

Unit 9(Comparing Quantities)

Multiple Choice Questions

Question. 1 Suppose for the principal P, rate R% and time T, the simple interest is S and compound interest is C. Consider the possibilities

(i) $C > S$

(ii) $C = S$

(iii) $C < S$ Then,

(a) only (i) is correct (b) either (i) or (ii) is correct

(c) either (ii) or (iii) is correct (d) only (iii) is correct

Solution. (a) Let the principal (P) = Rs. 100

Rate of interest (R) = 100% and time period (T) = 2 yr

$$\text{Then, simple interest} = \frac{P \times R \times T}{100} = \frac{100 \times 10 \times 2}{100} = ₹20$$

We know that,

$$\begin{aligned} A &= P \left(1 + \frac{R}{100} \right)^T = 100 \left(1 + \frac{10}{100} \right)^2 \\ &= 100 \times \frac{11}{10} \times \frac{11}{10} = ₹121 \end{aligned}$$

∴ Compound interest, $CI = A - P = ₹121 - ₹100 = ₹21$

So, $C > S$

Hence, option (a) is correct.

Question. 2 Suppose a certain sum doubles in 2 yr at r% rate of simple interest per annum

and R% rate of interest per annum compounded annually. Then,

(a) $r < R$ (b) $R < r$

(c) $R = r$ (d) Cannot be determined

Solution. (b) If the total amount received after 2 yr is same for both simple interest and compound interest on same principal, then the rate of simple interest is greater than the rate of compound interest.

i.e. $R < r$

Hence, option (b) is correct.

Question. 3 The compound interest on Rs. 50000 at 4% per annum for 2 yr compounded annually is (a) Rs. 4000 (b) Rs. 4080 (c) Rs. 4280 (d) Rs. 4050

Solution. (b) Given, principal (P) = Rs. 50000

Rate of interest (R%) = 4% per annum

Time period (T) = 2 yr We know that,

$$A = P \left(1 + \frac{R}{100}\right)^T$$

$$\therefore A = 50000 \left(1 + \frac{4}{100}\right)^2$$

$$= 50000 \left(1 + \frac{1}{25}\right)^2 = 50000 \times \frac{26}{25} \times \frac{26}{25} = 80 \times 26 \times 26 = ₹54080$$

$$\therefore \text{Compound interest, CI} = A - P = ₹54080 - ₹50000 = ₹4080$$

Hence, option (b) is correct.

Question. 4 If marked price of an article is Rs. 1200 and the discount is 12%, then the selling price of the article is (a) Rs. 1056 (b) Rs. 1344 (c) Rs. 1212 (d) Rs. 1188

Solution. (a) Given, marked price of an article = Rs. 1200 Discount % = 12%

Discount = Discount % on marked price

$$= A \times 1200 = 12 \times 12 = \text{Rs. } 144$$

Selling price = Marked price - Discount Selling price = Rs. 1200 - Rs. 144 = Rs. 1056 Hence, option (a) is correct.

Question. 5 If 90% of x is 315 km, then the value of x is

(a) 325 km (b) 350 km (c) 350 m

Solution. (b) We have, 90% of x = 315 km

$$\Rightarrow \frac{90}{100} \times x = 315$$

$$\Rightarrow x = \frac{315 \times 100}{90} = \frac{315 \times 10}{9} = 350$$

$$\Rightarrow x = 350 \text{ km}$$

Hence, option (b) is correct.

Question. 6 To gain 25% after allowing a discount of 10%, the shopkeeper must mark the price of the article which cost him Rs. 360 as

(a) Rs. 500 (b) Rs. 450 (c) Rs. 460 (d) Rs. 486

Solution. (a) Let the marked price of the article be Rs. x.

Cost price of the article = Rs. 360 According to the question,

$$x - x \times \frac{10}{100} - \frac{25 \times 360}{100} = 360$$

$$\Rightarrow x - \frac{x}{10} - 90 = 360$$

[∵ discount is always calculated on marked price and profit is always calculated on cost price]

$$\Rightarrow \frac{9x}{10} - 90 = 360$$

$$\Rightarrow \frac{9x}{10} = 360 + 90$$

$$\Rightarrow x = \frac{450 \times 10}{9}$$

$$\Rightarrow \frac{9x}{10} = 450$$

$$\Rightarrow x = ₹ 500$$

So, the marked price is ₹ 500.

Hence, option (a) is correct.

Question. 7 If a% is the discount per cent on marked price x, then discount is

(a) $\frac{x}{a} \times 100$ (b) $\frac{a}{x} \times 100$

(c) $x \times \frac{a}{100}$ (d) $\frac{100}{xa}$

Solution. (c) Since, discount can be calculated always on marked price, when discount percentage is given. Discount = Discount % on marked price = $\frac{a}{100}x$

Hence, option (c) is correct.

Question. 8 Ashima took a loan of Rs. 100000 at 12% per annum compounded half-yearly. She paid Rs. 112360. If $(1.06)^2$ is equal to 1.1236, then the period for which she took the loan is

(a) 2 yr (b) 1 yr

(c) 6 months (d) $1\frac{1}{2}$ yr

Solution. (b) Given, principal (P) = Rs.100000

Rate of interest (R%) = 12% per annum compounded half-yearly Let m be the time period, v

Amount paid = Rs.112360

We know that,

Amount, when interest is compounded half-yearly

$$\text{i.e. } A = P \left(1 + \frac{R}{200}\right)^{2n}, \text{ where } n = \text{time period}$$

$$\Rightarrow 112360 = 100000 \left(1 + \frac{12}{200}\right)^{2m}$$

$$\Rightarrow \left(\frac{53}{50}\right)^{2m} = \frac{112360}{100000}$$

$$\Rightarrow \left(\frac{53}{50}\right)^{2n} = \frac{2809}{2500}$$

$$\Rightarrow \left(\frac{53}{50}\right)^2 = \left(\frac{53}{50}\right)^{2n}$$

On comparing both sides, we get

$$2n = 2$$

$$\Rightarrow n = 1$$

So, the time period is 1 yr.

Hence, option (b) is correct.

Question. 9 For calculation of interest compounded half-yearly, keeping the principal same, which one of the following is true?

(a) Double the given annual rate and half the given number of years

(b) Double the given annual rate as well as the given number of years

(c) Half the given annual rate as well as the given number of years

(d) Half the given annual rate and double the given number of years

Solution. (d) If interest is compounded half-yearly, then $R = \frac{R}{2}$ and $T = 2T = 2n$

Now, the amount will be

$$A = P \left(1 + \frac{R}{200} \right)^{2n}$$

∴

$$C = A - P$$

So, half the given annual rate and double the given number of years. Hence, option (d) is correct.

Question. 10 Shyama purchases a scooter costing Rs. 36450 and the rate of sales tax is 9%, then the total amount paid by her is

(a) Rs. 36490.50 (b) Rs. 39730.50

(c) Rs. 36454.50 (d) Rs. 33169.50

Solution. (b) Since, sales tax is charged on the sale of an item by the government and is added to the bill amount. Shyama purchase a scooter of costing = Rs. 36450 Sales tax paid = 9%

So, total amount paid by her

= Rs. 36450 of 9% + Rs. 36450

$$= \frac{9}{100} \times 36450 + 36450$$

$$= 9 \times 364.5 + 36450 = 3280.5 + 36450 = \text{Rs. } 39730.5$$

Hence, option (b) is correct.

Question. 11 The marked price of an article is Rs. 80 and it is sold at Rs. 76, then the discount rate is

(a) 5% (b) 95%

(c) 10% (d) approx 11 %

Solution. (a) The marked price of an article = Rs. 80 Sold price of the article = Rs. 76 We know that,

Selling price = Marked price – Discount Discount = Marked price – Selling price

$$\Rightarrow \text{Discount} = \text{Rs. } 80 - \text{Rs. } 76 = \text{Rs. } 4$$

$$\text{Discount \%} = \frac{4}{80} \times 100 = \frac{40}{80} = 5\%$$

Hence, option (a) is correct.

Question. 12 A bought a tape recorder for Rs. 8000 and sold it to B. B in turn sold it to C, each earning a profit of 20%. Which of the following is true?

(a) A and B earn the same profit (b) A earns more profit than B

(c) A earns less profit than B (d) Cannot be determined

Solution. (c) Cost price of tape recorder for A = Rs. 8000

Cost price of tape recorder for B = 20% profit on cost price for A

$$= \frac{20}{100} \times 8000 + 8000$$

$$= 20 \times 80 + 8000$$

$$= 1600 + 8000 = \text{Rs. } 9600$$

Cost price of tape recorder for C = 20% profit on cost price for B

$$= \frac{20}{100} \times 9600 + 9600$$

$$= 1920 + 9600 = \text{Rs. } 11520$$

Here, profit for A = Rs. 1600 Profit for B = Rs. 1920

So, A earns less profit than B.

Hence, option (c) is correct.

Question. 13 Latika bought a teapot for Rs. 120 and a set of cups for Rs. 400. She sold teapot at a profit of 5% and cups at a loss of 5%. The amount received by her is

(a) Rs. 494 (b) 7 546

(c) Rs. 506 (d) Rs. 534

Solution. (c) Latika bought a teapot = Rs. 120 and a set of cups = Rs. 400 She sold teapot at a profit of 5%, So, selling price of teapot = $\frac{5}{100} \times 120 + 120$

$$= \frac{120}{20} + 120$$

= 6 + 120 = Rs.126 Also, she sold cups at a loss of 5%.

So, selling price of cups = $400 - \frac{5}{100} \times 400$

$$= 400 - 20 = \text{Rs. } 380$$

Then, the total amount received by her = Rs. 126 + Rs. 380 = Rs. 506 Hence, option (c) is correct.

Question. 14 A jacket was sold for Rs. 1120 after allowing a discount of 20%. The marked price of the jacket is

(a) Rs. 1440 (b) Rs. 1400 (c) Rs. 960 (d) Rs. 866.66

Solution. (b) Let the marked price of the jacket be Rs. x.

Discount % on marked price = 20%

Selling price of jacket = ₹1120

$$\text{Then, } 1120 = x - x \times \frac{20}{100}$$

$$\Rightarrow 1120 = x - \frac{x}{5}$$

$$\Rightarrow 1120 = \frac{4x}{5}$$

$$\Rightarrow x = \frac{1120 \times 5}{4} = 280 \times 5 = \text{₹}1400$$

So, marked price of the jacket is ₹ 1400.

Hence, option (b) is correct.

Question. 15 A sum is taken for two years at 16% per annum. If interest is compounded after every three months, the number of times for which interest is charged in 2 yrs is

(a) 8 (b) 4 (c) 6 (d) 9

Solution. (a) Since, rate of interest is calculated after every three months. Similarly, the time period for amount in a year will 4 times.

If amount is taken for 2 yr, means $4 \times 2 = 8$ times charged in 2 yr.

Hertee, option (a) is correct.

Question. 16 The original price of a washing machine which was bought for Rs. 13500 including of 8% VAT, is

(a) Rs. 12420 (b) Rs. 14580 (c) Rs.12500 (d) Rs. 13492

Solution. (a) The price of the washing machine = Rs.13500

VAT [Value Added Tax] is included in selling price, which is 8%.

The original price of the washing machine including of 8% VAT

$$= 13500 - 13500 \times \frac{8}{100}$$

$$= 13500 - 135 \times 8 = 13500 - 1080 = \text{Rs. } 12420 \text{ Hence, option (a) is correct.}$$

Question. 17 Avinash bought an electric iron for Rs. 900 and sold it at a gain of 10%. He sold another electric iron at 5% loss which was bought

Rs. 1200. On the transaction, he has a

(a) profit of Rs. 75 (b) loss of Rs. 75 (c) profit of Rs. 30 (d) loss of Rs. 30

Solution. (c) Avinash bought an electric iron = Rs. 900 He sold it, at 10% profit.

$$\text{So, selling price of the electric iron} = \frac{10}{100} \times 900 + 900$$

$$= 90 + 900 = \text{Rs. } 990$$

He also sold another electric iron at 5% loss.

Cost price of another electric iron = Rs.1200

$$\text{So, selling price of the electric iron} = 1200 - \frac{5}{100} \times 1200$$

$$= 1200 - 60 = \text{Rs. } 1140$$

Total amount paid by Avinash for purchasing electric irons = Rs. 900 + Rs.1200 = Rs.2100

Total received amount = Rs. 990 + Rs. 1140

= Rs. 2130 So, his profit = Rs.2130 - Rs.2100 = Rs.30 in transaction.

Hence, option (c) is correct.

Question. 18 A TV set was bought for ₹ 26250 including 5% VAT. The original price of the TV set is

(a) Rs. 27562.50 (b) Rs. 25000 (c) Rs. 24937.50 (d) Rs. 26245

Solution. (c) Cost price of TV set = Rs. 26250.

VAT including = 5%

$$\begin{aligned}\text{Original price} &= \text{Cost price of article including VAT} = 26250 \times \frac{100}{105} \\ &= 26250 - \frac{26250}{21} \\ &= 26250 - 1250 \\ &= 25000\end{aligned}$$

So, original price of the TV set = Rs. 25000 Hence, option (b) is correct.

Question. 19 40% of [100 – 20% of 300] is equal to

(a) 20 (b) 16 (c) 140 (d) 64

Solution. (b) 40% of [100-20% of 300]

$$\begin{aligned}&= \frac{40}{100} \times \left[100 - \frac{20}{100} \times 300 \right] \\ &= \frac{40}{100} [100 - 60] \\ &= \frac{40}{100} \times 40 = 4 \times 4 = 16\end{aligned}$$

Hence, option (b) is correct.

Question. 20 Radhika bought a car for Rs. 250000. Next year, its price decreased by 10% and further next year, it decreased by 12%. In the two years, overall decrease per cent in the price of the car is

(a) 3.2% (b) 22% (c) 20.8% (d) 8%

Solution. (c) Radhika bought a car for Rs. 250000.

Cost price of a car = Rs.250000

Its price decreased next year for 10%.

$$\begin{aligned}\text{So, price became} &= 250000 - \frac{10}{100} \times 250000 \\ &= 250000 - 25000 = ₹ 225000\end{aligned}$$

Further next year, its price decreased by 12%, then price will be

$$\begin{aligned}&= 225000 - 225000 \times \frac{12}{100} \\ &= 225000 - 27000 = ₹ 198000\end{aligned}$$

$$\begin{aligned}\text{In two years, overall decrease per cent} &= \frac{250000 - 198000}{250000} \times 100 \\ &= \frac{52000}{250000} \times 100 = \frac{520}{25} = 20.8\%\end{aligned}$$

Hence, option (c) is correct.

Fill in the Blanks

In questions 21 to 45, fill in the blanks to make the statements true.

Question. 21 is a reduction on the marked price of the article.

Solution. Discount is a reduction on the marked price of the article.

Question. 22 Increase of a number from 150 to 162 is equal to increase of per cent.

Solution. Initial number = 150

Final number = 162

Increased number = 162 - 150 = 12

Per cent of increased number = $\frac{12}{150} \times 100 = \frac{120}{15} = 8\%$

Question. 23 15% increase in price of an article, which is Rs. 1620, is the increase of ?

Solution. Let the price of the article be Rs. x.

After 15% increased in price, price became ₹1620.

$$\begin{aligned}\text{So,} \quad & 1620 = x + x \times \frac{15}{100} \\ \Rightarrow & 1620 = \frac{115x}{100} \\ \Rightarrow & 115x = 1620 \times 100 \\ \Rightarrow & x = \frac{1620 \times 100}{115} \\ \Rightarrow & x = ₹ 1408\end{aligned}$$

Hence, increase in price = ₹1620 – ₹1408 = ₹ 212

Question. 24 Discount =

Solution. Discount = MP – SP

Here, MP = Marked price, and SP = Selling price

Question. 25 Discount = Discount % of

Solution. Discount = Discount % of marked price

[discount is a reduction given on marked price]

Question. 26is charged on the sale of an item by the government and is added to the bill amount.

Solution. Sales tax is charged on the sale of an item by the government and is added to the bill amount.

Sales tax = Tax % of bill amount

Question. 27 Amount when interest is compounded annually, is given by the formula.....

Solution. Amount when interest is compounded annually, is given by the formula

$$A = P \left(1 + \frac{R}{100} \right)^T$$

where, P = principal, R = rate per annum and T = time

Question. 28 Sales tax = Tax% of.....

Solution. Sales tax=Tax % of bill amount

Question. 29 The time period after which the interest is added each time to form a new principal, is called the

Solution. The time period after which the interest is added each time to form a new principal, is called the conversion period.

Question. 30 expenses are the additional expenses incurred by a buyer for an item over and above its cost of purchase.

Solution. Overhead expenses are the additional expenses incurred by a buyer for an item over and above its cost of purchase.

Question. 31 The discount on an item for sale is calculated on the

Solution. The discount on an item for sale is calculated on the marked price.

Question. 32 When principal P is compounded semi-annually at r% per annum for t years, then amount =

Solution. When principal P is compounded semi-annually at r% per annum for t years.

i.e. Rate = $\frac{r}{2}$ and time = $2 \times t$

Then, amount = Principal $\left(1 + \frac{\text{Rate}}{200}\right)^{2 \times \text{Time}}$

i.e. $A = P \left(1 + \frac{r}{200}\right)^{2t}$

Question. 33 Percentages are to fractions with equal to 100.

Solution. Percentages are equal to fractions with denominator equal to 100.

e.g. 8% means $\frac{8}{100}$

Question. 34 The marked price of an article when it is sold for ₹ 880 after a discount of 12%, is

Solution. Selling price of an article = Rs.880 Discount % = 12%

We know that, discount is calculated on marked price. Let the marked price be Rs. x.

So, $x - x \times \frac{12}{100} = 880$

$\Rightarrow \frac{88x}{100} = 880$

$\Rightarrow x = \frac{880}{88} \times 100 = ₹ 1000$

So, marked price = ₹ 1000

Question. 35 The compound interest on Rs. 8000 for one year at 16% per annum compounded half-yearly is, given that $1.08^2 = 1.1664$.

Solution. Given, principal(P) = Rs.8000

Time period (T) = 1 yr

Rate (R) = 16% per annum compounded half-yearly

Question. 36 In the first year on an investment of Rs. 600000, the loss is 5% and in the second year, the gain is 10%, the net result is

Solution. Investment amount = 600000

In 1st year, the loss in 1st year = 5%.

So, investment in 1st year = $600000 - \frac{5}{100} \times 600000 = 600000 - 30000 = 570000$

In 2nd year, the gain is 10%.

So, net investment = $570000 + \frac{10}{100} \times 570000 = 570000 + 57000 = 627000$

Question. 37 If amount on the principal of Rs. 6000 is written as $6000 \left[1 + \frac{5}{100}\right]^3$ and compound interest payable half-yearly, then rate of interest per annum is..... and..... time (in years) is

Solution. If amount on the principal of 6000 is written as $6000 \left[1 + \frac{5}{100}\right]^3$ of and compound interest

payable half-yearly, then rate of interest per annum is 10% and time (in years) is $\frac{1}{2}$ yr.

Question. 38 By selling an article for Rs. 112000, a girl gains 40%. The cost price of the article was

Solution. Selling price of an article = ₹ 112000

Gain% = 40% .

Let ₹ x be the cost price of the article.

\therefore Cost price = Selling price - Profit% on cost price

\therefore Selling price = Cost price + Profit% on cost price

So, $112000 = x + x \times \frac{40}{100}$

$\Rightarrow 112000 = \frac{7x}{5}$

$\Rightarrow x = \frac{112000 \times 5}{7} = 16000 \times 5 = ₹ 80000$

Question. 39 The loss per cent on selling 140 geometry boxes at the loss of SP of 10 geometry boxes is equal to

Solution. Let the selling price of 1 geometry box be Rs. 1.

So, the selling price for 140 geometry boxes = Rs.1 x 140 = Rs.140

Similarly, selling price of 10 geometry boxes = Rs. 1 x 10 = Rs. 10

Loss = Selling price of 10 geometry boxes = Rs.10

$$\therefore \text{Loss percentage} = \frac{\text{Loss}}{\text{CP}} \times 100 = \frac{10}{140 + 10} \times 100 = \frac{10}{150} \times 100 = \frac{20}{3}\% = 6\frac{2}{3}\%$$

Question. 40 The cost price of 10 tables is equal to the sale price of 5 tables. The profit per cent in this transaction is

Solution. Let the cost price of 1 table be Rs. 1.

The cost price of 10 tables = Sale price of 5 tables Profit = Cost price of 5 tables = Rs. 5

$$\text{Profit percentage} = \frac{\text{profit}}{\text{CP}} \times 100 = \frac{5}{5} \times 100 = 100\%$$

Question. 41 Abida bought 100 pens at the rate of Rs. 3.50 per pen and pays a sales tax of 4%. The total amount paid by Abida is .

Solution. Number of pens bought by Abida = 100 Rate of per pen = Rs.3.50 So, cost of 100 pens = 100 x 3.50 = 350 Abida also paid 4% sales tax on Rs. 350.

$$\text{So, the total amount paid by Abida} = 350 \times \frac{4}{100} + 350 = 350 \times \frac{1}{25} + 350 = 14 + 350 = \text{Rs. } 364 .$$

Question. 42 The cost of a tape recorder is Rs. 10800 inclusive of sales tax charged at 8%. The price of the tape recorder before sales tax was charged, is

Solution. The cost of tape recorder, inclusive of 8% sales tax = Rs.10800 Let the price of the tape recorder before sales tax be Rs. x.

$$\begin{aligned} \text{So,} & \quad x + x \times \frac{8}{100} = 10800 \\ \Rightarrow & \quad \frac{108x}{100} = 10800 \\ \Rightarrow & \quad x = \frac{10800}{108} \times 100 = 100 \times 100 \\ & \quad x = \text{₹ } 10000 \end{aligned}$$

Hence, the price of the tape recorder before sales tax charged, is ₹ 10000.

Question. 43 2500 is greater than 500 by%.

Solution. Difference between 2500 and 500 = 2500 – 500 = 2000

$$\text{Hence, } \frac{2000}{500} \times 100 = \frac{2000}{5} = 400\%$$

Question. 44 Four times a number is a% increase in the number.

Solution. Let x be the number.

So, four times of x is 4x.

Hence, 4x is greater than x by 4x – x = 3x

$$\text{Percentage increase in } x = \frac{3x}{x} \times 100 = 300\%$$

Question. 45 5% sales tax is charged on an article marked X 200 after allowing a discount of 5%, then the amount payable is

Solution. The marked price of the article = 200 Discount = 5%

$$\text{Selling price of the article} = 200 - \frac{5}{100} \times 200$$

$$= 200 - 10 = \text{Rs. } 190$$

$$\text{Selling price including 5% sales tax} = 190 + \frac{5}{100} \times 190$$

$$= 190 + 9.5 = \text{Rs. } 199.5$$

$$\text{Payable amount} = \text{Rs. } 199.50$$

True/False

Questions 46 to 65, state whether the statements are True or False.

Question. 46. To calculate the growth of a bacteria if the rate of growth is known, the formula for calculation of amount in compound interest can be used.

Solution. True

For calculating the growth of a bacteria if the rate of growth is known, then we can use the formula for calculation of amount in compound interest. where, A = growth after n years, P = initial number of bacteria and R = rate of growth

Question. 47 Additional expenses made after buying an article are included in the cost price and are known as Value Added Tax.

Solution. False

In the selling price (known as MRP) include the tax known as VAT (Value Added Tax). Hence, VAT is always included in selling price.

Question. 48 Discount is a reduction given on cost price of an article.

Solution. False

Discount is a reduction given on marked price not on cost price.

Question. 49 Compound interest is the interest calculated on the previous year's amount.

Solution. True

Compound interest, $CI = A - P$

where,

$$A = P \left[1 + \frac{R}{100} \right]^n$$

Here, P = Principal on previous year's amount and A = Present year's amount R = Rate of interest and n = Time

Question. 50 $CP = MP - \text{Discount}$

Solution. False

The relation between marked price and discount is given by Selling price = Marked price - Discount

Question. 51 A man purchased a bicycle for Rs. 1040 and sold it for Rs. 800. His loss per cent is 30%.

Solution. False

Cost price of the bicycle = Rs. 1040 Selling price of the bicycle = Rs. 800

Loss = Cost price - Selling price = Rs. 1040 - Rs. 800 = Rs. 240

$$\begin{aligned} \text{Hence, loss \%} &= \frac{\text{Loss}}{\text{Cost price}} \times 100 = \frac{240}{1040} \times 100 \\ &= \frac{2400}{104} = 23.07\% \end{aligned}$$

Question. 52 Three times a number is 200% increase in the number, then one-third of the same number is 200% decrease in the number.

Solution. False

Let x be the number.

So, three times of x = 3x

Difference between 3x and x = 3x - x = 2x

∴ Difference between $3x$ and $x = 3x - x = 2x$

∴ Percentage increase in $x = \frac{2x}{x} \times 100 = 200\%$

If one-third of $x = \frac{1}{3}x$

∴ Difference between x and $\frac{x}{3} = x - \frac{x}{3} = \frac{2x}{3}$

∴ Percentage decrease = $\frac{\frac{2x}{3}}{x} \times 100$
 $= \frac{2}{3} \times 100$
 $= 66.66\%$

Question. 53 Simple interest on a given amount is always less than or equal to the compound interest on the same amount for the same time period and at the same rate of interest per annum.

Solution. False

For 1 yr, the simple interest and compound interest for same amount on same rate of interest are equal.

But for 2 yr, the simple interest is less than the compound interest for same amount on same rate of interest.

Question. 54 The cost of a sewing machine is Rs. 7000. Its value depreciates at 8% per annum. Then, the value of the machine after 2 yr is Rs. 5924.80.

Solution. True

Principal = Rs.7000

Rate of depreciation = 8% per annum Time period = 2 yr

$$\begin{aligned} A &= P \left(1 - \frac{R}{100}\right)^n = 7000 \left(1 - \frac{8}{100}\right)^2 \\ &= 7000 \times \frac{23}{25} \times \frac{23}{25} \\ &= 11.2 \times 23 \times 23 = ₹ 5924.8 \end{aligned}$$

Question. 55 If the discount of Rs. y is available on the marked price of Rs. x , then the discount per cent is $\frac{y}{x} \times 100\%$,

Solution. False

Marked price = Rs. x

Discount amount = Rs. y

∴ Discount percentage = $\frac{\text{Discount}}{\text{Marked price}} \times 100\% = \frac{y}{x} \times 100\%$

Question. 56 Number of students appearing for class X CBSE examination increases from 91422 in 1999-2000 to 116054 in 2008-09. Increase in the number of students appeared is approximately 27%.

Solution. True

Number of students increase from 116054 in 2008-09 to 91422 in 1999-2000

= 116054 - 91422 = 24632

Percentage of increase in number of students

$$\begin{aligned} &= \frac{\text{Number of students increase}}{\text{Number of students in previous year}} \times 100 \\ &= \frac{24632}{91422} \times 100 = 26.94 \times 100 = 26.9 \approx 27\% \end{aligned}$$

Question. 57. Selling price of 9 articles is equals to the cost price of 15 articles .In this transaction the profit of $66\frac{2}{3}\%$

Solution. True

Selling price of 9 articles = Cost price of 15 articles
 It means, 15 articles – 9 articles = 6 articles
 Cost price of 6 articles is the profit on transaction.

$$\therefore \text{Profit \%} = \frac{6}{9} \times 100 = \frac{600}{9} = \frac{200}{3} = 66\frac{2}{3}\%$$

Question. 58 The compound interest on a sum of Rs. P for T years at R% per annum compounded annually is given by the formula, $P \left[1 + \frac{R}{100} \right]^T$

Solution. False

The compound interest on a sum of ₹ P for T years at R% per annum compounded annually is given by the formula,

$$\text{Compound interest} = A - P$$

$$\text{where, } A = P \left(1 + \frac{R}{100} \right)^T$$

Question. 59 In case of gain, SP = **Formula does not parse**

Solution. True

We know that,

$$\text{Gain} = \text{Selling price} - \text{Cost price}$$

$$\therefore \text{Gain \%} = \frac{\text{Gain}}{\text{Cost price}} \times 100$$

$$\therefore \text{Selling price} = \frac{100 + \text{Gain\%}}{100} \times \text{Cost price}$$

Note Gain or loss is always calculated on cost price.

Question. 60 In case of loss, CP = **Formula does not parse**

Solution. False

We know that,

$$\text{Loss} = \text{Cost price} - \text{Selling price}$$

$$\therefore \text{Loss \%} = \frac{\text{Loss}}{\text{Cost price}} \times 100$$

$$\therefore \text{Cost price} = \frac{100}{100 - \text{Loss\%}} \times \text{Selling price}$$

Question. 61 The value of a car, bought for Rs. 440000 depreciates each year by 10% of its value at the beginning of that year. So, its value becomes Rs. 308000 after three years.

Solution. False

The value of a car i.e. principal = Rs.440000 Rate of depreciation (R%) = 10% per annum Time period (T) = 3 yr

The value of the car after depreciation in 3 yr is given by

$$\begin{aligned} A &= P \left(1 - \frac{R}{100} \right)^T \\ &= 440000 \left(1 - \frac{10}{100} \right)^3 \\ &= 440000 \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10} \\ &= 440 \times 729 = ₹ 320760 \end{aligned}$$

Question. 62 The cost of a book marked at Rs. 190 after paying a sales tax of 2% is Rs. 192.

Solution. False

Marked price of a book = Rs.190 .

Sales tax = 2%

$$\begin{aligned} \text{The cost price of the book after 2\% sales tax} &= 190 + \frac{2}{100} \times 190 \\ &= 190 + \frac{190}{50} = 190 + 3.8 = ₹ 193.8 \end{aligned}$$

Question. 63 The buying price of 5 kg of flour with the rate Rs. 20 per kg, when 5% sales tax is added on the purchase, is Rs. 21.

Solution. True

Total flour bought = 5 kg

Rate of one kg flour = Rs.20

$$\begin{aligned}\text{Cost of 5 kg flour with 5\% sales tax} &= 5 \times 20 + \frac{5}{100} \times (5 \times 20) \\ &= 100 + \frac{5}{100} \times 100 = 100 + 5 = ₹105\end{aligned}$$

$$\text{Per kg flour rate after 5\% sales tax} = \frac{105}{5} = ₹21$$

Question. 64 The original price of a shampoo bottle bought for Rs. 324, if 8% VAT is included in the price, is Rs. 300.

Solution. False

The original price of a shampoo bottle = Rs.300

Cost price of shampoo bottle after 8% VAT

$$\begin{aligned}&= 300 + \frac{8}{100} \times 300 \\ &= 300 + 8 \times 3 = 300 + 24 = ₹324\end{aligned}$$

Question. 65 Sales tax is always calculated on the cost price of an item and is added to the value of the bill.

Solution. False

Sales tax is always calculated on the selling price of an item and is added to the value of the bill.

Question. 66 In a factory, women are 35% of all the workers, the rest of the workers being men. The number of men exceeds that of women by 252. Find the total number of workers in the factory.

Solution. Percentage of women in factory = 35%

Percentage of men in factory = $100 - 35 = 65\%$

Let the number of persons in the factory be x .

According to the question,

$$\begin{aligned}\Rightarrow & x \times \frac{65}{100} - x \times \frac{35}{100} = 252 \\ \Rightarrow & \frac{65x - 35x}{100} = 252 \\ \Rightarrow & \frac{30x}{100} = 252 \\ \Rightarrow & x = \frac{2520}{3} = 840\end{aligned}$$

Hence, total number of workers in the factory is 840.

Question. 67 Three bags contain 64.2 kg of sugar. The second bag contains $\frac{4}{5}$ of the contents of the first and the third contains $45\frac{1}{2}\%$ of what there is in the second bag. How much sugar is there in each bag?

Solution. The total weight of sugar in three bags = 64.2 kg Let the first bag contains x kg sugar.

The second bag contains = $x \times \frac{4}{5} \text{ kg} = \frac{4x}{5} \text{ kg}$

Third bag contains = $x \times \frac{4}{5} \times \frac{91}{2} \% = x \times \frac{4}{5} \times \frac{2}{100} = \frac{91x}{250} \text{ kg}$

According to the question,

$$x + \frac{4x}{5} + \frac{91x}{250} = 64.2$$

$$\Rightarrow \frac{250x + 200x + 91x}{250} = 64.2$$

$$\Rightarrow 541x = 64.2 \times 250$$

$$541x = 16050$$

$$\Rightarrow x = \frac{16050}{541} = 29.67 \text{ kg}$$

So, first bag contains the sugar = 23.73 kg

Second bag contains the sugar = $29.67 \times \frac{4}{5} = 23.73 \text{ kg}$

and third bag contains the sugar = $\frac{91}{250} \times 29.67 = 10.8 \text{ kg}$

Question. 68 Find the SP, if

(a) MP = Rs. 5450 and discount = 5%

(b) MP = Rs.1300 and discount = 15%

Solution. (a) Marked price = 7 5450 Discount % = 5%

$$\therefore \text{Selling price} = \text{Marked price} - \frac{\text{Discount \%}}{100} \times \text{Marked price}$$

$$= 5450 - \frac{5}{100} \times 5450$$

$$= 5450 - 272.5 = ₹ 5177.5$$

i) Marked price (MP) = ₹ 1300

Discount % = 15%

$$\text{Selling price} = \text{Marked price} - \frac{\text{Discount \%}}{100} \times \text{MP}$$

$$= 1300 - \frac{15}{100} \times 1300 = 1300 - 195 = ₹ 1280.5$$

Question. 69 Find the MP, if

(a) SP = Rs. 495 and discount = 1%

(b) SP = Rs. 9250 and discount = $7\frac{1}{2} \%$

Solution. (a) Selling price (SP) = 7495 Discount % = 1%

Let the marked price be ₹ x.

$$\therefore \text{Selling price} = \text{Marked price} - \frac{\text{Discount \%}}{100} \times \text{MP}$$

$$\Rightarrow 495 = x - \frac{1}{100} \times x$$

$$\Rightarrow 495 = \frac{100x - x}{100}$$

$$\Rightarrow 495 = \frac{99x}{100}$$

[by cross-multiplication]

$$\Rightarrow 99x = 49500$$

$$\Rightarrow x = 500$$

Hence, the marked price = ₹ 500.

(b) Selling price (SP) = ₹ 9250

$$\text{Discount \%} = 7\frac{1}{2} \% = \frac{15}{2} \%$$

Let marked price be ₹ x.

$$\begin{aligned} \therefore \text{Selling price} &= \text{Marked price} - \frac{\text{Discount \%}}{100} \times \text{MP} \\ \Rightarrow 9250 &= x - \frac{15}{2 \times 100} \times x \\ \Rightarrow 9250 &= \frac{200x - 15x}{200} \\ \Rightarrow 9250 &= \frac{185x}{200} \\ \Rightarrow x &= \frac{9250 \times 200}{185} && \text{[by cross-multiplication]} \\ \Rightarrow x &= \frac{1550000}{185} = ₹ 10000 \end{aligned}$$

Hence, the marked price = ₹ 10000.

Question. 70 Find discount in percent when

(a) MP = Rs.625 and SP = Rs.562.50

(b) MP = Rs.900 and SP = Rs.873

Solution. (a) Marked price (MP) = Rs.625 Selling price (SP) = Rs. 562.50

$$\therefore \text{Discount} = \text{Marked price} - \text{Selling price} = ₹ 625 - ₹ 562.5 = ₹ 62.5$$

$$\therefore \text{Discount \%} = \frac{\text{Discount}}{\text{Marked price}} \times 100 = \frac{62.5}{625} \times 100 = \frac{6250}{625} = 10\%$$

(b) Marked price (MP) = ₹900

Selling price (SP) = ₹873

$$\therefore \text{Discount} = \text{Marked price} - \text{Selling price} = ₹ 900 - ₹ 873 = ₹ 27$$

$$\therefore \text{Discount \%} = \frac{\text{Discount}}{\text{Marked price}} \times 100 = \frac{27}{900} \times 100 = \frac{27}{9} = 3\%$$

Question. 71 The marked price of an article is Rs. 500. The shopkeeper gives a discount of 5% and still makes a profit of 25%. Find the cost price of the article.

Solution. Given, marked price of an article = Rs.500 Discount % = 5%

But it makes a profit of 25%.

Let the cost price of the article be Rs. x.

$$\begin{aligned} \text{Cost price after 5\% discount} &= 500 - \frac{5}{100} \times 500 \\ &= 500 - 25 = ₹ 475 \end{aligned}$$

According to the question,

$$(100 + 25)\% \text{ of } x = 475$$

$$\Rightarrow \frac{125}{100} \times x = 475$$

$$\Rightarrow x = \frac{475 \times 100}{125}$$

$$= 3.8 \times 100 = ₹ 380$$

Hence, cost price of an article is ₹ 380.

Question. 72 In 2007-08, the number of students appeared for Class X examination was 105332 and in 2008-09 the number was 116054. If 88151 students pass the examination in 2007-08 and 103804 students in 2008-09. What is the increase or decrease in pass percentage in class X result?

Solution. Number of students appeared in 2007-08 = 105332 Number of students appeared in 2008-09 = 116054 Number of students passed in 2007-08 = 88151 Number of students passed in 2008-09 = 103804

Passed percentage of students in 2007-08

$$\begin{aligned} &= \frac{\text{Number of students passed in 2007-08}}{\text{Number of students appeared in 2007-08}} \times 100 \\ &= \frac{88151}{105332} \times 100 \\ &= \frac{8815100}{105332} = 83.68\% \end{aligned}$$

Passed percentage of students in 2008-09

$$\begin{aligned} &= \frac{\text{Number of students passed in 2008-09}}{\text{Number of students appeared in 2008-09}} \times 100 \\ &= \frac{103804}{116054} \times 100 \\ &= \frac{10380400}{116054} = 89.44\% \end{aligned}$$

\therefore Increase in percentage = $89.44 - 83.68 = 5.76\%$

Question. 73 A watch worth Rs. 5400 is offered for sale at Rs. 4500. What per cent discount is offered during the sale?

Solution. Marked price of a watch = Rs.5400

Selling price = Rs.4500

Discount = Marked price – Selling price = Rs.5400 – Rs.4500 = Rs.900

$$\begin{aligned} \therefore \text{Discount\%} &= \frac{\text{Discount}}{\text{Marked price}} \times 100 \\ &= \frac{900}{5400} \times 100 \\ &= \frac{900}{54} = \frac{450}{27} = \frac{150}{9} = \frac{50}{3}\% \end{aligned}$$

Question. 74 In the year 2001, the number of malaria patients admitted in the hospitals of a state was 4375. Every year this number decreases by 8%. Find the number of patients in 2003.

Solution. The number of malaria patients admitted in a hospital in 2001 = 4375
Rate of decrement of malaria patients = 8%

Time period = 2 yr i.e. 2003-2001=2 yr

Let the number of patients in 2003 be A.

$$\begin{aligned} \text{By using formula,} \quad A &= P \left(1 - \frac{R}{100}\right)^T \\ &= 4375 \left(1 - \frac{8}{100}\right)^2 \\ &= 4375 \times \frac{23}{25} \times \frac{23}{25} \\ &= 7 \times 23 \times 23 = 3703 \end{aligned}$$

Hence, the number of patients in 2003 was 3703.

Question. 75 Jyotsana bought a product for Rs. 3155 including 4.5% sales tax. Find the price before tax was added.

Solution. A product bought by Jyotsana for Rs. 3155 including 4.5% sales tax.

Let the price of the product before sales tax be Rs. x.

$$\begin{aligned} \text{So,} \quad x + x \times \frac{4.5}{100} &= 3155 \\ \Rightarrow \quad x + \frac{x \times 45}{1000} &= 3155 \\ \Rightarrow \quad \frac{1045x}{1000} &= 3155 \quad [\because \text{sales tax included in selling price}] \\ \Rightarrow \quad x &= \frac{3155 \times 1000}{1045} = \frac{3155000}{1045} = ₹ 3019.1387 \\ \Rightarrow \quad x &\approx ₹ 3019.14 \end{aligned}$$

Hence, the price of the product before sales tax is ₹ 3019.14.

Question. 76 An average Urban Indian uses about 150 L of water everyday.

Activity	Litres per person per day
Drinking	3
Cooking	4
Bathing	20
Sanitation	40
Washing clothes	40
Washing utensils	20
Gardening	23
Total	150

- (a) What per cent of water is used for bathing and sanitation together per day?
 (b) How much less per cent of water is used for cooking in comparison to that used for bathing?
 (c) What per cent of water is used for drinking, cooking and gardening together?

Solution. (a) On the basis of given details, water used for bathing per day = 20 L

Water used for sanitation = 40 L

Total water used per day = 150 L

Percentage of water is used for bathing and sanitation together per day

$$\begin{aligned}
 &= \frac{20 + 40}{150} \times 100 = \frac{60}{150} \times 100 \\
 &= \frac{600}{15} = 40\%
 \end{aligned}$$

(b) Water used for cooking per day = 4 L

Water used for bathing per day = 20 L

Difference between water used for cooking and bathing = 20 - 4 = 16 L

= 16 L water less used for cooking in comparison of bathing

$$\text{In percentage} = \frac{16}{150} \times 100 = \frac{160}{15} = \frac{32}{3} \%$$

(c) Water used for drinking per day = 3 L

Water used for cooking per day = 4 L

Water used for gardening per day = 23 L

Water used for drinking, cooking and gardening together = 3 + 4 + 23 = 30 L

$$\text{In percentage} = \frac{30}{150} \times 100 = \frac{100}{5} = 20\%$$

Question. 77 In 1975, the consumption of water for human use was about 3850 cu km/yr. It increased to about 6000 cu km/yr in the year 2000.

Find the per cent increase in the consumption of water from 1975 to 2000. Also, find the annual per cent increase in consumption (assuming water consumption increases uniformly).

Solution. The consumption of water for human in 1975 = 3850 cu km/yr

The consumption of water for human in 2000 = 6000 cu km/yr

Increase in consumption of water in 1975 to 2000 = 6000 - 3850 = 2150 cu km/yr

$$\text{In percentage} = \frac{2150}{3850} \times 100 = 55.84\%$$

In 25 yr total increase in water consumption = 2150 cu km/yr

$$\therefore \text{Annually, i.e. per year water consumption} = \frac{2150}{25} = 86 \text{ cu km/yr} \quad [\because 2000 - 1975 = 25 \text{ yr}]$$

$$\therefore \text{In percentage} = \frac{86}{3850} \times 100 = \frac{8600}{3850} = 2.23\%$$

Question. 78 Harshna gave her car for service at service station on 27-05-2009 and was charged as follows

- (a) 3.10 L engine oil @ Rs. 178.75 per litre and VAT @ 20%.
 (b) Rs. 1105.12 for all other services and VAT @ 12.5%.
 (c) Rs. 2095.80 as labour charges and service tax @ 10%.
 (d) 3% cess on service tax.

Find the bill amount.

Solution. (a) The total litres of engine oil used = 3.10 L

Rate of engine oil per litres = Rs. 178.75

The cost of engine oil = $3.10 \times 17875 = \text{Rs. } 554.125$

$$\begin{aligned} \text{The cost of engine oil including 20\% VAT} &= 554.125 + 554.125 \times \frac{20}{100} \\ &= 554.125 + \frac{554.125}{5} \\ &= 554.125 + 110.825 = \text{₹ } 664.95 \end{aligned}$$

(b) Amount paid for all services = ₹ 1105.12

$$\begin{aligned} \text{Amount paid including 12.5\% VAT} &= 1105.12 + \frac{12.5}{100} \times 1105.12 \\ &= 1105.12 + 138.14 = \text{₹ } 1243.26 \end{aligned}$$

(c) Labour charges = ₹ 2095.80

Service tax = 10%

Total labour charges including 10% service tax

$$= 2095.80 + \frac{10}{100} \times 2095.8 = 2095.80 + 209.58 = \text{₹ } 2305.38$$

(d) Cess on service tax @ 3% = $209.58 \times \frac{3}{100} = 2.095 \times 3$

[∵ service tax = ₹ 209.58, get above]

$$= \text{₹ } 6.285 \approx \text{₹ } 6.29$$

Thus, total bill amount = ₹ 664.95 + ₹ 1243.26 + ₹ 2305.38 + ₹ 6.29 = ₹ 4219.88

Question. 79 Given, the principal = Rs.40000, rate of interest = 8% per annum compound annually. Find

(a) Interest if period is one year.

(b) Principal for IInd year.

(c) Interest for IInd year.

(d) Amount if period is two year.

Solution. Given, principal (P) = Rs.40000

Rate of interest (R) = 8% per annum

(a) Compound interest for one year,

We know that,

$$\begin{aligned} A &= P \left(1 + \frac{R}{100} \right)^n \\ &= 40000 \left(1 + \frac{8}{100} \right)^1 && [\because n = 1 \text{ yr}] \\ &= 40000 \times \frac{108}{100} \end{aligned}$$

∴ Amount, $A = 400 \times 108 = \text{₹ } 43200$

∴ Compound interest, $CI = A - P = \text{₹ } 43200 - \text{₹ } 40000 = \text{₹ } 3200$

(b) Amount of 1st year = Principal of IInd year = ₹ 43200.

(c) Now, for IInd year,

Principal = ₹ 43200

Rate of interest, $R = 8\%$ per annum

Time, $n = 1 \text{ yr}$

Question. 80 In Delhi University, in the year 2009-10, 49000 seats were available for admission to various courses at graduation level. Out of these 28200 seats were for the students of General Category while 7400 seats were reserved for SC and 3700 seats for ST. Find the percentage of seats available for

(a) students of General Category.

(b) students of SC Category and ST Category taken together.

Solution. The total number of seats available for admission in 2009-10 = 49000

Seats reserved for General Category students = 28200

Seats reserved for SC Category students = 7400

Seats reserved for ST Category students = 3700

$$\begin{aligned}\text{Amount for 1st year} &= 43200 \left(1 + \frac{8}{100}\right)^1 \\ &= 43200 \times \frac{108}{100} = 432 \times 108 = ₹ 46656\end{aligned}$$

$$\text{Compound interest, CI} = A - P = ₹ 46656 - ₹ 43200 = ₹ 3456$$

(d) Now, if period i.e. time (n) = 2 yr

Principal = ₹ 40000 and rate = 8% per annum

$$\begin{aligned}\therefore A &= P \left(1 + \frac{R}{100}\right)^n \\ \Rightarrow A &= 40000 \left(1 + \frac{8}{100}\right)^2 = 40000 \times \frac{108}{100} \times \frac{108}{100} = ₹ 46656\end{aligned}$$

\therefore Amount, $A = ₹ 46656$

Question. 81 Prachi bought medicines from a medical store as prescribed by her doctor for Rs 36.40 including 4% VAT. Find the price of before VAT was added.

Solution.

The cost of medicine including 4% VAT = ₹ 36.40

The price of medicine before 4% VAT [: selling price = cost price + VAT]

$$\begin{aligned}&= 36.40 - \frac{4}{100} \times 36.40 \\ &= 36.40 - 4 \times 0.364 \\ &= 36.40 - 1.456 \\ &= ₹ 34.944 \approx ₹ 35\end{aligned}$$

Question. 82 Kritika ordered one pizza and one garlic bread from a pizza store and paid Rs 387 inclusive of taxes of Rs 43. Find the tax%.

Solution.

The cost of one pizza and one garlic bread inclusive as tax = ₹ 43

\therefore The cost of one pizza and one garlic bread without tax = ₹ 387 - ₹ 43 = ₹ 344

$$\therefore \text{Tax \%} = \frac{43}{344} \times 100 = \frac{100}{8} = 12.5\%$$

Question. 83 Arunima bought household items whose marked price and discount % is as follows

	Item	Quantity	Rate (in ₹)	Discount %
(i)	Atta	1 packet	200	16%
(ii)	Detergent	1 packet	371	22.10%
(iii)	Namkeen	1 packet	153	18.30%

Find the total amount of the bill she has to pay.

Solution.

On the basis of given data in the above table,

Rate of one packet of atta = ₹ 200

Discount % = 16%

$$\text{So, price} = 200 - \frac{16}{100} \times 200 = 200 - 32 = ₹ 168$$

Rate of one packet of detergent = ₹ 371

Discount % = 22.10%

$$\text{So, price} = 371 - 371 \times \frac{22.10}{100} = 371 - 81.991 = ₹ 289.009$$

Rate of one packet of namkeen = ₹ 153

Discount % = 18.30%

$$\text{So, price} = 153 - 153 \times \frac{18.30}{100} = 153 - 27.999 = ₹ 125.001$$

$$\therefore \text{Total bill amount} = ₹ 168 + ₹ 289.009 + ₹ 125.001 = ₹ 582.01$$

Question. 84 Devangi's phone subscription charges for the period 17-02-09 to 16-03-09 were as follows

Period	Amount (in ₹)	Service tax %
17-02-09 to 23-02-09	199.75	12%
24-02-09 to 16-03-09	599.25	10%

Find the final bill amount, if 3% education cess was also charged on service tax.

Solution.

On the basis of above given table,

Amount for period 17-02-09 to 23-02-09 = ₹ 199.75

$$\therefore \text{Amount with service tax } 12\% = 199.75 + \frac{12}{100} \times 199.75 = 199.75 + 23.97 = ₹ 223.72$$

Amount for period 24-02-09 to 16-03-09 = ₹ 599.25

$$\begin{aligned} \text{Amount with service tax @ } 10\% &= 599.25 + 599.25 \times \frac{10}{100} \\ &= 599.25 + 59.925 = ₹ 659.175 \end{aligned}$$

$$\therefore \text{Total bill amount} = ₹ 223.72 + ₹ 659.175 = ₹ 882.895$$

Total bill amount including education cess of 3%

$$\begin{aligned} &= 882.895 + 3\% \text{ of } 882.895 \\ &= 882.895 + \frac{3}{100} \times 882.895 \\ &= 882.895 + 26.486 \\ &= ₹ 909.39 \end{aligned}$$

Question. 85 If principal = Rs 100000, rate of interest = 10% compounded half-yearly. Find.

(a) Interest for 6 months. (b) Amount after 6 months.

(c) Interest for next 6 months, (d) Amount after one year.

Solution.

Principal (P) = ₹ 100000

Rate of interest (R) = 10% compounded half-yearly

(a) Interest for 6 months,

We know that,

Compound interest, $CI = A - P$

$$\text{where, } A = P \left(1 + \frac{R}{200} \right)^n \quad \text{[for 6 months]}$$

$$\begin{aligned} \therefore A &= P \left(1 + \frac{R}{200} \right)^n = 100000 \left(1 + \frac{10}{200} \right)^1 \quad [\because n = 1 \text{ for 6 months}] \\ &= 100000 \times \frac{21}{20} = ₹ 105000 \end{aligned}$$

$$\therefore \text{Compound interest, } CI = A - P = ₹ 105000 - ₹ 100000 = ₹ 5000$$

(b) Amount after 6 months = ₹ 105000

(c) Interest for next 6 months

Principal = Amount after 6 months

\therefore Principal (P) = ₹ 105000

Rate of interest (R) = 10%

$$\begin{aligned} \therefore A &= P \left(1 + \frac{R}{200} \right)^n \\ &= 105000 \left(1 + \frac{10}{200} \right)^1 \quad [\because n = 1 \text{ for 6 months}] \\ &= 105000 \times \frac{21}{20} \\ &= \frac{2205000}{20} = ₹ 110250 \end{aligned}$$

$$\therefore \text{Compound interest, } CI = A - P = ₹ 110250 - ₹ 105000 = ₹ 5250$$

(d) Amount after one year = ₹ 110250

Question. 86 Babita bought 160 kg of mangoes at Rs 48 per kg. She sold 70% of the mangoes at Rs 70 per kg and the remaining mangoes at Rs 40 per kg. Find Babita's gain or loss per cent on the whole dealing.

Solution.

Babita bought 160 kg of mangoes = ₹ 48 per kg

So, total amount she paid = ₹ 48 × 160 = ₹ 7680

She sold 70% of mangoes at ₹ 70 per kg.

$$\therefore \text{Cost of 70\% mangoes} = 160 \times \frac{70}{100} \times 70 = 70 \times 16 \times 7 = ₹ 7840$$

Remaining mangoes = (100 - 70)% = 30%

$$\text{Cost of remaining at ₹ 40 per kg} = 160 \times \frac{30}{100} \times 40 = 16 \times 3 \times 40 = ₹ 1920$$

Total amount received after selling mangoes = ₹ 7840 + ₹ 1920 = ₹ 9760

\therefore SP > CP, so there is a gain.

$$\text{Gain} = \text{SP} - \text{CP} = ₹ 9760 - ₹ 7680 = ₹ 2080$$

$$\therefore \text{Gain \%} = \frac{\text{Gain}}{\text{CP}} \times 100$$

$$\therefore \text{Gain \%} = \frac{2080}{7680} \times 100 = 27.08\%$$

Question. 87 A shopkeeper was selling all his items at 25% discount. During the off season, he offered 30% discount over and above the existing discount. If Pragya bought a skirt which was marked for Rs 1200, how much did she pay for it?

Solution.

Marked price of the skirt = ₹ 1200

$$\text{During normal season discount @ 25\%} = \frac{25}{100} \times 1200 = 25 \times 12 = ₹ 300$$

Price of the skirt after discount = ₹ 1200 - ₹ 300 = ₹ 900

$$\text{In off season, the shopkeeper also offer discount @ 30\%} = \frac{30}{100} \times 900 = ₹ 270$$

Price of skirt after 30% discount = ₹ 900 - ₹ 270 = ₹ 630

So, ₹ 630 paid by Pragya for the skirt.

Question. 88 Ayesha announced a festival discount of 25% on all the items in her mobile phone shop. Ramandeep bought a mobile phone for himself. He got a discount of ₹ 1960. What was the marked price of the mobile phone?

Solution.

Let the marked price of the mobile phone be ₹ x .

Festival discount on mobile phone = 25%

Ramandeep got total discount = ₹ 1960

According to the question,

$$1960 = x \times \frac{25}{100}$$

$$\Rightarrow 1960 = \frac{x}{4}$$

$$\Rightarrow \frac{x}{4} = 1960$$

$$\Rightarrow x = 1960 \times 4 = ₹ 7840$$

Hence, marked price of mobile phone was ₹ 7840.

Question. 89 Find the difference between compound interest and simple interest on Rs 45000 at 12% per annum for 5 yr.

Solution.

Principal (P) = ₹45000

Rate of interest (R) = 12% per annum

Time period (T) = 5 yr

$$\text{Simple interest, SI} = \frac{P \times R \times T}{100} = \frac{45000 \times 12 \times 5}{100} \\ = 450 \times 60 = ₹ 27000$$

∴ Compound interest, $CI = A - P$

where, $A = P \left(1 + \frac{R}{100}\right)^T$

$$\begin{aligned} \therefore A &= 45000 \left(1 + \frac{12}{100}\right)^5 = 45000 \left(\frac{28}{25}\right)^5 \\ &= 45000 \times \frac{28}{25} \times \frac{28}{25} \times \frac{28}{25} \times \frac{28}{25} \times \frac{28}{25} \\ &= \frac{45000 \times 17210368}{9765625} \\ &= 45000 \times 1.76 = ₹ 79200 \end{aligned}$$

$$\begin{aligned} \therefore \text{Compound interest, CI} &= ₹ 79200 - ₹ 45000 \\ &= ₹ 34200 \end{aligned}$$

$$\therefore \text{Difference between SI and CI} = ₹ 34200 - ₹ 27000 = ₹ 7200$$

Question. 90 A new computer costs Rs 100000. The deprecation of computers is very high as new models with better technological advantages are coming into the market. The deprecation is as high as 50% every year. How much will the cost of computer be after two years?

Solution.

The cost of the new computer = ₹100000

The depreciation rate = 50% per annum

Time period (T) = 2 yr

Let the cost of computer after 2 yr = ₹ A

$$\begin{aligned} \therefore A &= P \left(1 - \frac{R}{100}\right)^T \\ &= 100000 \left(1 - \frac{50}{100}\right)^2 \\ \Rightarrow A &= 100000 \times \frac{1}{2} \times \frac{1}{2} \\ &= 25000 \times 1 \\ \therefore A &= ₹ 25000 \end{aligned}$$

Hence, the cost of computer after 2 yr is ₹ 25000.

Question. 91 The population of a town was decreasing every year due to migration, poverty and unemployment. The present population of the town is 631680. Last year the migration was 4% and the year before last, it was 6%. What was the population two years ago?

Solution.

Let the population two years ago = P (Principal)

Present population of the town = $A = 631680$

Rate of migration in 1st year = 4%

Rate of migration in 2nd year = 6%

By using the formula, $A = P \left(1 - \frac{R}{100}\right) \left(1 - \frac{R}{100}\right)$

$$\Rightarrow 631680 = P \left(1 - \frac{4}{100}\right) \left(1 - \frac{6}{100}\right)$$

$$\Rightarrow 631680 = P \times \frac{24}{25} \times \frac{47}{50}$$

$$\Rightarrow P = \frac{631680 \times 25 \times 50}{24 \times 47}$$

$$\Rightarrow = 560 \times 1250 = 700000$$

Hence, the population of town was 700000 two years ago.

Question. 92 Lemons were bought at Rs 48 per dozen and sold at the rate of Rs 40 per 10. Find the gain or loss per cent.

Solution.

Cost of 12 lemons = ₹ 48

[∵ 1 dozen = 12 pieces]

$$\therefore \text{Cost of 1 lemon} = \frac{₹ 48}{12} = ₹ 4$$

Also, 10 lemons sold by = ₹ 40

$$\therefore \text{Selling price of 1 lemon} = \frac{₹ 40}{10} = ₹ 4$$

∴ Cost price of 1 lemon = Selling price of 1 lemon

∴ No profit and no loss.

Question. 93 If the price of petrol, diesel and LPG is slashed as follows

Fuel	Old price/litre (in ₹)	New price/litre (in ₹)	% Decrease
Petrol/L	45.62	40.62	---
Diesel/L	32.86	30.86	---
LPG/14.2 kg	304.70	279.70	---

Complete the above table.

Solution.

For Petrol/L,

Old price = ₹ 45.62

New price = ₹ 40.62

Decrement in price = ₹ 45.62 - ₹ 40.62 = ₹ 5

$$\therefore \text{Decrease \%} = \frac{5}{45.62} \times 100 = \frac{50000}{4562} = 10.96\%$$

For Diesel/L,

Old price = ₹ 32.86

New price = ₹ 30.86

Decrement in price = ₹ 32.86 - ₹ 30.86 = ₹ 2

$$\therefore \text{Decrease \%} = \frac{2}{32.86} \times 100 = \frac{200}{32.86} = 6.0869 \approx 6.09\%$$

For LPG,

Old price = ₹ 304.70

New price = ₹ 279.70

Decrement in price = ₹ 304.70 - ₹ 279.70 = ₹ 25

$$\therefore \text{Decrease \%} = \frac{25}{304.70} \times 100 = \frac{2500}{304.70} = 8.20\%$$

Question. 94 What is the percentage increase or decrease in the number of seats won by A, B, C and D in the general elections of 2009 as compared to the results of 2004?

Political party	Number of seats won in 2004	Number of seats won in 2009
A	206	145
B	116	138
C	4	24
D	11	12

Solution.

For Political party A,
 Number of seats won in 2004 = 206
 Number of seats won in 2009 = 145
 Decrement in the number of seats won by party A = $206 - 145 = 61$
 \therefore Decrease % = $\frac{61}{206} \times 100 = 29.61\%$

For Political party B,
 Number of seats won in 2004 = 116
 Number of seats won in 2009 = 138
 Increment in the number of seats won by party B = $138 - 116 = 22$
 \therefore Increase % = $\frac{22}{116} \times 100 = 18.96\%$

For Political party C,
 Number of seats won in 2004 = 4
 Number of seats won in 2009 = 24
 Increment in the number of seats won by party C = $24 - 4 = 20$
 \therefore Increase % = $\frac{20}{4} \times 100 = 500\%$

For Political party D,
 Number of seats won in 2004 = 11
 Number of seats won in 2009 = 12
 Increment in the number of seat won by party D = $12 - 11 = 1$
 \therefore Increase % = $\frac{1}{11} \times 100 = 9.09\%$

Question. 95 How much more per cent seats were won by X as compared to Y in assembly election in the state based on the data given below?

Party	Won (out of 294)
X	158
Y	105
Z	18
W	13

Solution.

On the basis of above give table
 The total number of seats won by party X = 158
 The total number of seats won by party Y = 105
 \therefore Total number of seats in election = 294
 \therefore Percentage of seats won by party X = $\frac{158}{294} \times 100 = 53.74\%$
 \therefore Percentage of seats won by party Y = $\frac{105}{294} \times 100 = 35.71\%$
 So, difference of percentage = $(53.74 - 35.71)\% = 18.03\%$
 Hence, party X won 18.03% compared to party Y.

Question. 96 Ashima sold two coolers for ? 3990 each. On selling one cooler she gained 5% and on selling the other she suffered a loss of 5%. Find her overall gain or loss % in whole transaction.

Solution.

Selling price of each cooler = ₹ 3990

Let ₹ x be the cost price of both coolers for Ashima.

If Ashima gets 5% gain on transaction of first cooler.

$$\text{Then, } 3990 = x + x \times \frac{5}{100} \quad [\because \text{profit} = \text{SP} - \text{CP}]$$

$$\Rightarrow 3990 = \frac{21x}{20}$$

$$\Rightarrow x = \frac{3990 \times 20}{21} \\ = 190 \times 20 = ₹ 3800$$

Also, on the another transaction of other cooler she has a loss of 5%.

$$\text{Then, } 3990 = x - \frac{x \times 5}{100} \quad [\because \text{loss} = \text{CP} - \text{SP}]$$

$$\Rightarrow 3990 = \frac{19x}{20}$$

$$\Rightarrow x = \frac{3990 \times 20}{19} = 210 \times 20 = ₹ 4200$$

So, the total cost price for Ashima = ₹ 3800 + ₹ 4200 = ₹ 8000

Ashima sold both coolers = ₹ 3990 × 2 = ₹ 7980

Here, CP > SP. So, Ashima has loss on overall transaction.

$$\therefore \text{Loss} = ₹ 8000 - ₹ 7980 = ₹ 20$$

$$\therefore \text{Loss \%} = \frac{20}{8000} \times 100 = \frac{2000}{8000} = \frac{1}{4} \% = 0.25\%$$

Question. 97 A lady buys some pencils for Rs 3 and an equal number for Rs 6. She sells them for Rs 7. Find her gain or loss %.

Solution.

Let the Lady buys x number of pencils for ₹ 3.

$$\text{Cost price for one pencil, } CP_1 = ₹ \frac{3}{x}$$

Also, she buys same number of pencils for ₹ 6.

$$\therefore \text{Cost price for one pencil, } CP_2 = ₹ \frac{6}{x}$$

Now, total pencils = $x + x = 2x$

\therefore She sells, $2x$ pencils = ₹ 7

$$\therefore \text{Selling price of 1 pencil} = ₹ \frac{7}{2x}$$

Case I We know that,

$$\text{Gain} = \text{SP} - \text{CP}$$

$$\therefore \text{Gain} = ₹ \left(\frac{7}{2x} - \frac{3}{x} \right) = ₹ \left(\frac{7-6}{2x} \right) = ₹ \frac{1}{2x}$$

$$\therefore \text{Gain \%} = \frac{\text{Gain}}{\text{CP}} \times 100 = \frac{\frac{1}{2x}}{\frac{3}{x}} \times 100 = \frac{100}{2 \times 3} = \frac{50}{3} \%$$

Case II

Also, we know that,

$$\text{Loss} = \text{CP} - \text{SP}$$

$$\text{Loss} = \frac{6}{x} - \frac{7}{2x} = \frac{6 \times 2 - 7}{2x} = ₹ \frac{5}{2x}$$

$$\therefore \text{Loss \%} = \frac{\text{Loss}}{\text{CP}} \times 100 = \frac{\frac{5}{2x}}{\frac{6}{x}} \times 100 = \frac{250}{6} = \frac{125}{3} \%$$

$$\therefore \text{Net gain \%} = \frac{125}{3} - \frac{50}{3} = \frac{75}{3} = 25\%$$

Question. 98 On selling a chair of Rs 736, a shopkeeper suffers a loss of 8%. At what price should he sell it, so as to gain 8%?

Solution.

Let the cost price of a chair = ₹ x
 Selling price of a chair = ₹ 736
 At selling a shopkeeper suffers 8% loss.
 According to the question,

$$x - x \times \frac{8}{100} = 736$$

$$\Rightarrow \frac{92x}{100} = 736$$

$$\Rightarrow x = \frac{73600}{92} = ₹ 800$$

To gain 8% profit the price should be = $800 + \frac{8}{100} \times 800 = 800 + 64 = ₹ 864$

Question. 99 A dining table is purchased for Rs 3200 and sold at a gain of 6%. If a customer pays sales tax at the rate of 5%. How much does the customer pay in all for the table?

Solution.

The cost price of the dining table = ₹ 3200

∴ The dining table sold at a gain of 6%.

So, selling price of the dining table = $3200 + \frac{6}{100} \times 3200 = 3200 + 192 = ₹ 3392$

Also, customer pay sale tax = 5%

Selling price with sales tax = $3392 + 3392 \times \frac{5}{100} = 3392 + 169.6 = ₹ 3561.60$

Question. 100 Achal bought a second hand car for Rs 225000 and spend Rs 25000 for repairing. If she sold it for Rs 325000, what is his profit per cent?

Solution.

The cost price of second hand car = ₹ 225000

Also, Achal spends for repairing = ₹ 25000

So, actual cost for car = ₹ 225000 + ₹ 25000 = ₹ 250000

She sold the car = ₹ 325000

Profit = ₹ 325000 - ₹ 250000

= ₹ 75000

∴ Profit % = $\frac{\text{Profit}}{\text{CP}} \times 100 = \frac{75000}{250000} \times 100 = \frac{7500}{250} = 30\%$

Question. 101 A lady bought an air-conditioner for Rs 15200 and spent Rs 300 and Rs 500 on its transportation and repair, respectively. At what price should she sell it to make a gain of 15%?

Solution.

The cost price of air conditioner = ₹ 15200

Also, spent amount on transportation = ₹ 300

Spent amount on repair = ₹ 500

Actual cost price of air conditioner with transportation charge and repair charges

= ₹ 15200 + ₹ 300 + ₹ 500 = ₹ 15500 + ₹ 500 = ₹ 16000

For gain 15% she should sell it for = $16000 + 16000 \times \frac{15}{100}$

= $16000 + 160 \times 15 = 16000 + 2400 = ₹ 18400$

Question. 102 What price should a shopkeeper mark on a article that costs him Rs 600 to gain 20%, after allowing a discount of 10%?

Solution.

The cost price of the article = ₹ 600

Gain% = 20%

∴ Gain = $\frac{600 \times 20}{100} = ₹ 120$

∴ SP = Gain + CP = ₹ 600 + ₹ 120 = ₹ 720

Let marked price be ₹ x .

Since, he allow a discount of 10%.

According to the question,

$$\begin{aligned}x - 10\% \text{ of } x &= ₹720 \\ \Rightarrow x - \frac{10 \times x}{100} &= 720 \\ \Rightarrow \frac{100x - 10x}{100} &= 720 \\ \Rightarrow \frac{90x}{100} &= 720 \\ \Rightarrow x &= \frac{720 \times 100}{90} \\ \Rightarrow x &= ₹800\end{aligned}$$

Hence, required marked price is ₹ 800.

Question. 103 Brinda purchased 18 coats at the rate of Rs 1500 each and sold them at a profit of 6%. If customer is to pay sales tax at the rate of 4%, how much will one coat cost to the customer and what will be the total profit earned by Brinda after selling all coats?

Solution.

The cost of each coat = ₹ 1500

The total number of coat = 18

The total cost of 18 coat = ₹1500 × 18 = ₹ 27000

If Brinda sold them at profit = 6%

$$\begin{aligned}\text{The amount received by Brinda} &= 27000 + 27000 \times \frac{6}{100} \\ &= 27000 + 270 \times 6 = 27000 + 1620 = ₹ 28620\end{aligned}$$

If customer pay sale tax = 4%

$$\text{So, cost price with sale tax} = 28620 + \frac{4}{100} \times 28620 = 28620 + 1144.8 = ₹ 29764.80$$

$$\text{Cost price of one coat for customer} = \frac{29764.8}{18} = ₹ 1653.60$$

$$\text{Profit earned by Brinda} = ₹ 28620 - ₹ 27000 = ₹ 1620$$

Question. 104 Film borrowed Rs 1024000 from a bank for one year. If the bank charges interest of 5% per annum, compounded half-yearly, what amount will he have to pay after the given time period. Also, find the interest paid by him.

Solution.

Borrowed amount by Rahim (P) = ₹1024000

Time period (T) = 1 yr

Interest rate (R) = 5% per annum compounded half-yearly

Let amount = A

$$\begin{aligned}\text{For compounded half-yearly, } A &= P \left(1 + \frac{R}{200} \right)^{2T} = 1024000 \left(1 + \frac{5}{200} \right)^2 \\ & \left[\because \text{In half-yearly, } R = \frac{R}{2} \text{ and } T = 2T \right] \\ &= 1024000 \times \frac{41}{40} \times \frac{41}{40} = 640 \times 41 \times 41 = ₹ 1075840\end{aligned}$$

$$\therefore \text{Compound Interest, CI} = A - P = ₹ 1075840 - ₹ 1024000 = ₹ 51840$$

Question. 105 The following items are purchased from showroom T-Shirt worth Rs 1200 Jeans worth Rs 1000 2 skirts worth Rs 1350 each. What will these items cost to Shikha if the sales tax is 7%?

Solution.

On the basis of given information in the question,

Cost of T-shirt = ₹ 1200

Cost of Jeans = ₹ 1000

Cost of 2 skirts = ₹ 1350

$$\text{Total cost} = ₹ 1200 + ₹ 1000 + ₹ 1350 = ₹ 3550$$

Shikha have to pay sale tax = 7%

$$\text{So, the total amount to be paid} = 3550 + \frac{7}{100} \times 3550 = 3550 + 248.5 = ₹ 3798.5$$

Question. 106 The food labels given below information about 2 types of soup cream of

tomato and sweet corn. Use these labels to answer the given questions, (all the servings are based on a 2000 calories diet.)

Sweet corn		Cream of tomato	
Nutrition facts		Nutrition facts	
Serving size 1 cup (240 mL)		Serving size 1 cup (240 mL)	
About 2 serving per container		About 2 serving per container	
Amount per serving		Amount per serving	
Calories 90	Calories from fat 9	Calories 100	Calories from fat 20
	% Daily value		% Daily value
Total fat 2 g	2%	Total fat 2 g	3%
Saturated Fat-0 g	0%	Saturated fat-1.5 g	6%
Cholesterol 0 mg	0%	Cholesterol 10 mg	3%
Sodium 540 mg	22%	Sodium 690 mg	29%
Sweet corn		Cream of tomato	
Total carbohydrate 17g	6%	Total carbohydrate 17g	6%
Dietary fibre 3 g	14%	Dietary fibre 4 g	18%
Sugar 5g		Sugar 11g	
Protein 3 g		Protein 2 g	
Vitamin A 30%	Vitamin C 10%	Vitamin A 20%	Vitamin C 20%
Calcium 2%	Iron 6%	Calcium 0%	Iron 8%
Per cent daily values are based on a 2000 calories diet.		Per cent daily values are based on a 2000 calories diet.	

- (a) Which can be measured more accurately the total amount of fat in cream of tomato soup or the total amount of fat in sweet corn soup? Explain.
- (b) One serving of cream of tomato soup contains 29% of the recommended daily value of sodium for a 2000 calories diet. What is the recommended daily value of sodium in milligrams? Express the answer up to 2 decimal places.
- (c) Find the increase per cent of sugar consumed, if cream of tomato soup is chosen over sweet corn soup.
- (d) Calculate ratio of calories from fat in sweet corn soup to the calories from fat in cream of tomato soup.

Solution.

(a) Serving size of 1 cup of sweet corn = 240 mL

Total fat = 2g on 2%

2% of fat in sweet corn of 1 cup (with 2 serving per container)

$$= \frac{2}{100} \times 240$$

$$= \frac{48}{10} = 4.8 \text{ g}$$

$$\text{For one serving} = \frac{4.8}{2} = 2.4 \text{ g}$$

Serving size of 1 cup of cream of tomato = 240 mL

Total fat = 2 g on 3%

3% of fat in cream tomato of 1 cup

$$= \frac{3}{100} \times 240$$

$$= \frac{72}{10} = 7.2 \text{ g}$$

$$\text{For one serving} = \frac{7.2}{2} = 3.6 \text{ g}$$

Hence, 2.4g is nearest to 2g in comparison of 3.6 g to 3 g.

(b) On the basis of given information in the question, the cream of tomato soup contains 29% of the recommended daily value of sodium for a 2000 calories diet.

where, 29% of 2000 calories = 690 mg

(c) If cream of tomato soup is chosen over sweet corn soup, the increase in sugar consumed = 11g – 5g = 6g

[∵ sugar in sweet corn soup = 5 g and sugar in cream of tomato soup = 11g]

$$\text{Increase \%} = \frac{6}{5} \times 100 = \frac{600}{5} = 120\%$$

(d) Fat in sweet corn soup in calories = 9

Fat in cream tomato soup in calories = 20

$$\therefore \text{Ratio} = \frac{9}{20} = \frac{9}{21} = \frac{3}{7} = 3:7$$

Question. 107 Music CD originally priced at Rs 120 is on sale for 25% off. What is the SP?

Sonia and Rahul have different ways of calculating the sale price for the items they bought.



As you work on the next problem, try both of these methods to see which you prefer.

Solution.

Original price of music CD = ₹120

$$25\% \text{ discount on ₹120, if sale is applicable} = 120 \times \frac{25}{100} = \frac{120}{4} = ₹30$$

Discount = ₹30

$$\text{Selling price after discount} = ₹120 - ₹30 = ₹90$$

Question. 108 Store A and store B both charge Rs 750 for a video game. This week the video game is on sale Rs 600 at store B and for 25% off at store A. At which store is the game less expensive?

Solution.

Video game available in store A and store B at rate = ₹750

Store B sells video game on sale offer = ₹600

Store A sells video game at discount = 25%

$$\text{So, the price of video game at store B} = 750 - \frac{25}{100} \times 750 = 750 - 187.5 = ₹562.5$$

Hence, at store A the video game is less expensive.

Question. 109 At a toy shop price of all the toys is reduced to 66% of the original price.

(a) What is the sale price of a toy that originally costs Rs 90?

(b) How much money would you save on a toy costing Rs 90?

Solution.

(a) Original cost of the toy = ₹ 90

If price, reduce to 66% of the original price, then price became

$$= 90 - \frac{66}{100} \times 90 = 90 - 59.4 = ₹ 30.6$$

(b) We have discounted amount = 66% of 90 = $\frac{66}{100} \times 90 = ₹ 59.4$

Question. 110 A store is having a 25% discount sale. Sheela has a Rs 50 gift voucher and wants to use it to buy a board game marked for Rs 320. She is not sure how to calculate the concession she will get. The sales clerk has suggested two ways to calculate the amount payable.

Method 1 Subtract Rs 50 from the price and take 25% off the resulting price.

Method 2 Take 25% off the original price and then subtract Rs 50.

(a) Do you think both the methods will give the same result? If not, predict which method will be beneficial for her.

(b) For each method, calculate the amount Sheela would have to pay. Show your work.

(c) Which method do you think stores actually use? Why?

Solution.

(a) Marked price of board game = ₹ 320

Discount in store = 25%

Sheela have a gift voucher value = ₹ 50

In method 1 ₹ 320 - ₹ 50 = ₹ 270

$$\begin{aligned} \text{Now, 25\% discount on ₹ 270} &= 270 - \frac{25}{100} \times 270 \\ &= 270 - 67.5 = ₹ 202.5 \end{aligned}$$

In method 2 25% off on ₹ 320, then subtract ₹ 50

$$= 320 - \frac{25}{100} \times 320 - 50 = 320 - 80 - 50 = ₹ 190$$

Hence, method 2 will be beneficial for her.

(b) **In method 1** Amount paid = ₹ 202.5

In method 2 Amount paid = ₹ 190

(c) Method 1 will be used by stores because in this method actual discount is less.

Question. 111 Living on your own Sanjay is looking for one bedroom apartment on rent. At Neelgiri apartments, rent for the first two months is 20% off. The one bedroom rate at Neelgiri is Rs 6000 per month. At Savana apartments, the first month is 50% off. The one bedroom rate at Savana apartments is Rs 7000 per month. Which apartment will be cheaper for the first two months? By how much?

Solution.

The one bedroom rate at Neelgiri = ₹ 6000 per month

Also, 20% off for first two months,

$$\therefore \text{Rent for first 2 months} = 2 \times \left(6000 - \frac{20}{100} \times 6000 \right) = 2 \times 4800 = ₹ 9600$$

In comparison of Savana apartments, it offers 50% off for first month, where the rent for bedroom is ₹ 7000 per month = $7000 - \frac{50}{100} \times 7000$

$$= 7000 - 3500 = ₹ 3500$$

But rent for two months in Savana apartment = ₹ 3500 + ₹ 7000 = ₹ 10500

Hence, Neelgiri apartment will be cheaper by = ₹ 10500 - ₹ 9600 = ₹ 900

Question. 112 For an amount, explain why, a 20% increase followed by a 20% decrease is less than the original amount.

Solution.

Let the original amount = ₹100

$$\begin{aligned} 20\% \text{ increase in ₹ 100 will be} &= 100 + \frac{20}{100} \times 100 \\ &= 100 + 20 = ₹ 120 \end{aligned}$$

$$\text{Now, } 20\% \text{ decrease in ₹ 120} = 120 - \frac{20}{100} \times 120 = 120 - 24 = ₹ 96$$

Hence, decreased price is less than the original amount.

Question. 113 Sunscreens block harmful ultraviolet (UV) rays produced by the sun. Each sunscreen has a Sun Protection Factor (SPF) that tells you how many minutes you can stay in the sun before you receive one minute of burning UV rays. e.g. If you apply sunscreen with SPF 15, you get one minute of UV rays for every 15 minutes you stay in the sun.

(i) A sunscreen with SPF 15 allows only $\frac{1}{15}$ of the sun's UV rays. What per cent of UV rays does the sunscreen block?

(ii) Suppose, a sunscreen allows 25% of the sun's UV rays.

(a) What fraction of UV rays does this sunscreen block? Give your answer in lowest terms.

(b) Use your answer from part (a) calculate this sun screen's SPF. Explain how you found your answer?

(iii) A label on a sunscreen with SPF 30 claims that the sunscreen blocks , about 97% of harmful UV rays. Assuming the SPF factor is accurate, is this claim true. Explain.

Solution.

(i) A sunscreen with spf 15 allows only $\frac{1}{15}$ of the sun's UV rays.

$$\text{It means } = 1 - \frac{1}{15} = \frac{14}{15} \text{ of the sun's UV rays abort by sunscreen.}$$

$$\text{In percentage} = \frac{14}{15} \times 100 = \frac{1400}{15} = 93.333\%$$

(ii) (a) Sunscreen allows 25% of the sun's UV rays.

$$\therefore \text{ It blocks UV rays} = 100 - 25 = 75\% = \frac{75}{100} = \frac{3}{4}$$

(b) Sunscreen allows 25% on $\frac{3}{4}$ of UV rays. It means, it protect $= 1 - \frac{3}{4} = \frac{1}{4}$ of UV rays.

Hence, it's a SPF 4.

(iii) False,

According to the claim, for $\frac{3}{100}$ affect of UV rays

$$1 \text{ minute} = 33\frac{1}{3} \text{ SPF}$$

Affect \neq 30 SPF claim

Question. 114 A real estate agent receives Rs 50000 as commission, which is 4% of the selling price. At what price does the agent sell the property?

Solution.

Let price of the property = ₹ x

Commission received = ₹ 50000

Commission percentage = 4%

According to the question,

$$x \times \frac{4}{100} = 50000$$

$$\Rightarrow x = \frac{50000 \times 100}{4} = 50000 \times 25 = ₹ 1250000$$

Question. 115 With the decrease in prices of tea by 15%, Tonu, the chaiwallah, was able to buy 2 kg more of tea with the same Rs 45 that he spent each month on buying tea leaves for his chai shop. What was the reduced price of tea? What was the original price of tea?



Solution.

Let chaiwallah purchase y kg tea.

Let price of tea per kg = ₹ x

$$\text{Discount 15\% per kg} = x - \frac{15}{100} \times x = \frac{85x}{100}$$

Chaiwallah can buy 2 kg extra with 15% discount.

But without discount,

$$xy = 45 \quad \dots(i)$$

$$\text{and} \quad \left(x - \frac{15x}{100}\right)\left(\frac{85x}{100}\right)(x + 2) = 45 \quad \dots(ii)$$

After solving Eqs. (i) and (ii),

$$\begin{aligned} \frac{85}{100}(45) + \frac{85 \times 2x}{100} &= 45 \\ 45 \left[1 - \frac{85}{100}\right] &= \frac{85 \times 2x}{100} \\ \frac{45 \times 15}{100} &= \frac{85 \times 2x}{100} \\ x &= \frac{45 \times 15}{2 \times 85} = \frac{135}{34} \text{ per kg} = 3.97 \text{ per kg} \end{aligned}$$

$$\therefore \text{Reduced price} = \frac{85}{100} \times 3.97 = \frac{337.45}{100} = 3.3748 = 3.38 \text{ per kg}$$

Question. 116 Below is the report card of Vidit Atrey. Vidit's teacher left the last column blank. Vidit is not able to make out, in which subject he performed better and in which he needs improvement. Complete the table to help Vidit know his comparative performance. Assessment report for- 2009-2010

Class 9B		Name : Vidit Atrey		Date : 31 March 2010
Subject	Internal Assessment	Examination	Total	Final %
1. English literature	20/25	82/100	102/125	
2. English language	22/25	91/100	113/125	
3. Hindi literature	18/25	67/75	85/100	
4. Hindi language	16/25	68/75	84/100	
5. Mathematics	42/50	88/100	130/150	
6. Sanskrit	14/20	75/100	89/120	
7. Physics	45/50	90/100	135/150	
8. Chemistry	41/50	82/100	123/150	
9. Biology	43/50	87/100	130/150	
10. History and Civics	19/25	68/75	87/100	
11. Geography	17/20	71.5/80	88.5/100	

Solution.

On the basis of the given data in above table, we can calculate final percentage of each subjects.

1. English literature = $\frac{102}{125} \times 100 = \frac{102}{5} \times 4 = \frac{408}{5} = 81.6\%$
2. English language = $\frac{113}{125} \times 100 = \frac{113 \times 4}{5} = \frac{452}{5} = 90.4\%$
3. Hindi literature = $\frac{85}{100} \times 100 = 85\%$
4. Hindi language = $\frac{84}{100} \times 100 = 84\%$
5. Mathematics = $\frac{130}{150} \times 100 = \frac{1300}{15} = 86.67\%$
6. Sanskrit = $\frac{89}{120} \times 100 = \frac{890}{12} = 74.16\%$
7. Physics = $\frac{135}{150} \times 100 = \frac{1350}{15} = 90\%$
8. Chemistry = $\frac{123}{150} \times 100 = \frac{1230}{15} = 82\%$
9. Biology = $\frac{130}{150} \times 100 = \frac{1300}{15} = 86.66\%$
10. History and Civics = $\frac{87}{100} \times 100 = 87\%$
11. Geography = $\frac{88.5}{100} \times 100 = 88.5\%$

Question. 117 Sita's practicing basket ball. She has managed to score 32 baskets in 35 attempts. What is her success rate in percentage?



Solution.

Sita managed to score 32 baskets in 35 attempts.

$$\text{Her success rate} = \frac{32}{35} \times 100 = \frac{3200}{35} = 91.428\% = 91.43\%$$

Question. 118 During school hours, Neha finished 73% of her homework and Minakshi completed $\frac{5}{8}$ of her, homework. Who must finish a greater per cent of 8 homework?

Solution.

$$\text{Neha finished her homework in percentage} = 73\% = \frac{73}{100}$$

$$\text{Where Minakshi completed} = \frac{5}{8} \text{ of her home work}$$

$$\text{Home work left for Minakshi} = 1 - \frac{5}{8} = \frac{3}{8}$$

$$\text{In percentage} = \frac{3}{8} \times 100 = 37.5\%$$

$$\text{Home work left for Neha} = (100 - 73) = 27\% = \frac{27}{100}$$

Hence, Minakshi finished a greater percentage of homework.

Question. 119 Rain forests are home to 90000 of the 250000 identified plant species in the world. What per cent of the world's identified plant species are found in rain forests?

Solution.

90000 of the 250000 identified plant species in the world are specified as rain forest.

$$\text{In percentage} = \frac{90000}{250000} \times 100 = \frac{900}{25} = 36\%$$

Question. 120 Madhu's room measures 6m x 3m. Her carpet covers 8 m^2 . What per cent of floor is covered by the carpet?

Solution.

Madhu's room measures = $6 \text{ m} \times 3 \text{ m}$

Area of the room = $6 \times 3 = 18 \text{ m}^2$ [\therefore area of rectangle = length \times breadth]

Her carpet covers = 8 m^2

Area covered by the carpet in percentage = $\frac{8}{18} \times 100 = \frac{800}{18} = 44.44\%$

Question. 121 The human body is made up mostly of water. In fact about 67% of a person total body weight is water. If Jyoti weighs 56 kg, how much of her weight is water?

Solution.

Jyoti's weight = 56 kg

Where 67% of a person is total body weight is water.

Water in Jyoti body = $\frac{67}{100} \times 56 = \frac{3752}{100} = 37.52 \text{ kg}$

Question. 122 The per cent of pure gold in 14 carat gold is about 58.3%. A 14 carat gold ring weights 7.6 grams. How many grams of pure gold are in the ring?

Solution.

The percentage of gold in 14 carat gold = 58.3%

Weight of 14 carat gold = 7.6 g

Pure gold in 14 carat gold of 7.6 g = $7.6 \times \frac{58.3}{100} = \frac{443.08}{100} = 4.431 \text{ g}$

Hence, pure gold in 7.6 g of 14 carat gold is equal to 4.431 g.

Question. 123 A student used the proportion $n^{100} = 5^{32}$ to find 5% of 32. What did the student do wrong?

Solution.

5% of 32 will be calculated as = $\frac{5}{100} \times 32 = \frac{32}{20} = 1.6$

But student finding per cent is 5 of 32.

Question. 124 The table shows the cost of sunscreen of two brands with and without sales tax. Which brand has a greater sales tax rate? Give the sales tax rate of each brand?

	Cost (in ₹)	Cost + Tax (in ₹)
1. X (100 g)	70	75
2. Y (100 g)	62	65

Solution.

Brand X sunscreen cost = ₹ 70

With sales tax = ₹ 75

Sales tax paid = ₹ 75 - ₹ 70 = ₹ 5

Brand Y sunscreen cost = ₹ 62

With sales tax = ₹ 65

Sales tax = ₹ 65 - ₹ 62 = ₹ 3

Hence, brand X has greater sales tax rate.

Sales tax for brand X = $\frac{5}{70} \times 100 = \frac{50}{7} = 7.14\%$

Sales tax for brand Y = $\frac{3}{62} \times 100 = \frac{300}{62} = 4.838 = 4.84\%$