$

$$\therefore \text{Strength of final mixture} = 51.2\%.$$

190. Let the capacity of the tank be 100 litres. Then,

Initially : A type petrol = 100 litres.

After first operation :

$$\text{A type petrol} = \left(\frac{100}{2}\right) = 50 \text{ litres; B type petrol} = 50 \text{ litres.}$$

After second operation :

$$\text{A type petrol} = \left(\frac{50 + 50}{2}\right) = 75 \text{ litres; B type petrol} = \left(\frac{50}{2}\right) = 25 \text{ litres.}$$

After third operation :

$$\text{A type petrol} = \left(\frac{75}{2}\right) = 37.5 \text{ litres; B type petrol} = \left(\frac{25}{2} + 50\right) = 62.5 \text{ litres.}$$

$$\therefore \text{Required percentage} = 37.5\%.$$

191. Total money = Rs. $\left(600 \times \frac{25}{100} + 1200 \times \frac{50}{100}\right)$ = Rs. 750.

$$25 \text{ paise coins removed} = \left(\frac{12}{100} \times 600\right) = 72.$$

$$50 \text{ paise coins removed} = \left(\frac{24}{100} \times 1200\right) = 288.$$

$$\text{Money removed} = \text{Rs.} \left(72 \times \frac{25}{100} + 288 \times \frac{50}{100}\right) = \text{Rs.} 162.$$

$$\therefore \text{Required percentage} = \left(\frac{162}{750} \times 100\right)\% = 21.6\%.$$

192. Let the original price be Rs. 100 per kg.

$$\text{Money required to buy 49 kg of rice} = \text{Rs.} (100 \times 49) = \text{Rs.} 4900.$$

$$\text{New price} = \text{Rs.} 98 \text{ per kg.}$$

$$\therefore \text{Quantity of rice bought} = \left(\frac{4900}{98}\right) \text{ kg} = 50 \text{ kg.}$$

193. Let original price = Rs. x per kg. Reduced price = Rs. $\left(\frac{79x}{100}\right)$ per kg. (A) $x = 100$

$$\therefore \frac{\frac{100}{79x} - \frac{100}{x}}{100} = 10.5 \Leftrightarrow \frac{10000}{79x} - \frac{100}{x} = 10.5$$

$$\Leftrightarrow 10000 - 7900 = 10.5 \times 79x \Leftrightarrow x = \frac{2100}{10.5 \times 79}.$$

$$\therefore \text{Reduced price} = \text{Rs.} \left(\frac{79}{100} \times \frac{2100}{10.5 \times 79} \right) \text{per kg} = \text{Rs.} 2 \text{ per kg.}$$

194. Let the original price per egg be Rs. x . Then, increased price = Rs. $\left(\frac{130}{100}x\right)$.

$$\therefore \frac{7.80}{x} - \frac{7.80}{\frac{130}{100}x} = 3 \Leftrightarrow \frac{7.80}{x} - \frac{7.80}{130x} = 3$$

$$\Leftrightarrow 1014 - 780 = 3 \times 130x \Leftrightarrow 390x = 234 \Leftrightarrow x = 0.6.$$

$$\text{So, present price per dozen} = \text{Rs.} \left(12 \times \frac{130}{100} \times 0.6 \right) = \text{Rs.} 9.36.$$

195. Let original price = Rs. x per kg. Reduced price = Rs. $\left(\frac{90x}{100}\right)$ per kg.

$$\therefore \frac{\frac{279}{90x} - \frac{279}{x}}{100} = 6.2 \Leftrightarrow \frac{27900}{90x} - \frac{279}{x} = 6.2$$

$$\Leftrightarrow 27900 - 25110 = 6.2 \times 90x$$

$$\Leftrightarrow 558x = 2790 \Leftrightarrow x = 5.$$

\therefore Required difference = 10% of Rs. 5 = Re. 0.50.

196. $n(A) = 34$, $n(B) = 42$, $n(A \cap B) = 20$.

$$\text{So, } n(A \cup B) = n(A) + n(B) - n(A \cap B) = 34 + 42 - 20 = 56.$$

\therefore Percentage failed in either or both the subjects = 56.

Hence, percentage passed = $(100 - 56)\% = 44\%$.

197. $n(A) = 40$, $n(B) = 50$, $n(A \cap B) = 10$.

$$n(A \cup B) = n(A) + n(B) - n(A \cap B) = 40 + 50 - 10 = 80.$$

\therefore Percentage reading either or both newspapers = 80%.

Hence, percentage reading neither newspaper = $(100 - 80)\% = 20\%$.

198. $n(A) = 325$, $n(B) = 175$, $n(A \cup B) = 450 - 50 = 400$.

$$\text{Required number} = n(A \cap B) = n(A) + n(B) - n(A \cup B) = 325 + 175 - 400 = 100.$$

199. $n(A) = \left(\frac{60}{100} \times 96 \right) = \frac{288}{5}$, $n(B) = \left(\frac{30}{100} \times 96 \right) = \frac{144}{5}$, $n(A \cap B) = \left(\frac{15}{100} \times 96 \right) = \frac{72}{5}$.

$$\therefore n(A \cup B) = n(A) + n(B) - n(A \cap B) = \frac{288}{5} + \frac{144}{5} - \frac{72}{5} = \frac{360}{5} = 72.$$

So, people who had either or both types of lunch = 72.

Hence, people who had neither type of lunch = $(96 - 72) = 24$.

200. $n(A) = \left(\frac{75}{100} \times 600 \right) = 450, n(B) = \left(\frac{45}{100} \times 600 \right) = 270, n(A \cup B) = 600.$

$$\therefore n(A \cap B) = n(A) + n(B) - n(A \cup B) = (450 + 270 - 600) = 120.$$

201. Let total number be x . Then,

$$n(A) = \frac{72}{100}x = \frac{18x}{25}, n(B) = \frac{44}{100}x = \frac{11x}{25} \text{ and } n(A \cap B) = 40.$$

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$\Rightarrow x = \frac{18x}{25} + \frac{11x}{25} - 40 \Rightarrow \frac{29x}{25} - x = 40 \Rightarrow \frac{4x}{25} = 40 \Rightarrow x = 250.$$

202. Let the total number of students be x .

Number passed in one or both is given by :

$$n(A \cup B) = n(A) + n(B) - n(A \cap B) = 65\% \text{ of } x + 60\% \text{ of } x - 40\% \text{ of } x$$

$$= \left(\frac{65}{100}x + \frac{60}{100}x - \frac{40}{100}x \right) = \frac{85}{100}x = \frac{17}{20}x.$$

$$\therefore \text{Failed in both} = \left(x - \frac{17}{20}x \right) = \frac{3x}{20}.$$

$$\therefore \frac{3x}{20} = 90 \Leftrightarrow x = \left(\frac{90 \times 20}{3} \right) = 600.$$

203. Failed in 1st subject = $\left(\frac{35}{100} \times 2500 \right) = 875.$

$$\text{Failed in 2nd subject} = \left(\frac{42}{100} \times 2500 \right) = 1050.$$

$$\text{Failed in both} = \left(\frac{15}{100} \times 2500 \right) = 375.$$

$$\text{Failed in 1st subject only} = (875 - 375) = 500.$$

$$\text{Failed in 2nd subject only} = (1050 - 375) = 675.$$

$$\therefore \text{Passed in 2nd only} + \text{Passed in 1st only} = (675 + 500) = 1175.$$

11. PROFIT AND LOSS

IMPORTANT FACTS

Cost Price : The price at which an article is purchased, is called its **cost price**, abbreviated as **C.P.**

Selling Price : The price at which an article is sold, is called its **selling price**, abbreviated as **S.P.**

Profit or Gain : If S.P. is greater than C.P., the seller is said to have a **profit** or **gain**.

Loss : If S.P. is less than C.P., the seller is said to have incurred a **loss**.

FORMULAE

$$1. \text{Gain} = (\text{S.P.}) - (\text{C.P.}) \quad 2. \text{Loss} = (\text{C.P.}) - (\text{S.P.})$$

3. Loss or gain is always reckoned on C.P.

$$4. \text{Gain\%} = \left(\frac{\text{Gain} \times 100}{\text{C.P.}} \right)$$

$$6. \text{S.P.} = \frac{(100 + \text{Gain\%})}{100} \times \text{C.P.}$$

$$8. \text{C.P.} = \frac{100}{(100 + \text{Gain\%})} \times \text{S.P.}$$

$$5. \text{Loss\%} = \left(\frac{\text{Loss} \times 100}{\text{C.P.}} \right)$$

$$7. \text{S.P.} = \frac{(100 - \text{Loss\%})}{100} \times \text{C.P.}$$

$$9. \text{C.P.} = \frac{100}{(100 - \text{Loss\%})} \times \text{S.P.}$$

10. If an article is sold at a gain of say, 35%, then S.P. = 135% of C.P.

11. If an article is sold at a loss of say, 35%, then S.P. = 65% of C.P.

12. When a person sells two similar items, one at a gain of say, $x\%$, and the other at a loss of $x\%$, then the seller always incurs a loss given by :

$$\text{Loss\%} = \left(\frac{\text{Common Loss and Gain\%}}{10} \right)^2 = \left(\frac{x}{10} \right)^2.$$

13. If a trader professes to sell his goods at cost price, but uses false weights, then

$$\text{Gain\%} = \left[\frac{\text{Error}}{(\text{True Value}) - (\text{Error})} \times 100 \right]\%.$$

SOLVED EXAMPLES

Ex. 1. A man buys an article for Rs. 27.50 and sells it for Rs. 28.60. Find his gain percent.

Sol. C.P. = Rs. 27.50, S.P. = Rs. 28.60.

So, Gain = Rs. (28.60 - 27.50) = Rs. 1.10.

$$\therefore \text{Gain\%} = \left(\frac{1.10}{27.50} \times 100 \right)\% = 4\%.$$

Ex. 2. If a radio is purchased for Rs. 490 and sold for Rs. 465.50, find the loss percent.

Sol. C.P. = Rs. 490, S.P. = Rs. 465.50.

$$\text{Loss} = \text{Rs. } (490 - 465.50) = \text{Rs. } 24.50.$$

$$\therefore \text{Loss\%} = \left(\frac{24.50}{490} \times 100 \right)\% = 5\%.$$

Ex. 3. Find S.P., when

(i) C.P. = Rs. 56.25, Gain = 20%

(ii) C.P. = Rs. 80.40, Loss = 5%

$$\text{Sol. (i) } \text{S.P.} = 120\% \text{ of Rs. } 56.25 = \text{Rs. } \left(\frac{120}{100} \times 56.25 \right) = \text{Rs. } 67.50.$$

$$\text{(ii) } \text{S.P.} = 85\% \text{ of Rs. } 80.40 = \text{Rs. } \left(\frac{85}{100} \times 80.40 \right) = \text{Rs. } 68.34.$$

Ex. 4. Find C.P., when

(i) S.P. = Rs. 40.60, Gain = 16%

(ii) S.P. = Rs. 51.70, Loss = 12%

$$\text{Sol. (i) } \text{C.P.} = \text{Rs. } \left(\frac{100}{116} \times 40.60 \right) = \text{Rs. } 35.$$

$$\text{(ii) } \text{C.P.} = \text{Rs. } \left(\frac{100}{88} \times 51.70 \right) = \text{Rs. } 58.75.$$

Ex. 5. A person incurs 5% loss by selling a watch for Rs. 1140. At what price should the watch be sold to earn 5% profit? (R.R.B. 2002)

Sol. Let the new S.P. be Rs. x . Then,

$$(100 - \text{loss\%}) : (\text{1st S.P.}) = (100 + \text{gain\%}) : (\text{2nd S.P.})$$

$$\Rightarrow \left(\frac{100 - 5}{1140} \right) = \left(\frac{100 + 5}{x} \right) \Rightarrow x = \left(\frac{105 \times 1140}{95} \right) = 1260.$$

\therefore New S.P. = Rs. 1260.

Ex. 6. A book was sold for Rs. 27.50 with a profit of 10%. If it were sold for Rs. 25.75, then what would have been the percentage of profit or loss? (Hotel Management, 2003)

Sol. S.P. = Rs. 27.50, Profit = 10%.

$$\text{So, C.P.} = \text{Rs. } \left(\frac{100}{110} \times 27.50 \right) = \text{Rs. } 25.$$

When S.P. = Rs. 25.75, profit = Rs. $(25.75 - 25) = \text{Rs. } 0.75$.

$$\therefore \text{Profit\%} = \left(\frac{0.75}{25} \times 100 \right)\% = 3\%.$$

Ex. 7. If the cost price is 96% of the selling price, then what is the profit percent?

Sol. Let S.P. = Rs. 100. Then, C.P. = Rs. 96; Profit = Rs. 4.

$$\therefore \text{Profit\%} = \left(\frac{4}{96} \times 100 \right)\% = \frac{25}{6}\% = 4.17\%.$$

Ex. 8. The C.P. of 21 articles is equal to S.P. of 18 articles. Find the gain or loss percent.

Sol. Let C.P. of each article be Re. 1.

Then, C.P. of 18 articles = Rs. 18, S.P. of 18 articles = Rs. 21.

$$\therefore \text{Gain\%} = \left(\frac{3}{18} \times 100 \right)\% = 16\frac{2}{3}\%.$$

Ex. 9. By selling 33 metres of cloth, one gains the selling price of 11 metres. Find the gain percent. (Section Officers', 2001)

$$\text{Sol. } (\text{S.P. of } 33 \text{ m}) - (\text{C.P. of } 33 \text{ m}) = \text{Gain} = \text{S.P. of } 11 \text{ m}$$

$$\therefore \text{S.P. of } 22 \text{ m} = \text{C.P. of } 33 \text{ m}$$

Let C.P. of each metre be Re. 1. Then, C.P. of 22 m = Rs. 22, S.P. of 22 m = Rs. 33.

$$\therefore \text{Gain \%} = \left(\frac{11}{22} \times 100 \right) \% = 50\%$$

Ex. 10. A vendor bought bananas at 6 for Rs. 10 and sold them at 4 for Rs. 6. Find his gain or loss percent.

Sol. Suppose, number of bananas bought = L.C.M. of 6 and 4 = 12.

$$\therefore \text{C.P.} = \text{Rs.} \left(\frac{10}{6} \times 12 \right) = \text{Rs.} 20; \text{S.P.} = \text{Rs.} \left(\frac{6}{4} \times 12 \right) = \text{Rs.} 18.$$

$$\therefore \text{Loss \%} = \left(\frac{2}{20} \times 100 \right) \% = 10\%$$

Ex. 11. A man bought toffees at 3 for a rupee. How many for a rupee must he sell to gain 50%?

$$\text{Sol. C.P. of 3 toffees} = \text{Re.} 1; \text{S.P. of 3 toffees} = 150\% \text{ of Re.} 1 = \frac{3}{2}$$

$$\text{For Rs.} \frac{3}{2}, \text{toffees sold} = 3. \text{For Re.} 1, \text{toffees sold} = \left(3 \times \frac{2}{3} \right) = 2$$

Ex. 12. A grocer purchased 80 kg of sugar at Rs. 13.50 per kg and mixed it with 120 kg sugar at Rs. 16 per kg. At what rate should he sell the mixture to gain 16%?

Sol. C.P. of 200 kg of mixture = Rs. $(80 \times 13.50 + 120 \times 16) = \text{Rs.} 3000$.

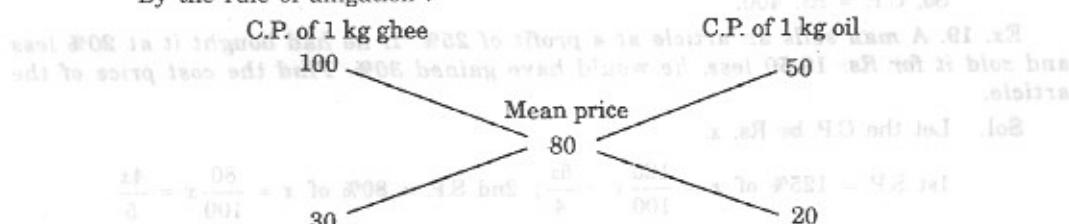
$$\text{S.P.} = 116\% \text{ of Rs.} 3000 = \text{Rs.} \left(\frac{116}{100} \times 3000 \right) = \text{Rs.} 3480.$$

$$\therefore \text{Rate of S.P. of the mixture} = \text{Rs.} \left(\frac{3480}{200} \right) \text{ per kg} = \text{Rs.} 17.40 \text{ per kg.}$$

Ex. 13. Pure ghee costs Rs. 100 per kg. After adulterating it with vegetable oil costing Rs. 50 per kg, a shopkeeper sells the mixture at the rate of Rs. 96 per kg, thereby making a profit of 20%. In what ratio does he mix the two?

$$\text{Sol. Mean cost price} = \text{Rs.} \left(\frac{100}{120} \times 96 \right) = \text{Rs.} 80 \text{ per kg.}$$

By the rule of alligation :



$$\therefore \text{Required ratio} = 30 : 20 = 3 : 2.$$

Ex. 14. A dishonest dealer professes to sell his goods at cost price but uses a weight of 960 gms for a kg. weight. Find his gain percent.

$$\text{Sol. Gain \%} = \left[\frac{\text{Error}}{(\text{True Value}) - (\text{Error})} \times 100 \right] \% = \left(\frac{40}{960} \times 100 \right) \% = 4 \frac{1}{6}\%$$

Ex. 15. If the manufacturer gains 10%, the wholesale dealer 15% and the retailer 25%, then find the cost of production of a table, the retail price of which is Rs. 1265?

Sol. Let the cost of production of the table be Rs. x .

Then, 125% of 115% of 110% of x = 1265

$$\Rightarrow \frac{125}{100} \times \frac{115}{100} \times \frac{110}{100} \times x = 1265 \Rightarrow \frac{253}{160} x = 1265 \Rightarrow x = \left(\frac{1265 \times 160}{253} \right) = \text{Rs. } 800.$$

Ex. 16. Monika purchased a pressure cooker at $\frac{9}{10}$ th of its selling price and sold it at 8% more than its S.P. Find her gain percent.

Sol. Let the S.P. be Rs. x . Then, C.P. = Rs. $\frac{9x}{10}$, Receipt = 108% of Rs. x = Rs. $\frac{27x}{25}$.

$$\text{Gain} = \text{Rs.} \left(\frac{27x}{25} - \frac{9x}{10} \right) = \text{Rs.} \left(\frac{108x - 90x}{100} \right) = \text{Rs.} \frac{18x}{100}.$$

$$\therefore \text{Gain\%} = \left(\frac{18x}{100} \times \frac{10}{9x} \times 100 \right)\% = 20\%.$$

Ex. 17. An article is sold at a certain price. By selling it at $\frac{2}{3}$ of that price one loses 10%. Find the gain percent at original price.

Sol. Let the original S.P. be Rs. x . Then, New S.P. = Rs. $\frac{2}{3}x$, Loss = 10%.

$$\text{So, C.P.} = \text{Rs.} \left(\frac{100}{90} \times \frac{2}{3}x \right) = \frac{20x}{27}.$$

$$\text{Now, C.P.} = \text{Rs.} \frac{20x}{27}, \text{S.P.} = \text{Rs. } x, \text{Gain} = \text{Rs.} \left(x - \frac{20x}{27} \right) = \text{Rs.} \frac{7x}{27}.$$

$$\therefore \text{Gain\%} = \left(\frac{7x}{27} \times \frac{27}{20x} \times 100 \right)\% = 35\%.$$

Ex. 18. A tradesman sold an article at a loss of 20%. If the selling price had been increased by Rs. 100, there would have been a gain of 5%. What was the cost price of the article? (S.S.C. 2004)

Sol. Let C.P. be Rs. x . Then, (105% of x) – (80% of x) = 100 or 25% of x = 100

$$\therefore \frac{x}{4} = 100 \text{ or } x = 400.$$

So, C.P. = Rs. 400.

Ex. 19. A man sells an article at a profit of 25%. If he had bought it at 20% less and sold it for Rs. 10.50 less, he would have gained 30%. Find the cost price of the article.

Sol. Let the C.P. be Rs. x .

$$\text{1st S.P.} = 125\% \text{ of } x = \frac{125}{100}x = \frac{5x}{4}; \text{2nd S.P.} = 80\% \text{ of } x = \frac{80}{100}x = \frac{4x}{5}.$$

$$\text{2nd S.P.} = 130\% \text{ of } \frac{4x}{5} = \left(\frac{130}{100} \times \frac{4x}{5} \right) = \frac{26x}{25}.$$

$$\therefore \frac{5x}{4} - \frac{26x}{25} = 10.50 \Leftrightarrow \frac{21x}{100} = 10.50 \Leftrightarrow x = \left(\frac{10.50 \times 100}{21} \right) = 50.$$

Hence, C.P. = Rs. 50.

Ex. 20. The price of a jewel, passing through three hands, rises on the whole by 65%. If the first and the second sellers earned 20% and 25% profit respectively, find the percentage profit earned by the third seller.

Sol. Let the original price of the jewel be Rs. P and let the profit earned by the third seller be $x\%$.

Then, $(100 + x)\%$ of 125% of 120% of P = 165% of P

$$\Rightarrow \left[\frac{(100+x)}{100} \times \frac{125}{100} \times \frac{120}{100} \times P \right] = \left(\frac{165}{100} \times P \right)$$

$$\Rightarrow (100+x) = \left(\frac{165 \times 100 \times 100}{125 \times 120} \right) = 110 \Rightarrow x = 10\%.$$

Ex. 21. A man sold two flats for Rs. 6,75,958 each. On one he gains 16% while on the other he loses 16%. How much does he gain or lose in the whole transaction?

Sol. Remember : In such a case, there is always a loss. The selling price is immaterial.

$$\therefore \text{Loss\%} = \left(\frac{\text{Common Loss and Gain\%}}{10} \right)^2 = \left(\frac{16}{10} \right)^2 \% = \left(\frac{64}{25} \right) \% = 2.56\%.$$

Ex. 22. A dealer sold three-fourth of his articles at a gain of 20% and the remaining at cost price. Find the gain earned by him in the whole transaction.

Sol. Let C.P. of whole be Rs. x.

$$\text{C.P. of } \frac{3}{4} \text{ th} = \text{Rs. } \frac{3x}{4}, \text{ C.P. of } \frac{1}{4} \text{ th} = \text{Rs. } \frac{x}{4}.$$

$$\therefore \text{Total S.P.} = \text{Rs. } \left[\left(120\% \text{ of } \frac{3x}{4} \right) + \frac{x}{4} \right] = \text{Rs. } \left(\frac{9x}{10} + \frac{x}{4} \right) = \text{Rs. } \frac{23x}{20}.$$

$$\text{Gain} = \text{Rs. } \left(\frac{23x}{20} - x \right) = \text{Rs. } \frac{3x}{20}.$$

$$\therefore \text{Gain\%} = \left(\frac{3x}{20} \times \frac{1}{x} \times 100 \right) \% = 15\%.$$

Ex. 23. A man bought a horse and a carriage for Rs. 3000. He sold the horse at a gain of 20% and the carriage at a loss of 10%, thereby gaining 2% on the whole. Find the cost of the horse. (M.B.A. 2002)

Sol. Let the C.P. of the horse be Rs. x. Then, C.P. of the carriage = Rs. $(3000 - x)$.

$$\therefore 20\% \text{ of } x - 10\% \text{ of } (3000 - x) = 2\% \text{ of } 3000$$

$$\Rightarrow \frac{x}{5} - \frac{(3000 - x)}{10} = 60 \Rightarrow 2x - 3000 + x = 600 \Rightarrow 3x = 3600 \Rightarrow x = 1200.$$

Hence, C.P. of the horse = Rs. 1200.

Ex. 24. Find the single discount equivalent to a series discount of 20%, 10% and 5%.

Sol. Let marked price be Rs. 100.

Then, Net S.P. = 95% of 90% of 80% of Rs. 100

$$= \text{Rs. } \left(\frac{95}{100} \times \frac{90}{100} \times \frac{80}{100} \times 100 \right) = \text{Rs. } 68.40.$$

$$\therefore \text{Required discount} = (100 - 68.40)\% = 31.6\%.$$

Ex. 25. After getting two successive discounts, a shirt with a list price of Rs. 150 is available at Rs. 105. If the second discount is 12.5%, find the first discount.

Sol. Let the first discount be $x\%$.

$$\text{Then, } 87.5\% \text{ of } (100 - x)\% \text{ of } 150 = 105$$

$$\Rightarrow \frac{87.5}{100} \times \frac{(100-x)}{100} \times 150 = 105 \Rightarrow 100 - x = \left(\frac{105 \times 100 \times 100}{150 \times 87.5} \right) = 80$$

$$\Rightarrow x = (100 - 80) = 20.$$

$$\therefore \text{First discount} = 20\%.$$

Ex. 26. An uneducated retailer marks all his goods at 50% above the cost price and thinking that he will still make 25% profit, offers a discount of 25% on the marked price. What is his actual profit on the sales? (IGNOU, 2003)

Sol. Let C.P. = Rs. 100. Then, marked price = Rs. 150.
 $\text{S.P.} = 75\% \text{ of Rs. } 150 = \text{Rs. } 112.50$.

Ex. 27. A retailer buys 40 pens at the marked price of 36 pens from a wholesaler. If he sells these pens giving a discount of 1%, what is the profit percent? (S.S.C., 2002)

Sol. Let the marked price of each pen be Rs. 1.

Then, C.P. of 40 pens = Rs. 36. S.P. of 40 pens = 90% of Rs. 40 = Rs. 36.

$$\therefore \text{Profit \%} = \left(\frac{3.60}{36} \times 100 \right) \% = 10\%.$$

E= 88 At what point does the curve cross the x-axis?

At what percentage above the C.P. must an article be marked so as to gain 20% after allowing a discount of 10%?

Sol. Let C.P. = Rs. 100. Then, S.P. = Rs. 133.
Let marked price be Rs. x.

Let marked price be Rs. x.

$$\text{Then, } 95\% \text{ of } x = 133 \Rightarrow \frac{95}{100}x = 133 \Rightarrow x = \left(\frac{133 \times 100}{95} \right) = 140$$

10

Marked price = 40% above C.P.

Ex. 29. When a producer allows 36%

earns a profit of 8.8%. What would be his profit percent if he

24% ?

Sol. Let retail price = R

$$\therefore \text{S.P.} = \text{Rs. } (100 - 36) = \text{Rs. } 64.$$

$$\therefore \text{C.P.} = \text{Rs. } \left[\frac{100}{108.8} \times 64 \right] = \text{Rs. } \frac{1000}{17}.$$

New commission B-12 N.Y.

New commission =

$$\text{Gain} = \text{Rs. } \left(88 - \frac{1000}{17} \right) = \text{Rs. } \frac{496}{17}.$$

$$\text{Gain \%} = \left| \frac{\frac{100}{17}}{\frac{17}{1000}} \times 100 \right| \% = 4$$

EXERCISE 11A

(OBJECTIVE TYPE QUESTIONS)

Directions : Mark (✓) against the correct answer :

1. I gain 70 paise on Rs. 70. My gain percent is :
 (a) 0.1% (b) 1% (c) 7% (d) 10%

2. In terms of percentage profit, which is the best transaction ? (C.B.I. 2003)

C.P. (in Rs.)	Profit (in Rs.)
(a) 36	17
(b) 50	24
(c) 40	19
(d) 60	29

16. Saransh purchased 120 reams of paper at Rs. 80 per ream. He spent Rs. 280 on transportation, paid octroi at the rate of 40 paise per ream and paid Rs. 72 to the coolie. If he wants to have a gain of 8%, what must be the selling price per ream ?
 (a) Rs. 86 (b) Rs. 87.48 (c) Rs. 89 (d) Rs. 90
17. A person bought 20 litres of milk at the rate of Rs. 8 per litre. He got it churned after spending Rs. 10 and 5 kg of cream and 20 litres of toned milk were obtained. If he sold the cream at Rs. 30 per kg and toned milk at Rs. 4 per litre, his profit in the transaction is :
 (a) 25% (b) 35.3% (c) 37.5% (d) 42.5%
18. Jacob bought a scooter for a certain sum of money. He spent 10% of the cost on repairs and sold the scooter for a profit of Rs. 1100. How much did he spend on repairs if he made a profit of 20% ?
 (Assistant Grade, 1997)
 (a) Rs. 400 (b) Rs. 440 (c) Rs. 500 (d) Rs. 550
19. A manufacturer undertakes to supply 2000 pieces of a particular component at Rs. 25 per piece. According to his estimates, even if 5% fail to pass the quality tests, then he will make a profit of 25%. However, as it turned out, 50% of the components were rejected. What is the loss to the manufacturer ?
 (M.A.T. 2003)
 (a) Rs. 12,000 (b) Rs. 13,000 (c) Rs. 14,000 (d) Rs. 15,000
20. A trader buys a chair for Rs. 600 and sells it for Rs. 765 at a credit of 4 months. Reckoning money worth 6% p.a., his gain percent is :
 (a) 20% (b) $22\frac{1}{2}\%$ (c) 25% (d) $27\frac{1}{2}\%$
21. When a plot is sold for Rs. 18,700, the owner loses 15%. At what price must the plot be sold in order to gain 15%?
 (A.A.O. Exam, 2003)
 (a) Rs. 21,000 (b) Rs. 22,500 (c) Rs. 25,300 (d) Rs. 25,800
22. A fruitseller sells mangoes at the rate of Rs. 9 per kg and thereby loses 20%. At what price per kg, he should have sold them to make a profit of 5%?
 (R.R.B. 2002)
 (a) Rs. 11.81 (b) Rs. 12 (c) Rs. 12.25 (d) Rs. 12.31
23. A property dealer sells a house for Rs. 6,30,000 and in the bargain makes a profit of 5%. Had he sold it for Rs. 5,00,000, then what percentage of loss or gain he would have made ?
 (Hotel Management, 2001)
 (a) $2\frac{1}{4}\%$ gain (b) 10% loss (c) $12\frac{1}{2}\%$ loss (d) $16\frac{2}{3}\%$ loss
24. A shopkeeper sells one transistor for Rs. 840 at a gain of 20% and another for Rs. 960 at a loss of 4%. His total gain or loss percent is :
 (Hotel Management, 1999)
 (a) $5\frac{15}{17}\%$ loss (b) $5\frac{15}{17}\%$ gain (c) $6\frac{2}{3}\%$ gain (d) None of these
25. If selling price of an article is $\frac{4}{3}$ of its cost price, the profit in the transaction is :
 (a) $16\frac{2}{3}\%$ (b) $20\frac{1}{2}\%$ (c) $25\frac{1}{2}\%$ (d) $33\frac{1}{3}\%$
26. The ratio of the cost price and the selling price is 4 : 5. The profit percent is :
 (a) 10% (b) 20% (c) 25% (d) 30%
 (Hotel Management, 2003)
27. The ratio between the sale price and the cost price of an article is 7 : 5. What is the ratio between the profit and the cost price of that article ?
 (Bank P.O. 2000)
 (a) 2 : 7 (b) 5 : 2 (c) 7 : 2
 (d) Data inadequate (e) None of these

28. A man gains 20% by selling an article for a certain price. If he sells it at double the price, the percentage of profit will be : (S.S.C. 2004)
 (a) 40 (b) 100 (c) 120 (d) 140
29. If selling price is doubled, the profit triples. Find the profit percent : (M.A.T. 2001)
 (a) $66\frac{2}{3}\%$ (b) 100 (c) $105\frac{1}{3}\%$ (d) 120
30. At what profit percent must an article be sold so that by selling at half that price, there may be a loss of 30% ?
 (a) 25% (b) 36% (c) 40% (d) 42%
31. The C.P. of an article is 40% of the S.P. The percent that the S.P. is of C.P. is :
 (a) 250 (b) 240 (c) 60 (d) 40
32. By selling a pen for Rs. 15, a man loses one-sixteenth of what it costs him. The cost price of the pen is :
 (a) Rs. 16 (b) Rs. 18 (c) Rs. 20 (d) Rs. 21
33. By selling an article, Michael earned a profit equal to one-fourth of the price he bought it. If he sold it for Rs. 375, what was the cost price ?
 (a) Rs. 281.75 (b) Rs. 300 (c) Rs. 312.50 (d) Rs. 350
34. 10% loss on selling price is what percent loss on the cost price ?
 (a) $9\frac{1}{11}\%$ (b) $9\frac{2}{11}\%$ (c) 10% (d) 11%
35. If loss is $\frac{1}{3}$ of S.P., the loss percentage is :
 (a) $16\frac{2}{3}\%$ (b) 20% (c) 25% (d) $33\frac{1}{3}\%$
36. In a certain store, the profit is 320% of the cost. If the cost increases by 25% but the selling price remains constant, approximately what percentage of the selling price is the profit ? (M.A.T. 1998)
 (a) 30% (b) 70% (c) 100% (d) 250%
37. The profit earned by selling an article for Rs. 832 is equal to the loss incurred when the same article is sold for Rs. 448. What should be the sale price for making 50% profit ? (Bank P.O. 2000)
 (a) Rs. 920 (b) Rs. 960 (c) Rs. 1060 (d) Rs. 1200 (e) None of these
38. The profit earned by selling an article for Rs. 900 is double the loss incurred when the same article is sold for Rs. 450. At what price should the article be sold to make 25% profit ?
 (a) Rs. 600 (b) Rs. 750 (c) Rs. 800 (d) Data inadequate
39. The percentage profit earned by selling an article for Rs. 1920 is equal to the percentage loss incurred by selling the same article for Rs. 1280. At what price should the article be sold to make 25% profit ? (SIDBI, 2000)
 (a) Rs. 2000 (b) Rs. 2200 (c) Rs. 2400
 (d) Data inadequate (e) None of these
40. Profit earned by selling an article for Rs. 1060 is 20% more than the loss incurred by selling the article for Rs. 950. At what price should the article be sold to earn 20% profit ?
 (a) Rs. 980 (b) Rs. 1080 (c) Rs. 1800 (d) None of these
41. If the cost price of 12 pens is equal to the selling price of 8 pens, the gain percent is :
 (a) 25% (b) $33\frac{1}{3}\%$ (c) 50% (d) $66\frac{2}{3}\%$
 (S.S.C. 2004)

42. The cost price of 19 articles is equal to the selling price of 16 articles. Gain percent is :

- (a) $3\frac{9}{17}\%$ (b) $15\frac{15}{19}\%$ (c) $18\frac{3}{4}\%$ (d) 20%

43. If the selling price of 50 articles is equal to the cost price of 40 articles, then the loss or gain percent is : (Hotel Management, 2003)

- (a) 20% loss (b) 20% gain (c) 25% loss (d) 25% gain

44. If by selling 110 mangoes, the C.P. of 120 mangoes is realised, the gain percent is :

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

45. The cost price of 20 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x is : (M.A.T. 2004)

- (a) 15 (b) 16 (c) 18 (d) 25

46. On an order of 5 dozen boxes of a consumer product, a retailer receives an extra dozen free. This is equivalent to allowing him a discount of : (C.B.I. 1997)

- (a) 15% (b) $16\frac{1}{6}\%$ (c) $16\frac{2}{3}\%$ (d) 20%

47. A man sold 18 cots for Rs. 16,800, gaining thereby the cost price of 3 cots. The cost price of a cot is : (S.S.C. 2000)

- (a) Rs. 650 (b) Rs. 700 (c) Rs. 750 (d) Rs. 800

48. If on selling 12 notebooks, a seller makes a profit equal to the selling price of 4 notebooks, what is his percent profit ? (Bank P.O. 2000)

- (a) $16\frac{2}{3}\%$ (b) 25 (c) 50
(d) Data inadequate (e) None of these

49. On selling 17 balls at Rs. 720, there is a loss equal to the cost price of 5 balls. The cost price of a ball is : (S.S.C. 2004)

- (a) Rs. 45 (b) Rs. 50 (c) Rs. 55 (d) Rs. 60

50. A vendor loses the selling price of 4 oranges on selling 36 oranges. His loss percent is : (S.S.C. 2003)

- (a) 10% (b) $11\frac{1}{9}\%$ (c) $12\frac{1}{2}\%$ (d) None of these

51. A man buys 2 dozen bananas at Rs. 16 per dozen. After selling 18 bananas at the rate of Rs. 12 per dozen, the shopkeeper reduced the rate to Rs. 4 per dozen. The percent loss is : (Section Officers', 2003)

- (a) 25.2% (b) 32.4% (c) 36.5% (d) 37.5%

52. A man bought apples at the rate of 8 for Rs. 34 and sold them at the rate of 12 for Rs. 57. How many apples should be sold to earn a net profit of Rs. 45 ? (S.S.C. 2003)

- (a) 90 (b) 100 (c) 135 (d) 150

53. Oranges are bought at the rate of 10 for Rs. 25 and sold at the rate of 9 for Rs. 25. The profit is : (S.S.C. 2003)

- (a) $9\frac{1}{11}\%$ (b) 10% (c) $11\frac{1}{9}\%$ (d) $12\frac{1}{2}\%$

54. Some articles were bought at 6 for Rs. 5 and sold at 5 for Rs. 6. Gain percent is : (S.S.C. 2004)

- (a) 30% (b) $33\frac{1}{3}\%$ (c) 35% (d) 44%

55. A man bought some fruits at the rate of 16 for Rs. 24 and sold them at the rate of 8 for Rs. 18. What is the profit percent ? (Bank P.O. 2003)

- (a) 25% (b) 40% (c) 50% (d) 60% (e) None of these

56. A man purchased a box full of pencils at the rate of 7 for Rs. 9 and sold all of them at the rate of 8 for Rs. 11. In this transaction, he gained Rs. 10. How many pencils did the box contain ? (C.B.I. 1997)
- (a) 100 (b) 112 (c) 114 (d) 115
57. A man bought a number of clips at 3 for a rupee and an equal number at 2 for a rupee. At what price per dozen should he sell them to make a profit of 20% ? (C.B.I. 1998)
- (a) Rs. 4 (b) Rs. 5 (c) Rs. 6 (d) Rs. 7
58. A man buys eggs at 2 for Re. 1 and an equal number at 3 for Rs. 2 and sells the whole at 5 for Rs. 3. His gain or loss percent is : (R.R.B. 2003)
- (a) $2\frac{2}{7}\%$ loss (b) $3\frac{6}{7}\%$ gain (c) $3\frac{2}{7}\%$ loss (d) $2\frac{6}{7}\%$ gain
59. A man bought some oranges at Rs. 10 per dozen and bought the same number of oranges at Rs. 8 per dozen. He sold these oranges at Rs. 11 per dozen and gained Rs. 120. The total number of oranges bought by him was : (R.R.B. 2003)
- (a) 30 dozens (b) 40 dozens (c) 50 dozens (d) 60 dozens
60. A vendor bought toffees at 6 for a rupee. How many for a rupee must he sell to gain 20% ? (C.B.I. 1998)
- (a) 3 (b) 4 (c) 5 (d) 6
61. By selling 12 toffees for a rupee, a man loses 20%. How many for a rupee should he sell to get a gain of 20% ? (R.R.B. 2003)
- (a) 5 (b) 8 (c) 10 (d) 15
62. By selling 45 lemons for Rs. 40, a man loses 20%. How many should he sell for Rs. 24 to gain 20% in the transaction ? (R.R.B. 2003)
- (a) 16 (b) 18 (c) 20 (d) 22
63. A trader mixes 26 kg of rice at Rs. 20 per kg with 30 kg of rice of other variety at Rs. 36 per kg and sells the mixture at Rs. 30 per kg. His profit percent is : (Bank P.O. 2003)
- (a) No profit, no loss (b) 5% (c) 8%
 (d) 10% (e) None of these
64. Arun purchased 30 kg of wheat at the rate of Rs. 11.50 per kg and 20 kg of wheat at the rate of Rs. 14.25 per kg. He mixed the two and sold the mixture. Approximately what price per kg should he sell the mixture to make 30% profit ? (Bank P.O. 1999)
- (a) Rs. 14.80 (b) Rs. 15.40 (c) Rs. 15.60
 (d) Rs. 16.30 (e) Rs. 18.20
65. Padam purchased 30 kg of rice at the rate of Rs. 17.50 per kg and another 30 kg rice at a certain rate. He mixed the two and sold the entire quantity at the rate of Rs. 18.60 per kg and made 20% overall profit. At what price per kg did he purchase the lot of another 30 kg rice ? (Bank P.O. 2000)
- (a) Rs. 12.50 (b) Rs. 13.50 (c) Rs. 14.50
 (d) Rs. 15.50 (e) None of these
66. A trader mixes three varieties of groundnuts costing Rs. 50, Rs. 20 and Rs. 30 per kg in the ratio 2 : 4 : 3 in terms of weight, and sells the mixture at Rs. 33 per kg. What percentage of profit does he make ? (Hotel Management, 1998)
- (a) 8% (b) 9% (c) 10% (d) None of these
67. A dairyman pays Rs. 6.40 per litre of milk. He adds water and sells the mixture at Rs. 8 per litre, thereby making 37.5% profit. The proportion of water to milk received by the customers is : (M.A.T. 2003)
- (a) 1 : 10 (b) 1 : 12 (c) 1 : 15 (d) 1 : 20

68. By mixing two brands of tea and selling the mixture at the rate of Rs. 177 per kg, a shopkeeper makes a profit of 18%. If to every 2 kg of one brand costing Rs. 200 per kg, 3 kg of the other brand is added, then how much per kg does the other brand cost?
 (a) Rs. 110 (b) Rs. 120 (c) Rs. 140 (d) None of these
 (Hotel Management, 1999)
69. The manufacturer of a certain item can sell all he can produce at the selling price of Rs. 60 each. It costs him Rs. 40 in materials and labour to produce each item and he has overhead expenses of Rs. 3000 per week in order to operate the plant. The number of units he should produce and sell in order to make a profit of at least Rs. 1000 per week, is :
 (a) 200 (b) 250 (c) 300 (d) 400
70. A dishonest dealer uses a scale of 90 cm instead of a metre scale and claims to sell at cost price. His profit is :
 (N.I.E.T. 2000)
 (a) 9% (b) 10% (c) 12% (d) None of these
71. A shopkeeper professes to sell his goods at cost price but uses a weight of 800 gm instead of kilogram weight. Thus, he makes a profit of :
 (C.B.I. 1997)
 (a) 20% (b) $16\frac{2}{3}\%$ (c) 25% (d) None of these
72. A dishonest dealer professes to sell his goods at cost price. But he uses a false weight and thus gains $6\frac{18}{47}\%$. For a kg, he uses a weight of :
 (A.A.O. Exam, 2003)
 (a) 940 gms (b) 947 gms (c) 953 gms (d) 960 gms
73. A shopkeeper cheats to the extent of 10% while buying as well as selling, by using false weights. His total gain is :
 (Bank P.O. 2003)
 (a) 10% (b) 11% (c) 20% (d) 21% (e) $22\frac{2}{9}\%$
74. A grocer sells rice at a profit of 10% and uses weights which are 20% less than the market weight. The total gain earned by him will be :
 (a) 30% (b) 35% (c) 37.5% (d) None of these
75. A fair price shopkeeper takes 10% profit on his goods. He lost 20% goods during theft. His loss percent is :
 (S.S.C. 2000)
 (a) 8 (b) 10 (c) 11 (d) 12
76. A sells a bicycle to B at a profit of 20%. B sells it to C at a profit of 25%. If C pays Rs. 225 for it, the cost price of the bicycle for A is :
 (B.S.F. 2001)
 (a) Rs. 110 (b) Rs. 120 (c) Rs. 125 (d) Rs. 150
77. A bought a radio set and spent Rs. 110 on its repairs. He then sold it to B at 20% profit, B sold it to C at a loss of 10% and C sold it for Rs. 1188 at a profit of 10%. What is the amount for which A bought the radio set ?
 (a) Rs. 850 (b) Rs. 890 (c) Rs. 930 (d) Rs. 950
78. A house worth Rs. 1,50,000 is sold by X to Y at 5% profit. Y sells the house back to X at 2% loss. Then, in the entire transaction :
 (a) X loses Rs. 1350 (b) X gains Rs. 3150
 (c) X loses Rs. 4350 (d) X gains Rs. 4350
79. A manufacturer sells a pair of glasses to a wholesale dealer at a profit of 18%. The wholesaler sells the same to a retailer at a profit of 20%. The retailer in turn sells them to a customer for Rs. 30.09, thereby earning a profit of 25%. The cost price for the manufacturer is :
 (a) Rs. 15 (b) Rs. 16 (c) Rs. 17 (d) Rs. 18

80. An article was sold for Rs. 144. If the percentage of profit was numerically equal to the cost price, the cost of the article was :
 (a) Rs. 72 (b) Rs. 80 (c) Rs. 90 (d) Rs. 100

81. Rahul purchased a scooter at $\frac{13}{15}$ th of its selling price and sold it at 12% more than its selling price. His gain is :
 (a) 20% (b) $29\frac{3}{13}\%$ (c) 30% (d) $38\frac{1}{13}\%$

82. A man buys an article for 10% less than its value and sells it for 10% more than its value. His gain or loss percent is :
 (a) no profit, no loss (b) 20% profit
 (c) less than 20% profit (d) more than 20% profit (S.S.C. 1999)

83. Samant bought a microwave oven and paid 10% less than the original price. He sold it with 30% profit on the price he had paid. What percentage of profit did Samant earn on the original price ?
 (a) 17% (b) 20% (c) 27% (d) 32% (e) None of these (Bank P.O. 2002)

84. If 5% more is gained by selling an article for Rs. 350 than by selling it for Rs. 340, the cost of the article is :
 (a) Rs. 50 (b) Rs. 160 (c) Rs. 200 (d) Rs. 225

85. If a man reduces the selling price of a fan from Rs. 400 to Rs. 380, his loss increases by 2%. The cost price of the fan is :
 (a) Rs. 480 (b) Rs. 500 (c) Rs. 600 (d) None of these (R.R.B. 2001)

86. An article when sold at a gain of 5% yields Rs. 15 more than when sold at a loss of 5%. Its cost price would be :
 (a) Rs. 150 (b) Rs. 200 (c) Rs. 250 (d) Rs. 300

87. A shopkeeper sells an article at a loss of $12\frac{1}{2}\%$. Had he sold it for Rs. 51.80 more, he would have earned a profit of 6%. The cost price of the article is :
 (a) Rs. 280 (b) Rs. 300 (c) Rs. 380 (d) Rs. 400 (Section Officers', 2003)

88. The difference between the cost price and sale price of an article is Rs. 240. If the profit is 20%, the selling price is :
 (a) Rs. 1240 (b) Rs. 1400 (c) Rs. 1600 (d) None of these

89. A dealer sold an article at a loss of $2\frac{1}{2}\%$. Had he sold it for Rs. 100 more, he would have gained $7\frac{1}{2}\%$. To gain $12\frac{1}{2}\%$, he should sell it for :
 (a) Rs. 850 (b) Rs. 925 (c) Rs. 1080 (d) Rs. 1125

90. The cash difference between the selling prices of an article at a profit of 4% and 6% is Rs. 3. The ratio of the two selling prices is :
 (a) 51 : 52 (b) 52 : 53 (c) 51 : 53 (d) 52 : 55 (C.B.I. 2003)

91. A shopkeeper sells two watches for Rs. 308 each. On one he gets 12% profit and on the other 12% loss. His profit or loss in the entire transaction was :
 (a) Neither profit, nor loss (b) $1\frac{11}{25}\%$ loss
 (c) $1\frac{11}{25}\%$ profit (d) $3\frac{2}{25}\%$ loss (B.S.F. 2001)

92. A man sells two flats at the rate of Rs. 1.995 lakhs each. On one he gains 5% and on the other, he loses 5%. His gain or loss percent in the whole transaction is :
 (a) 0.25% loss (b) 0.25% gain (c) 2.5% loss (d) 25% loss

93. A man sells two commodities for Rs. 4000 each, neither losing nor gaining in the deal. If he sold one commodity at a gain of 25%, the other commodity is sold at a loss of :
 (a) $16\frac{2}{3}\%$ (b) $18\frac{2}{9}\%$ (c) 25% (d) None of these.
94. A house and a shop were sold for Rs. 1 lakh each. In this transaction, the house sale resulted into 20% loss whereas the shop sale resulted into 20% profit. The entire transaction resulted in :
 (a) no loss, no gain (b) loss of Rs. $\frac{1}{12}$ lakh
 (c) loss of Rs. $\frac{1}{18}$ lakh (d) gain of Rs. $\frac{1}{24}$ lakh
95. Ranjan purchased 120 tables at a price of Rs. 110 per table. He sold 30 tables at a profit of Rs. 12 per table and 75 tables at a profit of Rs. 14 per table. The remaining tables were sold at a loss of Rs. 7 per table. What is the average profit per table ?
 (a) Rs. 10.04 (b) Rs. 10.875 (c) Rs. 12.80 (d) Rs. 12.875
96. Hemant sold 10 sarees for a total profit of Rs. 460 and 12 sarees for a total profit of Rs. 144. At what profit per saree should he sell the remaining 20 sarees so that he gets an average profit of Rs. 18 per saree ?
 (a) Rs. 7.40 (b) Rs. 7.60 (c) Rs. 7.80 (d) Rs. 8
97. Sanket purchased 20 dozen notebooks at Rs. 48 per dozen. He sold 8 dozen at 10% profit and the remaining 12 dozen with 20% profit. What is his profit percentage in the transaction ?
 (a) 7.68 (b) 15 (c) 16 (d) 19.2
98. A man purchased sugar worth Rs. 400. He sold $\frac{3}{4}$ th at a loss of 10% and the remainder at a gain of 10%. On the whole, he gets :
 (a) a loss of 5% (b) a gain of $5\frac{1}{2}\%$
 (c) a loss of $5\frac{1}{19}\%$ (d) a loss of $5\frac{5}{19}\%$
99. A businessman sold $\frac{2}{3}$ of his stock at a gain of 20% and the rest at a gain of 14%. The overall percentage of gain to the businessman is :
 (a) 12% (b) 17% (c) 18% (d) 20%
100. A cloth merchant sold half of his cloth at 20% profit, half of the remaining at 20% loss and the rest was sold at the cost price. In the total transaction, his gain or loss will be : (S.S.C. 2003)
 (a) Neither loss nor gain (b) 5% loss
 (c) 5% gain (d) 10% gain
101. A person purchases 90 clocks and sells 40 clocks at a gain of 10% and 50 clocks at a gain of 20%. If he sold all of them at a uniform profit of 15%, then he would have got Rs. 40 less. The cost price of each clock is : (Hotel Management, 2003)
 (a) Rs. 50 (b) Rs. 60 (c) Rs. 80 (d) Rs. 90
102. A person earns 15% on an investment but loses 10% on another investment. If the ratio of the two investments be 3 : 5, what is the gain or loss on the two investments taken together ?
 (a) $6\frac{1}{4}\%$ loss (b) $13\frac{1}{8}\%$ gain (c) $13\frac{1}{8}\%$ loss (d) None of these
103. A man bought goods worth Rs. 6000 and sold half of them at a gain of 10%. At what gain percent must he sell the remainder so as to get a gain of 25% on the whole ?
 (a) 25% (b) 30% (c) 35% (d) 40%

80. An article was sold for Rs. 144. If the percentage of profit was numerically equal to the cost price, the cost of the article was :
 (a) Rs. 72 (b) Rs. 80 (c) Rs. 90 (d) Rs. 100
81. Rahul purchased a scooter at $\frac{13}{15}$ th of its selling price and sold it at 12% more than its selling price. His gain is :
 (a) 20% (b) $29\frac{3}{13}\%$ (c) 30% (d) $38\frac{1}{13}\%$
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85. If a man reduces the selling price of a fan from Rs. 400 to Rs. 380, his loss increases by 2%. The cost price of the fan is :
 (a) Rs. 480 (b) Rs. 500 (c) Rs. 600 (d) None of these (R.R.B. 2001)
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87. A shopkeeper sells an article at a loss of $12\frac{1}{2}\%$. Had he sold it for Rs. 51.80 more, he would have earned a profit of 6%. The cost price of the article is :
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88. The difference between the cost price and sale price of an article is Rs. 240. If the profit is 20%, the selling price is :
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90. The cash difference between the selling prices of an article at a profit of 4% and 6% is Rs. 3. The ratio of the two selling prices is :
 (a) 51 : 52 (b) 52 : 53 (c) 51 : 53 (d) 52 : 55 (C.B.I. 2003)
91. A shopkeeper sells two watches for Rs. 308 each. On one he gets 12% profit and on the other 12% loss. His profit or loss in the entire transaction was : (B.S.F. 2001)
 (a) Neither profit, nor loss (b) $1\frac{11}{25}\%$ loss
 (c) $1\frac{11}{25}\%$ profit (d) $3\frac{2}{25}\%$ loss
92. A man sells two flats at the rate of Rs. 1.995 lakhs each. On one he gains 5% and on the other, he loses 5%. His gain or loss percent in the whole transaction is :
 (a) 0.25% loss (b) 0.25% gain (c) 2.5% loss (d) 25% loss

104. A fruitseller has 24 kg of apples. He sells a part of these at a gain of 20% and the balance at a loss of 5%. If on the whole he earns a profit of 10%, the amount of apples sold at a loss is : (P.S.I. 2001) (A.O. 2001) (B.T.B. 2001)
- (a) 4.6 kg (b) 6 kg (c) 9.6 kg (d) 11.4 kg
105. Two-third of a consignment was sold at a profit of 5% and the remainder at a loss of 2%. If the total profit was Rs. 400, the value of the consignment (in Rs.) was : (C.R.A. 2001) (B.T.B. 2001) (A.O. 2001) (R.R.B. 2001)
- (a) 10,000 (b) 12,000 (c) 15,000 (d) 20,000
106. A trader purchases a watch and a wall clock for Rs. 390. He sells them making a profit of 10% on the watch and 15% on the wall clock. He earns a profit of Rs. 51.50. The difference between the original prices of the wall clock and the watch is equal to : (S.I. 2001) (P.S.I. 2001) (B.T.B. 2001) (A.O. 2001)
- (a) Rs. 80 (b) Rs. 100 (c) Rs. 110 (d) Rs. 120
107. Albert buys 4 horses and 9 cows for Rs. 13,400. If he sells the horses at 10% profit and the cows at 20% profit, then he earns a total profit of Rs. 1880. The cost of a horse is : (C.D.S. 2003)
- (a) Rs. 1000 (b) Rs. 2000 (c) Rs. 2500 (d) Rs. 3000
108. A man purchases two clocks A and B at a total cost of Rs. 650. He sells A with 20% profit and B at a loss of 25% and gets the same selling price for both the clocks. What are the purchasing prices of A and B respectively ? (S.I. 2001) (P.S.I. 2001) (B.T.B. 2001) (A.O. 2001)
- (a) Rs. 225, Rs. 425 (b) Rs. 250, Rs. 400
(c) Rs. 275, Rs. 375 (d) Rs. 300, Rs. 350
109. The C.P. of two watches taken together is Rs. 840. If by selling one at a profit of 16% and the other at a loss of 12%, there is no loss or gain in the whole transaction, then the C.P. of the two watches are respectively : (S.I. 2001) (P.S.I. 2001) (B.T.B. 2001) (A.O. 2001)
- (a) Rs. 360, Rs. 480 (b) Rs. 480, Rs. 360
(c) Rs. 380, Rs. 460 (d) Rs. 400, Rs. 440
110. On selling a chair at 7% loss and a table at 17% gain, a man gains Rs. 296. If he sells the chair at 7% gain and the table at 12% gain, then he gains Rs. 400. The actual price of the table is : (S.I. 2001) (P.S.I. 2001) (B.T.B. 2001) (A.O. 2001)
- (a) Rs. 1600 (b) Rs. 1800 (c) Rs. 2200 (d) Rs. 2400
111. A shopkeeper offers 2.5% discount on cash purchases. What cash amount would Rohan pay for a cycle, the marked price of which is Rs. 650 ? (IGNOU, 2003)
- (a) Rs. 633.25 (b) Rs. 633.75 (c) Rs. 634 (d) Rs. 635
112. If a company sells a car with a marked price of Rs. 2,72,000 and gives a discount of 4% on Rs. 2,00,000 and 2.5% on the remaining amount of Rs. 72,000, then the actual price charged by the company for the car is : (S.S.C. 2003)
- (a) Rs. 2,50,000 (b) Rs. 2,55,000 (c) Rs. 2,60,100 (d) Rs. 2,62,200
113. Garima purchased a briefcase with an additional 10% discount on the reduced price after deducting 20% on the labelled price. If the labelled price was Rs. 1400, at what price did she purchase the briefcase ? (Bank P.O. 2002)
- (a) Rs. 980 (b) Rs. 1008 (c) Rs. 1056 (d) Rs. 1120 (e) None of these
114. A bag marked at Rs. 80 is sold for Rs. 68. The rate of discount is : (I.T. 2001)
- (a) 12% (b) 15% (c) $17\frac{11}{17}\%$ (d) 20%
115. A pair of articles was bought for Rs. 37.40 at a discount of 15%. What must be the marked price of each of the articles ? (A.A.O. Exam, 2003)
- (a) Rs. 11 (b) Rs. 22 (c) Rs. 33 (d) Rs. 44
116. A shopkeeper gives 12% additional discount on the discounted price, after giving an initial discount of 20% on the labelled price of a radio. If the final sale price of the radio is Rs. 704, then what is its labelled price ? (R.R.B. 2002)
- (a) Rs. 844.80 (b) Rs. 929.28 (c) Rs. 1000 (d) Rs. 1044.80

- 117.** A fan is listed at Rs. 1500 and a discount of 20% is offered on the list price. What additional discount must be offered to the customer to bring the net price to Rs. 1100 ?
 (a) 8% (b) 10% (c) 12% (d) 15%
 (S.S.C. 2002)
- 118.** A discount of 15% on one article is the same as a discount of 20% on another article. The costs of the two articles can be :
 (a) Rs. 40, Rs. 20 (b) Rs. 60, Rs. 40 (c) Rs. 80, Rs. 60 (d) Rs. 60, Rs. 40
 (S.S.C. 1999)
- 119.** If the S.P. of Rs. 24 results in a 20% discount on list price, what S.P. would result in a 30% discount on list price ?
 (a) Rs. 18 (b) Rs. 20 (c) Rs. 21 (d) Rs. 27
 (S.S.C. 2002)
- 120.** An article was sold for Rs. y after giving a discount of $x\%$. Then, its list price is :
 (a) $\frac{100y}{100 - x}$ (b) $\frac{100y}{1 - x}$ (c) $\frac{100y}{1 - (x/100)}$ (d) None of these
 (R.R.B. 2003)
- 121.** Jatin bought a refrigerator with 20% discount on the labelled price. Had he bought it with 25% discount, he would have saved Rs. 500. At what price did he buy the refrigerator ?
 (a) Rs. 5000 (b) Rs. 10,000 (c) Rs. 12,500 (d) Rs. 15,000
 (S.S.C. 2004)
- 122.** A manufacturer offers a 20% rebate on the marked price of a product. The retailer offers another 30% rebate on the reduced price. The two reductions are equivalent to a single reduction of :
 (a) 40% (b) 44% (c) 46% (d) 50%
 (S.S.C. 2004)
- 123.** Successive discounts of 10%, 12% and 15% amount to a single discount of :
 (a) 32.68% (b) 35.28% (c) 36.68% (d) None of these
 (R.R.B. 2003)
- 124.** List price of an article at a showroom is Rs. 2000 and it is being sold at successive discounts of 20% and 10%. Its net selling price will be :
 (a) Rs. 1400 (b) Rs. 1440 (c) Rs. 1520 (d) Rs. 1700
 (S.S.C. 2004)
- 125.** Find the selling price of an article if a shopkeeper allows two successive discounts of 5% each on the marked price of Rs. 80.
 (a) Rs. 70.10 (b) Rs. 70.20 (c) Rs. 72 (d) Rs. 72.20
 (C.B.I. 2003)
- 126.** The price of a VCR is marked at Rs. 12,000. If successive discounts of 15%, 10% and 5% be allowed, then at what price does a customer buy it ?
 (a) Rs. 8400 (b) Rs. 8721 (c) Rs. 8856 (d) None of these
 (Hotel Management, 2002)
- 127.** After successive discounts of 12% and 5% an article was sold for Rs. 209. What was the original price of the article ?
 (a) Rs. 226 (b) Rs. 250 (c) Rs. 252 (d) Rs. 269
 (S.S.C. 2004)
- 128.** Applied to a bill for Rs. 1,00,000, the difference between a discount of 40% and two successive discounts of 36% and 4% is :
 (a) Nil (b) Rs. 1440 (c) Rs. 2500 (d) Rs. 1960
 (Section Officers', 2003)
- 129.** The difference between a discount of 35% and two successive discounts of 20% on a certain bill was Rs. 22. Find the amount of the bill.
 (Bank P.O. 1999)
 (a) Rs. 200 (b) Rs. 1100 (c) Rs. 2200
 (d) Data inadequate (e) None of these
 (S.S.C. 2004)
- 130.** Two shopkeepers announce the same price of Rs. 700 for a sewing machine. The first offers successive discounts of 30% and 6% while the second offers successive discounts of 20% and 16%. The shopkeeper that offers better discount, charges less than the other shopkeeper.
 (a) Rs. 9.80 (b) Rs. 16.80 (c) Rs. 22.40 (d) Rs. 36.40
 (S.S.C. 2004)

131. The marked price of a watch was Rs. 720. A man bought the same for Rs. 550.80 after getting two successive discounts, the first being 10%. What was the second discount rate ? (S.S.C. 2000)
- (a) 12% (b) 14% (c) 15% (d) 18%
132. A shopkeeper purchased 150 identical pieces of calculators at the rate of Rs. 250 each. He spent an amount of Rs. 2500 on transport and packing. He fixed the labelled price of each calculator at Rs. 320. However, he decided to give a discount of 5% on the labelled price. What is the percentage profit earned by him ? (Bank P.O. 1998)
- (a) 14% (b) 15% (c) 16% (d) 20% (e) None of these
133. A trader marked the price of his commodity so as to include a profit of 25%. He allowed discount of 16% on the marked price. His actual profit was : (S.S.C. 2004)
- (a) 5% (b) 9% (c) 16% (d) 25%
134. A tradesman marks his goods 30% above the C.P. If he allows a discount of $6\frac{1}{4}\%$, then his gain percent is :
- (a) $21\frac{7}{8}\%$ (b) 22% (c) $23\frac{3}{4}\%$ (d) None of these
135. The price of an article is raised by 30% and then two successive discounts of 10% each are allowed. Ultimately, the price of the article is : (S.S.C. 2003)
- (a) decreased by 5.3% (b) increased by 3%
(c) increased by 5.3% (d) increased by 10%
136. A retailer buys 30 articles from a wholesaler at the price of 27. If he sells them at their marked price, the gain percent in the transaction is :
- (a) $9\frac{1}{11}\%$ (b) 10% (c) $11\frac{1}{9}\%$ (d) $16\frac{2}{3}\%$
137. By selling an umbrella for Rs. 300, a shopkeeper gains 20%. During a clearance sale, the shopkeeper allows a discount of 10% on the marked price. His gain percent during the sale is : (M.B.A. 2002)
- (a) 7 (b) 7.5 (c) 8 (d) 9
138. The cost price of an article is 64% of the marked price. Calculate the gain percent after allowing a discount of 12%. (C.B.I. 1998)
- (a) 37.5% (b) 48% (c) 50.5% (d) 52%
139. A shopkeeper allows a discount of 10% on the marked price of an item but charges a sales tax of 8% on the discounted price. If the customer pays Rs. 680.40 as the price including the sales tax, then what is the marked price of the item ?
- (a) Rs. 630 (b) Rs. 700 (c) Rs. 780 (d) None of these
140. At what percent above the cost price must a shopkeeper mark his goods so that he gains 20% even after giving a discount of 10% on the marked price ? (S.S.C. 2004)
- (a) 25% (b) 30% (c) $33\frac{1}{3}\%$ (d) $37\frac{1}{2}\%$
141. At what price should a shopkeeper mark a radio that costs him Rs. 1200 in order that he may offer a discount of 20% on the marked price and still make a profit of 25% ? (Bank P.O. 1998)
- (a) Rs. 1675 (b) Rs. 1875 (c) Rs. 1900 (d) Rs. 2025 (e) None of these
142. A shopkeeper earns a profit of 12% on selling a book at 10% discount on the printed price. The ratio of the cost price to the printed price of the book is :
- (a) 45 : 56 (b) 50 : 61 (c) 55 : 69 (d) 99 : 125
143. By selling an article at $\frac{2}{5}$ of the marked price, there is a loss of 25%. The ratio of the marked price and the cost price of the article is : (S.S.C. 2003)
- (a) 2 : 5 (b) 5 : 2 (c) 8 : 15 (d) 15 : 8

ANSWERS

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

SOLUTIONS

1. Gain% = $\left(\frac{0.70}{70} \times 100\right)\% = 1\%$.
 2. (a) Profit% = $\left(\frac{17}{36} \times 100\right)\% = 47\frac{2}{9}\%$. (b) Profit% = $\left(\frac{24}{50} \times 100\right)\% = 48\%$

$$(c) \text{ Profit\%} = \left(\frac{19}{40} \times 100 \right)\% = 47\frac{1}{2}\%. \quad (d) \text{ Profit\%} = \left(\frac{29}{60} \times 100 \right)\% = 48\frac{1}{3}\%.$$

Clearly, (d) is the best transaction.

3. Least C.P. = Rs. (200×8) = Rs. 1600. Greatest S.P. = Rs. (425×8) = Rs. 3400.

Required profit = Rs. $(3400 - 1600)$ = Rs. 1800.

4. Profit = Rs. $(2602.58 - 2090.42)$ = Rs. 512.16.

$$\text{Profit\%} = \left(\frac{512.16}{2090.42} \times 100 \right)\% = \left(\frac{512160}{209042} \times 10 \right)\% = 24.5\% \approx 25\%.$$

5. C.P. = Rs. $(4700 + 800)$ = Rs. 5500; S.P. = Rs. 5800.

$$\text{Gain\%} = \left(\frac{300}{5500} \times 100 \right)\% = 5\frac{5}{11}\%.$$

$$6. \text{C.P. of 1 kg} = \text{Rs.} \left(\frac{420}{70} \right) = \text{Rs. 6. S.P. of 1 kg} = \text{Rs. 6.50.}$$

$$\therefore \text{Gain\%} = \left(\frac{0.50}{6} \times 100 \right)\% = \frac{25}{3}\% = 8\frac{1}{3}\%.$$

7. C.P. of 1 toy = Rs. $\left(\frac{375}{12} \right)$ = Rs. 31.25. S.P. of 1 toy = Rs. 33.

$$\therefore \text{Profit\%} = \left(\frac{1.75}{31.25} \times 100 \right)\% = \frac{28}{5}\% = 5.6\%.$$

8. C.P. of 1 orange = Rs. $\left(\frac{350}{100} \right)$ = Rs. 3.50. S.P. of 1 orange = Rs. $\left(\frac{48}{12} \right)$ = Rs. 4.

$$\therefore \text{Gain\%} = \left(\frac{0.50}{3.50} \times 100 \right)\% = \frac{100}{7}\% = 14\frac{2}{7}\%.$$

9. S.P. = 85% of Rs. 1400 = Rs. $\left(\frac{85}{100} \times 1400 \right)$ = Rs. 1190.

10. C.P. for B = 120% of Rs. 400 = Rs. $\left(\frac{120}{100} \times 400 \right)$ = Rs. 480.

C.P. for C = 110% of Rs. 480 = Rs. $\left(\frac{110}{100} \times 480 \right)$ = Rs. 528.

11. C.P. = Rs. $(80000 + 5000 + 1000)$ = Rs. 86000, Profit = 25%.

$$\therefore \text{S.P.} = 125\% \text{ of Rs. } 86000 = \text{Rs.} \left(\frac{125}{100} \times 86000 \right) = \text{Rs. } 107500.$$

12. S.P. = Rs. 100, gain = Rs. 15.

$$\therefore \text{C.P.} = \text{Rs.} (100 - 15) = \text{Rs. } 85.$$

$$\text{Gain\%} = \left(\frac{15}{85} \times 100 \right)\% = \frac{300}{17}\% = 17\frac{11}{17}\%$$

13. C.P. = Rs. $\left(\frac{100}{75} \times 34.80 \right)$ = Rs. 46.40.

14. C.P. = Rs. $\left(\frac{100}{122.50} \times 392 \right)$ = Rs. $\left(\frac{1000}{1225} \times 392 \right)$ = Rs. 320.

$$\therefore \text{Profit} = \text{Rs.} (392 - 320) = \text{Rs. } 72.$$

15. 110% of S.P. = 616 \Rightarrow S.P. = Rs. $\left(\frac{616 \times 100}{110} \right)$ = Rs. 560.

$$\therefore \text{C.P.} = \text{Rs.} \left(\frac{100}{112} \times 560 \right) = \text{Rs.} 500.$$

16. Total investment = Rs. $\left(120 \times 80 + 280 + \frac{40}{100} \times 120 + 72 \right)$
 $= \text{Rs.} (9600 + 280 + 48 + 72) = \text{Rs.} 10000.$

S.P. of 120 reams = 108% of Rs. 10000 = Rs. 10800.

$$\therefore \text{S.P. per ream} = \text{Rs.} \left(\frac{10800}{120} \right) = \text{Rs.} 90.$$

17. Investment = Rs. $(20 \times 8 + 10)$ = Rs. 170, Receipt = Rs. $(30 \times 5 + 20 \times 4)$ = Rs. 230.

$$\therefore \text{Gain\%} = \left(\frac{60}{170} \times 100 \right)\% = 35.29\% \approx 35.3\%.$$

18. Let the C.P. be Rs. x . Then, 20% of x = 1100 \Rightarrow $\frac{20}{100} \times x = 1100 \Rightarrow x = 5500.$

C.P. = Rs. 5500, Expenditure on repairs = 10%.

$$\text{Actual price} = \text{Rs.} \left(\frac{100}{110} \times 5500 \right) = \text{Rs.} 5000.$$

\therefore Expenditure on repairs = Rs. $(5500 - 5000)$ = Rs. 500.

19. Total cost incurred = Rs. $\left[\frac{100}{125} \times 25 \times (95\% \text{ of } 2000) \right]$

$$= \text{Rs.} \left(\frac{100}{125} \times 25 \times 1900 \right) = \text{Rs.} 38000.$$

Loss to the manufacturer = Rs. $[38000 - (25 \times 1000)]$ = Rs. 13000.

20. C.P. = Rs. $\left(600 + \frac{600 \times 6 \times 4}{100 \times 12} \right)$ = Rs. 612. Gain = Rs. $(765 - 612)$ = Rs. 153.

$$\therefore \text{Gain\%} = \left(\frac{153}{612} \times 100 \right)\% = 25\%.$$

21. $85 : 18700 = 115 : x$ or $x = \left(\frac{18700 \times 115}{85} \right)$ = 25300.

Hence, S.P. = Rs. 25,300.

22. $80 : 9 = 105 : x$ or $x = \left(\frac{9 \times 105}{80} \right)$ = 11.81.

Hence, S.P. per kg = Rs. 11.81.

23. C.P. = Rs. $\left(\frac{100}{105} \times 630000 \right)$ = Rs. 600000.

$$\therefore \text{Required loss\%} = \left(\frac{100000}{600000} \times 100 \right)\% = 16\frac{2}{3}\%.$$

24. C.P. of 1st transistor = Rs. $\left(\frac{100}{120} \times 840 \right)$ = Rs. 700.

$$\text{C.P. of 2nd transistor} = \text{Rs.} \left(\frac{100}{96} \times 960 \right) = \text{Rs.} 1000.$$

So, total C.P. = Rs. $(700 + 1000) = \text{Rs. } 1700$.

Total S.P. = Rs. $(840 + 960) = \text{Rs. } 1800$.

$$\therefore \text{Gain\%} = \left(\frac{100}{1700} \times 100 \right)\% = 5\frac{15}{17}\%$$

25. Let C.P. = Rs. x . Then, S.P. = Rs. $\frac{4x}{3}$. Gain = Rs. $\left(\frac{4x}{3} - x \right) = \text{Rs. } \frac{x}{3}$.

$$\therefore \text{Gain\%} = \left(\frac{\frac{x}{3}}{x} \times 100 \right)\% = 33\frac{1}{3}\%$$

26. Let C.P. = Rs. $4x$. Then, S.P. = Rs. $5x$. Gain = Rs. $(5x - 4x) = \text{Rs. } x$.

$$\therefore \text{Gain\%} = \left(\frac{x}{4x} \times 100 \right)\% = 25\%$$

27. Let C.P. = Rs. $5x$ and S.P. = Rs. $7x$. Then, Gain = Rs. $2x$.

$$\therefore \text{Required ratio} = 2x : 5x = 2 : 5$$

28. Let C.P. = Rs. x . Then, S.P. = Rs. $(120\% \text{ of } x) = \text{Rs. } \frac{6x}{5}$.

$$\text{New S.P.} = \text{Rs.} \left(2 \times \frac{6x}{5} \right) = \text{Rs. } \frac{12x}{5}. \text{ Profit} = \text{Rs.} \left(\frac{12x}{5} - x \right) = \text{Rs. } \frac{7x}{5}$$

$$\therefore \text{Profit\%} = \left(\frac{7x}{5} \times \frac{1}{x} \times 100 \right)\% = 140\%$$

29. Let C.P. be Rs. x and S.P. be Rs. y . Then, $3(y - x) = (2y - x) \Rightarrow y = 2x$.

$$\text{Profit} = \text{Rs.} (y - x) = \text{Rs.} (2x - x) = \text{Rs. } x$$

$$\therefore \text{Profit\%} = \left(\frac{x}{x} \times 100 \right)\% = 100\%$$

30. Let S.P. = Rs. x . New S.P. = Rs. $\frac{x}{2}$, Loss = 30%.

$$\text{So, C.P.} = \text{Rs.} \left(\frac{100}{70} \times \frac{x}{2} \right) = \text{Rs. } \frac{5x}{7}. \text{ Profit} = \text{Rs.} \left(x - \frac{5x}{7} \right) = \text{Rs. } \frac{2x}{7}$$

$$\therefore \text{Profit\%} = \left(\frac{2x}{7} \times \frac{7}{5x} \times 100 \right)\% = 40\%$$

31. C.P. = $\frac{40}{100} \times \text{S.P.} \Rightarrow \text{S.P.} = \frac{5}{2} \text{C.P.} = \left(\frac{5}{2} \times 100 \right)\% \text{ of C.P.} = 250\% \text{ of C.P.}$

32. Let the C.P. be Rs. x . Then, $x - 15 = \frac{x}{16} \Rightarrow x - \frac{x}{16} = 15 \Rightarrow \frac{15x}{16} = 15 \Rightarrow x = 16$.

$$\therefore \text{C.P.} = \text{Rs. } 16$$

33. S.P. = C.P. + $\frac{1}{4}$ C.P. = $\frac{5}{4}$ C.P.

$$\therefore \frac{5}{4} \text{C.P.} = 375 \Rightarrow \text{C.P.} = \text{Rs.} \left(375 \times \frac{4}{5} \right) = \text{Rs. } 300$$

34. Let S.P. = Rs. 100. Then, Loss = Rs. 10, C.P. = Rs. $(100 + 10) = \text{Rs. } 110$.

$$\therefore \text{Loss\%} = \left(\frac{10}{110} \times 100 \right)\% = 9\frac{1}{11}\%$$

35. Let S.P. = Rs. x . Then, Loss = Rs. $\frac{x}{3}$. C.P. = Rs. $\left(x + \frac{x}{3} \right) = \text{Rs. } \frac{4x}{3}$.

$$\therefore \text{Loss\%} = \left(\frac{x}{3} \times \frac{3}{4x} \times 100 \right)\% = 25\%$$

36. Let C.P. = Rs. 100. Then, Profit = Rs. 320, S.P. = Rs. 420.
 New C.P. = 125% of Rs. 100 = Rs. 125; New S.P. = Rs. 420.
 Profit = Rs. (420 - 125) = Rs. 295.
 \therefore Required percentage = $\left(\frac{295}{420} \times 100\right)\% = \frac{1475}{21}\% \approx 70\%$.
37. Let C.P. = Rs. x. Then, $832 - x = x - 448 \Rightarrow 2x = 1280 \Rightarrow x = 640$.
 \therefore Required S.P. = 150% of Rs. 640 = Rs. $\left(\frac{150}{100} \times 640\right)$ = Rs. 960.
38. Let C.P. = Rs. x. Then, $900 - x = 2(x - 450) \Rightarrow 3x = 1800 \Rightarrow x = 600$.
 \therefore Required S.P. = 125% of Rs. 600 = Rs. $\left(\frac{125}{100} \times 600\right)$ = Rs. 750.
39. Let C.P. be Rs. x.
 Then, $\frac{1920 - x}{x} \times 100 = \frac{x - 1280}{x} \times 100 \Rightarrow 1920 - x = x - 1280$
 $\Rightarrow 2x = 3200 \Rightarrow x = 1600$.
 \therefore Required S.P. = 125% of Rs. 1600 = Rs. $\left(\frac{125}{100} \times 1600\right)$ = Rs. 2000.
40. Let C.P. be Rs. x.
 Then, $(1060 - x) = \frac{120}{100}(x - 950) \Rightarrow 106000 - 100x = 120x - 120 \times 950$
 $\Rightarrow 220x = 220000 \Rightarrow x = 1000$.
 \therefore Desired S.P. = Rs. $\left(\frac{120}{100} \times 1000\right)$ = Rs. 1200.
41. Let C.P. of each pen be Re. 1. Then, C.P. of 8 pens = Rs. 8; S.P. of 8 pens = Rs. 12.
 \therefore Gain% = $\left(\frac{4}{8} \times 100\right)\% = 50\%$.
42. Let C.P. of each article be Re. 1.
 Then, C.P. of 16 articles = Rs. 16; S.P. of 16 articles = Rs. 19.
 \therefore Gain% = $\left(\frac{3}{16} \times 100\right)\% = 18\frac{3}{4}\%$.
43. Let C.P. of each article be Re. 1.
 Then, C.P. of 50 articles = Rs. 50; S.P. of 50 articles = Rs. 40.
 \therefore Loss% = $\left(\frac{10}{50} \times 100\right)\% = 20\%$.
44. Let C.P. of each mango be Re. 1.
 C.P. of 110 mangoes = Rs. 110; S.P. of 110 mangoes = Rs. 120.
 \therefore Gain% = $\left(\frac{10}{110} \times 100\right)\% = 9\frac{1}{11}\%$.
45. Let C.P. of each article be Re. 1. C.P. of x articles = Rs. x; S.P. of x articles = Rs. 20.
 Profit = Rs. $(20 - x)$.
 $\therefore \frac{20 - x}{x} \times 100 = 25 \Rightarrow 2000 - 100x = 25x \Rightarrow 125x = 2000 \Rightarrow x = 16$.
46. Clearly, the retailer gets 1 dozen out of 6 dozens free.
 \therefore Equivalent discount = $\left(\frac{1}{6} \times 100\right)\% = 16\frac{2}{3}\%$.

47. (S.P. of 18 cots) – (C.P. of 18 cots) = (C.P. of 3 cots)
 \Rightarrow C.P. of 21 cots = S.P. of 18 cots = Rs. 16800
 \Rightarrow C.P. of 1 cot = Rs. $\left(\frac{16800}{21}\right)$ = Rs. 800.
48. (S.P. of 12 notebooks) – (C.P. of 12 notebooks) = (S.P. of 4 notebooks)
 \Rightarrow C.P. of 12 notebooks = S.P. of 8 notebooks.
Let C.P. of each notebook be Re. 1.
Then, C.P. of 8 notebooks = Rs. 8; S.P. of 8 notebooks = Rs. 12.
 \therefore Gain % = $\left(\frac{4}{8} \times 100\right)\% = 50\%$.
49. (C.P. of 17 balls) – (S.P. of 17 balls) = (C.P. of 5 balls) = Loss = (S.P. of 4 balls)
 \Rightarrow C.P. of 12 balls = S.P. of 17 balls = Rs. 720
 \Rightarrow C.P. of 1 ball = Rs. $\left(\frac{720}{12}\right)$ = Rs. 60.
50. (C.P. of 36 mangoes) – (S.P. of 36 mangoes) = Loss = (S.P. of 4 mangoes)
 \Rightarrow S.P. of 40 mangoes = C.P. of 36 mangoes.
Let C.P. of each mango be Re. 1.
C.P. of 40 mangoes = Rs. 40; S.P. of 40 mangoes = Rs. 36.
 \therefore Loss % = $\left(\frac{4}{40} \times 100\right)\% = 10\%$.
51. C.P. = Rs. (16×2) = 32. S.P. = Rs. $(12 \times 1.5 + 4 \times 0.5)$ = Rs. $(18 + 2)$ = Rs. 20.
 \therefore Loss % = $\left(\frac{12}{32} \times 100\right)\% = 37.5\%$.
52. C.P. of 1 apple = Rs. $\left(\frac{34}{8}\right)$ = Rs. 4.25. S.P. of 1 apple = Rs. $\left(\frac{57}{12}\right)$ = Rs. 4.75.
Profit on each apple = Re. 0.50.
 \therefore Number of apples required = $\left(\frac{45}{0.50}\right)$ = 90.
53. Suppose, number of oranges bought = L.C.M. of 9 and 10 = 90.
C.P. of 90 oranges = Rs. $\left(\frac{25}{10} \times 90\right)$ = Rs. 225.
S.P. of 90 oranges = Rs. $\left(\frac{25}{9} \times 90\right)$ = Rs. 250.
 \therefore Profit % = $\left(\frac{25}{225} \times 100\right)\% = \frac{100}{9}\% = 11\frac{1}{9}\%$.
54. Suppose, number of articles bought = L.C.M. of 6 and 5 = 30.
C.P. of 30 articles = Rs. $\left(\frac{5}{6} \times 30\right)$ = Rs. 25. S.P. of 30 articles = Rs. $\left(\frac{6}{5} \times 30\right)$ = Rs. 36.
 \therefore Gain % = $\left(\frac{11}{25} \times 100\right)\% = 44\%$.
55. Suppose, number of fruits bought = L.C.M. of 16 and 8 = 16.
C.P. of 16 fruits = Rs. 24. S.P. of 16 fruits = Rs. $\left(\frac{18}{8} \times 16\right)$ = Rs. 36.
 \therefore Profit % = $\left(\frac{12}{24} \times 100\right)\% = 50\%$.

56. Suppose, number of pencils bought = L.C.M. of 7 and 8 = 56.

$$\text{C.P. of 56 pencils} = \text{Rs.} \left(\frac{9}{7} \times 56 \right) = \text{Rs.} 72, \text{S.P. of 56 pencils} = \text{Rs.} \left(\frac{11}{8} \times 56 \right) = \text{Rs.} 77.$$

Now, Rs. 5 are gained on 56 pencils.

$$\text{So, Rs. 10 are gained on } \left(\frac{56}{5} \times 10 \right) = 112 \text{ pencils.}$$

57. Suppose he bought 1 dozen clips of each kind.

$$\text{C.P. of 2 dozens} = \text{Rs.} \left(\frac{1}{3} \times 12 + \frac{1}{2} \times 12 \right) = \text{Rs.} 10.$$

$$\therefore \text{S.P. of 2 dozens} = 120\% \text{ of Rs.} 10 = \text{Rs.} \left(\frac{120}{100} \times 10 \right) = \text{Rs.} 12.$$

Hence, S.P. per dozen = Rs. 6.

58. Suppose he buys 6 eggs of each kind.

$$\text{C.P. of 12 eggs} = \text{Rs.} \left(\frac{1}{2} \times 6 + \frac{2}{3} \times 6 \right) = \text{Rs.} 7. \text{S.P. of 12 eggs} = \text{Rs.} \left(\frac{3}{5} \times 12 \right) = \text{Rs.} 7.20.$$

$$\therefore \text{Gain} = \left(\frac{0.20}{7} \times 100 \right)\% = 2\frac{6}{7}\%.$$

59. C.P. of 2 dozen oranges = Rs. $(10 + 8) = \text{Rs.} 18$. S.P. of 2 dozen oranges = Rs. 22.

If profit is Rs. 4, oranges bought = 2 dozen.

$$\text{If profit is Rs.} 120, \text{oranges bought} = \left(\frac{2}{4} \times 120 \right) \text{dozens} = 60 \text{ dozens.}$$

60. C.P. of 6 toffees = Re. 1. S.P. of 6 toffees = 120% of Re. 1 = Rs. $\frac{6}{5}$.

$$\text{For Rs. } \frac{6}{5}, \text{toffees sold} = 6. \text{For Re. 1, toffees sold} = \left(6 \times \frac{5}{6} \right) = 5.$$

61. Let S.P. of 12 toffees be Rs. x . Then, $80 : 1 = 120 : x$ or $x = \left(\frac{120}{80} \right) = \frac{3}{2}$.

$$\text{For Rs. } \frac{3}{2}, \text{toffees sold} = 12. \text{For Re. 1, toffees sold} = \left(12 \times \frac{2}{3} \right) = 8.$$

62. Let S.P. of 45 lemons be Rs. x . Then, $80 : 40 = 120 : x$ or $x = \left(\frac{120 \times 40}{80} \right) = 60$.

$$\text{For Rs.} 60, \text{lemons sold} = 45. \text{For Rs.} 24, \text{lemons sold} = \left(\frac{45}{60} \times 24 \right) = 18.$$

63. C.P. of 56 kg rice = Rs. $(26 \times 20 + 30 \times 36) = \text{Rs.} (520 + 1080) = \text{Rs.} 1600$.

S.P. of 56 kg rice = Rs. $(56 \times 30) = \text{Rs.} 1680$.

$$\therefore \text{Gain} = \left(\frac{80}{1600} \times 100 \right)\% = 5\%.$$

64. C.P. of 50 kg wheat = Rs. $(30 \times 11.50 + 20 \times 14.25) = \text{Rs.} (345 + 285) = \text{Rs.} 630$.

$$\text{S.P. of 50 kg wheat} = 130\% \text{ of Rs.} 630 = \text{Rs.} \left(\frac{130}{100} \times 630 \right) = \text{Rs.} 819.$$

$$\therefore \text{S.P. per kg} = \text{Rs.} \left(\frac{819}{50} \right) = \text{Rs.} 16.38 = \text{Rs.} 16.30.$$

65. Let the required price per kg be Rs. x . Then,
 C.P. of 60 kg rice = Rs. $(30 \times 17.50 + 30 \times x) = \text{Rs. } (525 + 30x)$.
 S.P. of 60 kg rice = Rs. $(60 \times 18.60) = \text{Rs. } 1116$.

$$\therefore \frac{1116 - (525 + 30x)}{525 + 30x} \times 100 = 20 \Leftrightarrow \frac{591 - 30x}{525 + 30x} = \frac{1}{5}$$

$$\Leftrightarrow 2955 - 150x = 525 + 30x \Leftrightarrow 180x = 2430 \Leftrightarrow x = \left(\frac{2430}{180}\right) = \left(\frac{27}{2}\right) = 13.50.$$

So, the C.P. of second lot is Rs. 13.50 per kg.

66. Suppose he bought 2 kg, 4 kg and 3 kg of the three varieties.

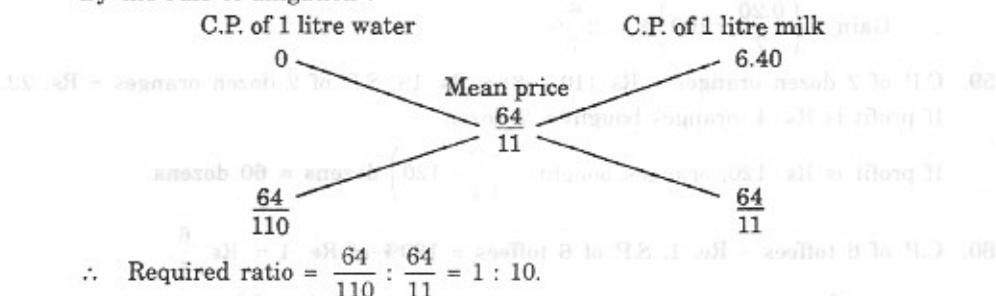
C.P. of 9 kg = Rs. $(2 \times 50 + 4 \times 20 + 3 \times 30) = \text{Rs. } 270$.

S.P. of 9 kg = Rs. $(9 \times 33) = \text{Rs. } 297$.

$$\therefore \text{Profit\%} = \left(\frac{27}{270} \times 100\right)\% = 10\%.$$

67. Mean cost price = Rs. $\left(\frac{100}{137.5} \times 8\right) = \text{Rs. } \frac{64}{11}$.

By the rule of alligation :



$$\therefore \text{Required ratio} = \frac{64}{110} : \frac{64}{11} = 1 : 10.$$

68. Let the cost of the other brand be Rs. x per kg.

C.P. of 5 kg = Rs. $(2 \times 200 + 3 \times x) = \text{Rs. } (400 + 3x)$.

S.P. of 5 kg = Rs. $(5 \times 177) = \text{Rs. } 885$.

$$\therefore \frac{885 - (400 + 3x)}{400 + 3x} \times 100 = 18 \Leftrightarrow \frac{485 - 3x}{400 + 3x} = \frac{9}{50}$$

$$\Leftrightarrow 24250 - 150x = 3600 + 27x \Leftrightarrow 177x = 20650 \Leftrightarrow x = \left(\frac{20650}{177}\right) = 116\frac{2}{3}.$$

So, cost of the other brand = Rs. 116.66.

69. Suppose, he must produce x items. Then, C.P. = Rs. $(40x + 300)$, S.P. = Rs. $60x$.

$$\therefore 60x - (40x + 300) = 1000 \text{ or } 20x = 4000 \text{ or } x = 200.$$

70. Gain\% = $\left(\frac{10}{90} \times 100\right)\% = 11\frac{1}{9}\%$.

71. Profit\% = $\left(\frac{200}{800} \times 100\right)\% = 25\%$.

72. Let error = x gms. Then, $\frac{x}{1000 - x} \times 100 = 6\frac{18}{47} \Leftrightarrow \frac{100x}{1000 - x} = \frac{300}{47}$

$$\Leftrightarrow 47x = 3(1000 - x) \Leftrightarrow 50x = 3000 \Leftrightarrow x = 60.$$

\therefore Weight used = $(1000 - 60) = 940$ gms.

73. Rule : Gain% = $\frac{(100 + \text{common gain}\%)^2}{100} - 100.$

$$\therefore \text{Gain\%} = \left[\frac{(100 + 10)^2}{100} - 100 \right] \% = \left(\frac{12100 - 10000}{100} \right) \% = 21\%.$$

74. Let us consider a packet of rice marked 1 kg.

Its actual weight is 80% of 1000 gm = 800 gm.

Let C.P. of each gm be Re. 1. Then, C.P. of this packet = Rs. 800.

$$\text{S.P. of this packet} = 110\% \text{ of C.P. of 1 kg} = \text{Rs.} \left(\frac{110}{100} \times 1000 \right) = \text{Rs.} 1100.$$

$$\therefore \text{Gain\%} = \left(\frac{300}{800} \times 100 \right) \% = 37.5\%.$$

75. Suppose he has 100 items. Let C.P. of each item be Re. 1.

Total cost = Rs. 100. Number of items left after theft = 80.

S.P. of each item = Rs. 1.10.

$$\therefore \text{Total sale} = \text{Rs.} (1.10 \times 80) = \text{Rs.} 88.$$

$$\text{Hence, Loss\%} = \left(\frac{12}{100} \times 100 \right) \% = 12\%.$$

76. 125% of 120% of A = 225 $\Rightarrow \frac{125}{100} \times \frac{120}{100} \times A = 225 \Rightarrow A = \left(225 \times \frac{2}{3} \right) = 150.$

77. 110% of 90% of 120% of A = 1188

$$\Rightarrow \frac{110}{100} \times \frac{90}{100} \times \frac{120}{100} A = 1188 \Rightarrow \frac{1188}{1000} A = 1188 \Rightarrow A = 1000.$$

\therefore A purchased it for Rs. (1000 - 110) = Rs. 890.

78. Money spent by X = Rs. 150000.

Money received by X = 105% of Rs. 150000 = Rs. 157500.

C.P. to X = 98% of Rs. 157500 = Rs. 154350.

\therefore X gains Rs. (157500 - 154350) = Rs. 3150.

79. Let the cost price for the manufacturer be Rs. x.

Then, 125% of 120% of 118% of x = 30.09.

$$\Rightarrow \frac{125}{100} \times \frac{120}{100} \times \frac{118}{100} x = \frac{3009}{100} \Rightarrow \frac{177}{100} x = \frac{3009}{100} \Rightarrow x = \left(\frac{3009}{177} \right) = 17.$$

80. Let C.P. = Rs. x, Profit% = x% and S.P. = Rs. 144.

$$\therefore x = \left[\frac{100}{(100+x)} \times 144 \right] \Rightarrow x^2 + 100x = 14400 \Rightarrow x^2 + 100x - 14400 = 0$$

$$\Rightarrow x^2 + 180x - 80x - 14400 = 0 \Rightarrow (x+180)(x-80) = 0 \Rightarrow x = 80.$$

81. Let S.P. be Rs. x. Then, C.P. = Rs. $\frac{13}{15}x$, Receipt = 112% of Rs. x = Rs. $\frac{28}{25}x$.

$$\text{Gain} = \text{Rs.} \left(\frac{28x}{25} - \frac{13x}{15} \right) = \text{Rs.} \frac{19x}{75}.$$

$$\therefore \text{Gain\%} = \left(\frac{19x}{75} \times \frac{15}{13x} \times 100 \right) \% = \frac{380}{13} \% = 29\frac{3}{13}\%.$$

82. Let the article be worth Rs. x .

$$\text{C.P.} = 90\% \text{ of Rs. } x = \text{Rs. } \frac{9x}{10}; \text{ S.P.} = 110\% \text{ of Rs. } x = \text{Rs. } \frac{11x}{10}$$

$$\text{Gain} = \text{Rs. } \left(\frac{11x}{10} - \frac{9x}{10} \right) = \text{Rs. } \frac{x}{5}$$

$$\therefore \text{Gain\%} = \left(\frac{x}{5} \times \frac{10}{9x} \times 100 \right)\% = 22\frac{2}{9}\% > 20\%$$

83. Let original price = Rs. 100.

$$\text{Then C.P.} = \text{Rs. } 90, \text{ S.P.} = 130\% \text{ of Rs. } 90 = \text{Rs. } \left(\frac{130}{100} \times 90 \right) = \text{Rs. } 117.$$

$$\therefore \text{Required percentage} = (117 - 100)\% = 17\%.$$

84. Let C.P. be Rs. x . Then, $5\% \text{ of } x = (350 - 340) = 10 \Rightarrow \frac{x}{20} = 10 \Rightarrow x = 200$.

85. Let C.P. be Rs. x . Then, $2\% \text{ of } x = (400 - 380) = 20 \Rightarrow \frac{x}{50} = 20 \Rightarrow x = 1000$.

86. Let C.P. be Rs. x . Then, $\frac{105}{100}x - \frac{95}{100}x = 15 \Rightarrow \frac{10x}{100} = 15 \Rightarrow x = 150$.

87. Let C.P. be Rs. x . Then, $(106\% \text{ of } x) - \left(87\frac{1}{2}\% \text{ of } x \right) = 51.80$

$$\Rightarrow 18\frac{1}{2}\% \text{ of } x = 51.80 \Rightarrow x = \left(\frac{51.80 \times 100 \times 2}{37} \right) = 280.$$

88. Let the C.P. be Rs. x .

$$\text{Then, S.P.} = 120\% \text{ of Rs. } x = \text{Rs. } \left(x \times \frac{120}{100} \right) = \text{Rs. } \frac{6x}{5}$$

$$\therefore \frac{6x}{5} - x = 240 \Leftrightarrow x = 1200.$$

$$\therefore \text{S.P.} = \text{Rs. } \left(\frac{6}{5} \times 1200 \right) = \text{Rs. } 1200.$$

89. Let C.P. be Rs. x . Then,

$$\left(107\frac{1}{2}\% \text{ of } x \right) - \left(97\frac{1}{2}\% \text{ of } x \right) = 100 \Rightarrow 10\% \text{ of } x = 100 \Rightarrow x = 1000.$$

$$\therefore \text{Desired S.P.} = 112\frac{1}{2}\% \text{ of Rs. } 1000 = \text{Rs. } \left(\frac{225}{200} \times \frac{1}{100} \times 1000 \right) = \text{Rs. } 1125.$$

90. Let C.P. of the article be Rs. x . Then, Required ratio = $\frac{104\% \text{ of } x}{106\% \text{ of } x} = \frac{104}{106} = \frac{52}{53} = 52 : 53$.

91. Loss% = $\left(\frac{\text{Common Loss and Gain\%}}{10} \right)^2 \% = \left(\frac{12}{10} \right)^2 \% = \frac{36}{25}\% = 1\frac{11}{25}\%$.

92. Loss% = $\left(\frac{5}{10} \right)^2 \% = (0.5)^2 \% = 0.25\%$.

93. Total S.P. = Rs. 8000 and Total C.P. = Rs. 8000.
S.P. of 1st commodity = Rs. 4000. Gain on it = 25%.

$$\therefore \text{C.P. of 1st commodity} = \text{Rs. } \left(\frac{100}{125} \times 4000 \right) = \text{Rs. } 3200.$$

C.P. of 2nd commodity = Rs. $(8000 - 3200) = \text{Rs. } 4800$.

S.P. of 2nd commodity = Rs. 4000.

$$\therefore \text{Loss on 2nd commodity} = \left(\frac{800}{4800} \times 100 \right)\% = 16\frac{2}{3}\%$$

94. Total S.P. = Rs. 2 lakh.

$$\text{C.P. of house} = \text{Rs.} \left(\frac{100}{80} \times 1 \right) \text{lakh} = \text{Rs.} \frac{5}{4} \text{lakh.}$$

$$\text{C.P. of shop} = \text{Rs.} \left(\frac{100}{120} \times 1 \right) \text{lakh} = \text{Rs.} \frac{5}{6} \text{lakh.}$$

$$\text{Total C.P.} = \text{Rs.} \left(\frac{5}{4} + \frac{5}{6} \right) \text{lakh} = \text{Rs.} \frac{25}{12} \text{lakh.}$$

$$\therefore \text{Loss} = \text{Rs.} \left(\frac{25}{12} - 2 \right) \text{lakh} = \text{Rs.} \frac{1}{12} \text{lakh.}$$

95. Total C.P. = Rs. $(120 \times 110) = \text{Rs. } 13200$.

$$\begin{aligned} \text{Total S.P.} &= \text{Rs.} [(30 \times 110 + 30 \times 12) + (75 \times 110 + 75 \times 14) + (15 \times 110 - 15 \times 7)] \\ &= \text{Rs. } 14505. \end{aligned}$$

$$\text{Average profit} = \text{Rs.} \left(\frac{14505 - 13200}{120} \right) = \text{Rs.} \frac{1305}{120} = \text{Rs. } 10.875.$$

96. Total profit required = Rs. $(42 \times 18) = \text{Rs. } 756$.

Profit on 22 sarees = Rs. $(460 + 144) = \text{Rs. } 604$.

Profit on 20 sarees = Rs. $(756 - 604) = \text{Rs. } 152$.

$$\text{Average profit on these sarees} = \text{Rs.} \left(\frac{152}{20} \right) = \text{Rs. } 7.60.$$

97. C.P. of 20 dozen = Rs. $(48 \times 20) = \text{Rs. } 960$.

$$\text{C.P. of 8 dozen} = \text{Rs.} (48 \times 8) = \text{Rs. } 384.$$

$$\text{C.P. of 12 dozen} = \text{Rs.} (960 - 384) = \text{Rs. } 576.$$

$$\text{Total S.P.} = \text{Rs.} \left(\frac{110}{100} \times 384 + \frac{120}{100} \times 576 \right) = \text{Rs. } 1113.60.$$

$$\therefore \text{Profit \%} = \left(\frac{153.60}{960} \times 100 \right)\% = 16\%.$$

98. C.P. of $\frac{3}{4}$ th = Rs. $\left(\frac{3}{4} \times 400 \right) = \text{Rs. } 300$, C.P. of $\frac{1}{4}$ th = Rs. 100.

$$\therefore \text{Total S.P.} = (90\% \text{ of Rs. } 300 + 110\% \text{ of Rs. } 100) = \text{Rs. } 380.$$

$$\text{Loss} = \left(\frac{20}{400} \times 100 \right)\% = 5\%.$$

99. Let C.P. of whole be Rs. x. C.P. of $\frac{2}{3}$ rd = Rs. $\frac{2x}{3}$, C.P. of $\frac{1}{3}$ rd = Rs. $\frac{x}{3}$.

$$\text{Total S.P.} = \text{Rs.} \left[\left(120\% \text{ of } \frac{2x}{3} \right) + \left(114\% \text{ of } \frac{x}{3} \right) \right] = \text{Rs.} \left(\frac{4x}{5} + \frac{19x}{50} \right) = \text{Rs.} \frac{59x}{50}.$$

$$\text{Gain} = \text{Rs.} \left(\frac{59x}{50} - x \right) = \text{Rs.} \frac{9x}{50}.$$

$$\therefore \text{Gain \%} = \left(\frac{9x}{50} \times \frac{1}{x} \times 100 \right)\% = 18\%.$$

100. Let C.P. of whole be Rs. x . C.P. of $\frac{1}{2}$ stock = Rs. $\frac{x}{2}$, C.P. of $\frac{1}{4}$ stock = Rs. $\frac{x}{4}$.

$$\text{Total S.P.} = \text{Rs.} \left[\left(120\% \text{ of } \frac{x}{2} \right) + \left(80\% \text{ of } \frac{x}{4} \right) + \frac{x}{4} \right] = \text{Rs.} \left(\frac{3x}{5} + \frac{x}{5} + \frac{x}{4} \right) = \text{Rs.} \frac{21x}{20}.$$

$$\text{Gain} = \text{Rs.} \left(\frac{21x}{20} - x \right) = \text{Rs.} \frac{x}{20}.$$

$$\therefore \text{Gain\%} = \left(\frac{x}{20} \times \frac{1}{x} \times 100 \right)\% = 5\%.$$

101. Let C.P. of each clock be Rs. x . Then, C.P. of 90 clocks = Rs. $90x$

$$\therefore [(110\% \text{ of } 40x) + (120\% \text{ of } 50x)] - (115\% \text{ of } 90x) = 40$$

$$\Rightarrow 44x + 60x - 103.5x = 40 \Rightarrow 0.5x = 40 \Rightarrow x = 80.$$

102. Let the investments be $3x$ and $5x$. Then, total investment = $8x$.

$$\text{Total receipt} = (115\% \text{ of } 3x + 90\% \text{ of } 5x) = (3.45x + 4.5x) = 7.95x.$$

$$\therefore \text{Loss} = \left(\frac{0.05x}{8x} \times 100 \right)\% = 0.625\%.$$

103. Let the required gain percent be $x\%$.

$$\text{Then, } (110\% \text{ of } 3000) + [(100 + x)\% \text{ of } 3000] = 125\% \text{ of } 6000$$

$$\Rightarrow \left(\frac{110}{100} \times 3000 \right) + \left[\frac{(100 + x)}{100} \times 3000 \right] = \frac{125}{100} \times 6000$$

$$\Rightarrow 30(100 + x) = 4200 \Rightarrow 100 + x = 140 \Rightarrow x = 40\%.$$

104. Let the quantity sold at a loss be x kg and let C.P. per kg be Re. 1.

$$\text{Total C.P.} = \text{Rs.} 24.$$

$$\text{Total S.P.} = \text{Rs.} [120\% \text{ of } (24 - x) + 95\% \text{ of } x] = \text{Rs.} \left[\frac{6}{5} (24 - x) + \frac{19x}{20} \right] = \text{Rs.} \left(\frac{576 - 5x}{20} \right).$$

$$\therefore \frac{576 - 5x}{20} = 110\% \text{ of } 24 \Rightarrow \frac{576 - 5x}{20} = \frac{264}{10} \Rightarrow 576 - 5x = 528 \\ \Rightarrow 5x = 48 \Rightarrow x = 9.6 \text{ kg.}$$

105. Let the total value be Rs. x . Value of $\frac{2}{3}$ rd = Rs. $\frac{2x}{3}$, Value of $\frac{1}{3}$ rd = Rs. $\frac{x}{3}$.

$$\text{Total S.P.} = \text{Rs.} \left[\left(105\% \text{ of } \frac{2x}{3} \right) + \left(98\% \text{ of } \frac{x}{3} \right) \right] = \text{Rs.} \left(\frac{210x}{300} + \frac{98x}{300} \right) = \text{Rs.} \frac{308x}{300}.$$

$$\therefore \frac{308x}{300} - x = 400 \Rightarrow \frac{8x}{300} = 400 \Rightarrow x = \left(\frac{400 \times 300}{8} \right) = 15000.$$

106. Let C.P. of watch be Rs. x . Then, C.P. of wall clock = Rs. $(390 - x)$.

$$\therefore (10\% \text{ of } x) + [15\% \text{ of } (390 - x)] = 51.50 \Rightarrow \frac{10}{100} \times x + \frac{15}{100} \times (390 - x) = \frac{515}{10}$$

$$\Rightarrow 10x + 5850 - 15x = 5150 \Rightarrow 5x = 700 \Rightarrow x = 140.$$

So, C.P. of watch = Rs. 140, C.P. of wall clock = Rs. 250.

$$\therefore \text{Difference} = \text{Rs.} (250 - 140) = \text{Rs.} 110.$$

107. Let C.P. of each horse be Rs. x and C.P. of each cow be Rs. y . Then,

$$4x + 9y = 13400 \quad \dots(i)$$

$$\text{And, } 10\% \text{ of } 4x + 20\% \text{ of } 9y = 1880$$

$$\Rightarrow \frac{2}{5}x + \frac{9}{5}y = 1880 \Rightarrow 2x + 9y = 9400 \quad \dots(ii)$$

Solving (i) and (ii), we get : $x = 2000$ and $y = 600$.

\therefore Cost price of each horse = Rs. 2000.

108. Let C.P. of clock A be Rs. x and that of clock B be Rs. $(650 - x)$. Then,

$$\begin{aligned} 120\% \text{ of } x = 75\% \text{ of } (650 - x) &\Rightarrow \frac{120}{100}x = \frac{75}{100}(650 - x) \\ &\Rightarrow \frac{13}{5}x = 650 \Rightarrow x = \left(\frac{650 \times 5}{13}\right) = 250. \end{aligned}$$

\therefore C.P. of A = Rs. 250, C.P. of B = Rs. 400.

109. Let the C.P. of the watches be Rs. x and Rs. $(840 - x)$.

$$\therefore (116\% \text{ of } x) + [88\% \text{ of } (840 - x)] = 840$$

$$\Rightarrow 116x + 73920 - 88x = 84000 \Rightarrow 28x = 10080 \Rightarrow x = 360.$$

\therefore Their cost prices are Rs. 360 and Rs. 480.

110. Let C.P. of the chair be Rs. x and that of the table be Rs. y .

$$\text{Then, } 17\% \text{ of } y - 7\% \text{ of } x = 296 \Rightarrow 17y - 7x = 29600 \quad \dots(i)$$

$$\text{And, } 12\% \text{ of } y + 7\% \text{ of } x = 400 \Rightarrow 12y + 7x = 40000 \quad \dots(ii)$$

Solving (i) and (ii), we get : $y = 2400$ and $x = 1600$.

\therefore C.P. of table = Rs. 2400.

$$111. \text{S.P.} = 97\frac{1}{2}\% \text{ of Rs. } 650 = \text{Rs.} \left(\frac{195}{2} \times \frac{1}{100} \times 650 \right) = \text{Rs. } 633.75.$$

112. M.P. = Rs. 272000.

$$\text{Discount} = \text{Rs.} [(4\% \text{ of } 200000) + (2.5\% \text{ of } 72000)] = \text{Rs.} (8000 + 1800) = \text{Rs. } 9800.$$

\therefore Actual price = Rs. $(272000 - 9800) = \text{Rs. } 262200.$

$$113. \text{C.P.} = 90\% \text{ of } 80\% \text{ of Rs. } 1400 = \text{Rs.} \left(\frac{90}{100} \times \frac{80}{100} \times 1400 \right) = \text{Rs. } 1008.$$

$$114. \text{Rate of discount} = \left(\frac{12}{80} \times 100 \right)\% = 15\%.$$

$$115. \text{S.P. of each article} = \text{Rs.} \left(\frac{37.40}{2} \right) = \text{Rs. } 18.70.$$

Let M.P. be Rs. x .

$$\text{Then, } 85\% \text{ of } x = 18.70 \Rightarrow x = \left(\frac{18.70 \times 100}{85} \right) = 22.$$

116. Let the labelled price be Rs. x .

$$88\% \text{ of } 80\% \text{ of } x = 704 \Rightarrow x = \left(\frac{704 \times 100 \times 100}{88 \times 80} \right) = 1000.$$

$$117. \text{S.P. after 1st discount} = \text{Rs.} \left(\frac{80}{100} \times 1500 \right) = \text{Rs. } 1200.$$

Net S.P. = Rs. 1104. Discount on Rs. 1200 = Rs. 96.

$$\therefore \text{Required discount} = \left(\frac{96}{1200} \times 100 \right)\% = 8\%.$$

$$118. \text{Let the costs of the two articles be } x \text{ and } y. \text{ Then, } 15\% \text{ of } x = 20\% \text{ of } y \Rightarrow \frac{x}{y} = \frac{20}{15} = \frac{4}{3}.$$

So, x and y must be in the ratio of $4 : 3$.

119. Let the list price be Rs. x .

$$\Rightarrow \frac{80}{100}x = 24 \Rightarrow x = \frac{24 \times 100}{80} = 30.$$

\therefore Required S.P. = $70\% \text{ of Rs. } 30 = \text{Rs. } 21.$