Unit 7(Comparing Quantities)

Multiple Choice Questions (MCQs)

Question 1:

20% of 700 m is

(a) 560 m (b) 70 m (c)210 m (d)140 m

Solution :

(d) We have, 20% of 700 m = $\frac{20}{100}$ x 700 = 20 x 7 = 140 m

Hence, 20% of 700 m is 140 m.

Question 2:

Gayatri's income is Rs 160000 per year. She pays 15% of this as house rent and 10% of the remainder on her child's education. The money left with her is

(a) Rs 136000 (b) Rs 120000 (c) Rs 122400 (d) Rs 14000

Solution :

(c) Income of Gayatri = ? 160000 [given]

Money paid as house rent = 15% of 160000 = $\frac{15}{100}$ x 160000 = Rs 24000

Remaining amount = 160000 – 24000 = Rs 136000

Money spent on child's education = 10%of 136000 = x 136000 = Rs 13600

Money left with her = 136000 -13600= Rs 122400

Question 3:

The ratio of Fatima's income to her savings is 4 : 1. The percentage of money saved by her is

(a) 20% (b) 25% (c) 40% (d) 80%

Solution :

(a) Given, ratio of income to savings = 4:1

Let income = $4x$ and savings = x.

$$\therefore \text{Percentage of money saved by her} = \frac{\text{Savings}}{(\text{Income} + \text{Savings})} \times 100\%$$

$$= \frac{x}{4x + x} \times 100 = \frac{x}{5x} \times 100\% = \frac{1}{5} \times 100\% = 20\%$$

Question 4:

0.07 is equal to

(a) 70% (b) 7%

(c) 0.7% (d) 0.07%

Solution :

(b) We have, 0.07

In percentage, 0.07 =$\frac{7}{100} \times \frac{100}{100} = \frac{7}{100}$x100%=7%

Note: To convert any number into per cent, we multiply that number by 100 along with the symbol '%'

Question 5:

In a scout camp, 40% of the scouts were from Gujarat state and 20% of these were from Ahmedabad. The percentage of scouts in the camp from Ahmedabad is

(a) 25% (b) 32.5%

(c) 8% (d) 50%

Solution :

(c) Let the scouts in scout camp = 100

$$\text{Then, scouts from Gujarat} = 40\% \text{ of } 100 = \frac{40}{100} \times 100 = 40$$

$$\text{and scouts from Ahmedabad} = 20\% \text{ of } 40 = \frac{20}{100} \times 40 = 8$$

$$\therefore \text{Percentage of scouts from Ahmedabad} = \frac{\text{Scouts from Ahmedabad}}{\text{Total scouts}} \times 100\%$$

$$= \frac{8}{100} \times 100\% = 8\%$$

Question 6:

What per cent of Rs 4500 is Rs 9000?

(a) 200% (b) 1/2%

(c) 2% (d) 50%

Solution :

Question 7:

5.2 is equal to

(a) 52% (b) 5.2%

(c) 520% (d) 0.52%

Solution :

(c) We have, 5.2

In percentage, $\frac{52}{10}$ x 100% = 520%

Question 8:

The ratio 3 : 8 is equal to

(a) 3.75% (b) 37.5% (c) 0.375% (d) 267%

Solution :

(b) Given, ratio =3:8

In percentage, $\frac{3}{8}$ x 100% = 37.5%

Question 9:

225% is equal to

(a) 9 : 4 (b) 4 : 9 (c) 3 : 2 (d) 2 : 3

Solution :

(a) We have, 225%

For fraction, 225 x $\frac{1}{100} = \frac{225}{100} = \frac{9}{4}$

∴ Required ratio = 9:4

Note: The sign of percentage (%) is removed dividing the number by 100.

Question 10:

A bicycle is purchased for Rs 1800 and is sold at a profit of 12%. Its selling price is

(a) Rs 1584 (b) Rs 2016 (c) Rs 1788 (d) Rs 1812

Solution :

(b) Given, cost price of bicycle = ? 1800 and profit =12%

As we know,

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

$$\Rightarrow \quad 12 = \frac{\text{Profit}}{1800} \times 100$$

$$\Rightarrow \quad \text{Profit} = 12 \times 18 = ₹\ 216$$

$$\therefore \text{SP} = \text{CP} + \text{Profit} = 1800 + 216 = ₹\ 2016$$

Hence, the selling price for bicycle is ₹ 2016.

Question 11:

A cricket bat was purchased for Rs 800 and was sold for Rs 1600. Then, profit earned is

(a) 100% (b) 64% (c) 50% (d) 60%

Solution :

(a) Given, cost price of cricket bat = ₹ 800

and selling price of cricket bat = ₹ 1600

$\therefore$ Profit = SP – CP = ₹ (1600 – 800) = ₹ 800

We know that,

$$\text{Profit\%} = \frac{\text{Profit}}{\text{CP}} \times 100\% = \frac{800}{800} \times 100\% = 100\%$$

Hence, profit earned is 100%.

Question 12:

A farmer bought a buffalo for Rs 44000 and a cow for Rs 18000. He sold the buffalo at a loss of 5% but made a profit of 10% on the cow. The net result of the transaction is

(a) loss of Rs 200 (b) profit of Rs 400

(c) loss of Rs 400 (d) profit of Rs 200

Solution :

(c) For buffalo, CP = ₹ 44000

Loss% = 5%

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

$$\Rightarrow \quad 5 = \frac{\text{Loss}}{44000} \times 100$$

$$\Rightarrow \quad \text{Loss} = 5 \times 440 = ₹\ 2200$$

So, $\text{SP} = \text{CP} - \text{Loss} = 44000 - 2200 = ₹\ 41800$

For cow, $\text{CP} = ₹\ 18000$

$$\text{Profit\%} = 10\%$$

$$\therefore \quad \text{Profit\%} = \frac{\text{Profit}}{\text{CP}} \times 100\% \Rightarrow 10 = \frac{\text{Profit}}{18000} \times 100$$

$$\text{Profit} = ₹\ 1800$$

So, $\text{SP} = \text{CP} + \text{Profit} = 18000 + 1800 = ₹\ 19800$

Total CP of buffalo and cow = 44000 + 18000 = ₹ 62000

Total SP of buffalo and cow = 41800 + 19800 = ₹ 61600

Net loss = CP – SP = 62000 – 61600 = ₹ 400

Question 13:

If Mohan's income is 25% more than Raman's income, then Raman's income is less than Mohan's income by

(a) 25% (b) 80%

(c) 20% (d) 75%

Solution :

(c) Let the Raman's income be x. it is given that Mohan's income is 25% more than Raman's income.

Then, Mohan's income $= x + 25\%$ of $x = x + \frac{25}{100}x = x\left(1 + \frac{25}{100}\right)$

$$= x\left(\frac{100 + 25}{100}\right) = \frac{125}{100}x$$

$\therefore$ Raman's income as compared to Mohan's income

$$= \frac{\text{Mohan's income} - \text{Raman's income}}{\text{Mohan's income}} \times 100\%$$

$$= \frac{\frac{125}{100}x - x}{\frac{125}{100}x} \times 100\% = \frac{\frac{125x - 100x}{100}}{\frac{125}{100}x} \times 100\%$$

$$= \frac{25x}{125x} \times 100\% = 20\%$$

Question 14:

The interest on t 30000 for 3 yr at the rate of 15% per annum is

(a) 7 4500 (b) 7 9000 (c) 7 18000 (d) 7 13500

Solution :

(d) Given, $P = ₹\ 30000$, $T = 3$ yr, $R = 15\%$

We know that, $I = \frac{P \times R \times T}{100} = \frac{30000 \times 15 \times 3}{100} = ₹\ 13500$

Question 15:

Amount received on Rs 3000 for 2 yr at the rate of 11% per annum is

(a) Rs 2340 (b) Rs 3660 (c) Rs 4320 (d) Rs 3330

Solution :

(b) Given, $P = ₹\ 3000$,

$T = 2$ yr

and $R = 11\%$

$\therefore$ $I = \frac{P \times R \times T}{100} = \frac{3000 \times 11 \times 2}{100} = ₹\ 660$

Now, amount $(A) = P + I$

$= 3000 + 660$

$= ₹\ 3660$

Question 16:

Interest on Rs 12000 for 1 month at the rate of 10% per annum is

(a) Rs 1200 (b) Rs 600 (c) Rs 100 (d) Rs 12100

Solution :

(c) Given, $P = ₹\ 12000$,

$R = 10\%$,

$T = 1\text{ month} = \frac{1}{12}$ yr

$\therefore$ $I = \frac{P \times R \times T}{100} = \frac{12000 \times 10 \times 1}{100 \times 12} = ₹100$

Question 17:

Rajni and Mohini deposited Rs 3000 and Rs 4000 in a company at the rate of 10% per annum for 3 yr and $2\frac{1}{2}$yr, respectively. The difference of the amounts received by them will be

(a) Rs 100 (b) Rs 1000 (c) Rs 900 (d) Rs 1100

Solution :

(d) For Rajni, $P = ₹\ 3000$,

$R = 10\%$ per annum

$T = 3$ yr

$$\therefore \quad I = \frac{P \times R \times T}{100}$$

$$= \frac{3000 \times 10 \times 3}{100} = ₹\ 900$$

and $A = P + I = 3000 + 900 = ₹\ 3900$

For Mohini, $P = ₹\ 4000$,

$R = 10\%$ per annum

and $T = 2\frac{1}{2}\text{ yr} = \frac{5}{2}\text{ yr}$

$$\therefore \quad I = \frac{P \times R \times T}{100}$$

$$= \frac{4000 \times 10 \times 5}{100 \times 2} = ₹\ 1000$$

and $A = P + I = 4000 + 1000 = ₹\ 5000$

Difference in amounts $= 5000 - 3900 = ₹\ 1100$

Question 18:

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

(a) 325 km (b) 350 km (c) 405 km (d) 340 km

Solution :

(b) Given, 90% of $x = 315$ km

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

$$\therefore \quad x = 350 \text{ km}$$

Question 19:

On selling an article for Rs 329, a dealer lost 6%. The cost price of the article is

(a) Rs 310.37 (b) Rs 348.74 (c) Rs 335 (d) Rs 350

Solution :

(d) Given, SP = ₹ 329 and loss% = 6%

We know that,

$$\text{Loss\%} = \frac{\text{Loss}}{\text{CP}} \times 100$$

$$\Rightarrow \quad 6 = \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100 \qquad [\because \text{loss} = \text{CP} - \text{SP}]$$

$$\Rightarrow \quad 6\,\text{CP} = 100\,(\text{CP} - \text{SP})$$

$$\Rightarrow \quad \frac{6}{100}\,\text{CP} = \text{CP} - \text{SP}$$

$$\Rightarrow \quad \text{CP} - \frac{6}{100}\,\text{CP} = 329 \qquad [\because \text{SP} = ₹\ 329, \text{ given}]$$

$$\Rightarrow \quad \frac{94}{100}\,\text{CP} = 329$$

$$\Rightarrow \quad \text{CP} = \frac{329 \times 100}{94}$$

$$\therefore \quad \text{CP} = ₹\ 350$$

Question 20:

$\frac{25\%\text{ of }50\%\text{ of }100\%}{25 \times 50}$ is equal to

(a) 1.1% (b) 0.1% (c) 0.01% (d) 1%

Solution :

We have, $\frac{25\%\text{ of }50\%\text{ of }100\%}{25 \times 50} = \frac{25}{100} \times \frac{50}{100} \times \frac{100}{100} \times \frac{1}{25 \times 50}$

$$= \frac{125000}{1250 \times 100 \times 100 \times 100} = \frac{1}{10000} = 0.0001$$

In percentage, $0.0001 \times 100\,\% = 0.01\%$

Question 21:

The sum which will earn a simple interest of Rs 126 in 2 yr at 14% per annum, is

(a) Rs 394 (b) Rs 395 (c) Rs 450 (d) Rs 540

Solution :

(c) Given, $I = ₹\ 126$, $R = 14\%$ and $T = 2$ yr

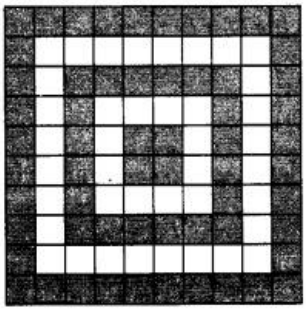
$$\therefore \quad I = \frac{P \times R \times T}{100} \Rightarrow 126 = \frac{P \times 14 \times 2}{100}$$

$$\Rightarrow \quad 126 \times 100 = P \times 14 \times 2$$

$$\Rightarrow \quad P = \frac{12600}{14 \times 2} \Rightarrow P = ₹\ 450$$

Question 22:

The per cent that represents the unshaded region in the figure, is



(a) 75% (b) 50% (c) 40% (d) 60%

Solution :

(c) Given, total parts $= 10 \times 10 = 100$

$\because$ Shaded parts $= 60$

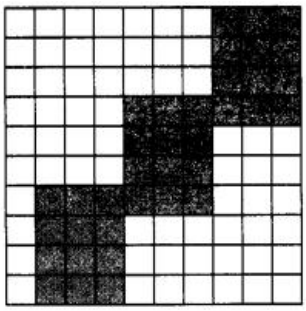
$\therefore$ Per cent of shaded parts $= \frac{60}{100} \times 100\% = 60\%$

Then, per cent of unshaded parts $= 100 - 60 = 40\%$

Hence, the unshaded region is 40%.

Question 23:

The per cent that represents the shaded region in the figure, is



(a) 36% (b) 64% (c) 27% (d) 48%

Solution :

(a) Given, total parts $= 10 \times 10 = 100$

$\because$ Shaded parts $= 36$

$\therefore$ Per cent of shaded parts $= \frac{36}{100} \times 100\% = 36\%$

Hence, the shaded region is 36%.

Fill in the Blanks

In questions 24 to 59, fill in the blanks to make the statements true.

Question 24:

2 : 3=_____%

Solution :

Given ratio = 2:3

In percentage=2/3 x 100%=$66\frac{2}{3}$%

Question 25:

$18\frac{3}{4}$ % =___:___

Solution :

Given, percentage $= 18\frac{3}{4}\% = \frac{75}{4}\%$

$$\left[\because \text{mixed fraction} = \text{improper fraction} = \frac{\text{whole number} \times \text{denominator} + \text{numerator}}{\text{denominator}}\right]$$

In fraction, $\frac{75}{4} \times \frac{1}{100} = \frac{3}{16}$

$\therefore$ Ratio = **3 : 16**

$$\left[\because a : b = \frac{a}{b}\right]$$

Question 26:

30% of Rs 360 = _____

Solution :

We have, 30% of Rs 360 =$\frac{30}{100}$ x 360 = Rs 108

Question 27:

120% of 50 km =_____

Solution :

We have, 120% of 50 km =$\frac{120}{100}$ x 50 km = 60 km

Question 28:

2.5 =_____%

Solution :

We have, 2.5

In percentage, 2.5 x 100% = 250%

Question 29:

8/5=____%

Solution :

We have, 8/5

In percentage, 8/5 x 100% = 160%

Question 30:

A_____with its denominator 100 is called a per cent.

Solution :

A fraction with its denominator 100 is called a per cent.

Question 31:

15 kg is____% of 50 kg.

Solution :

Let x% of 50 kg be 15 kg.

Then, $\frac{x}{100} \times 50 = 15$

$\Rightarrow \quad \frac{x}{2} = 15 \Rightarrow x = 15 \times 2$

$\therefore \quad x = 30\%$

Hence, 15 kg is **30%** of 50 kg.

Question 32:

Weight of Nikhil increased from 60 kg to 66 kg. Then, the increase in weight is_____%

Solution :

We have, initial weight of Nikhil = 60 kg

After increase in weight, weight became =66 kg ‘ Increase in weight = 66 – 60 = 6 kg

∴ Increase percentage of weight

$\frac{Increase}{Initial weight}$ x100%=$\frac{6}{60}$ x100%=$\frac{60}{6}$ %=10%

So, the number of students present on that day, was 46.

Question 33:

In a class of 50 students 8% were absent on one day. The number of students present on that day, was_____.

Solution :

We have, total number of students =50 Absent on one day = 8%

Percentage of present students on that day = 100-8 = 92%

∴ Number of students present on that day = 92% of 50 = $\frac{92}{100}$ x 50 =$\frac{92}{2}$ = 46

So, the number of students present on that day, was 46.

Question 34:

Savitri obtained 440 marks out of 500 in an examination. She secured _____% marks in the examination.

Solution :

Marks obtained by Savitri out of 500 = 440

Percentage of marks obtained =$\frac{440}{500}$ x 100% = 88%

Hence, Savitri secured 88% marks in the examination.

Question 35:

Out of a total deposit of Rs 1500 in her bank account, Abida withdrew 40% of the deposit. Now, the balance in her account is_____.

Solution :

Total deposit=Rs 1500

Amount withdrawn = 40% of Rs 1500 = $\frac{40}{100}$ x 1500 = Rs 600

∴ Balance in the account = 1500 – 600 = Rs 900

Question 36:

____ is 50% more than 60.

Solution :

Let number be x. It is given that x is 50% more than 60.

Therefore, x = 60 + 50% of 60 = 60 + $\frac{50}{100}$ x 60 = 60 + 30 = 90

Question 37:

John sells a bat for Rs 75 and suffers a loss of Rs 8. The cost price of the bat is___.

Solution :

Given, SP of bat = Rs 75 and loss = Rs 8

We know that, CP = SP + Loss = 75 + 8 = Rs 83

Hence, cost price of the bat is Rs 83.

Question 38:

If the price of sugar is decreased by 20%, then the new price of 3kg sugar originally costing Rs 120, will be_____.

Solution :

Original price of 3 kg sugar = Rs 120

Given that, price of sugar is decreased by 20%.

So, new price of sugar = Original price – 20% of original price

= 120 – 20% of 120

= 120- $\frac{20}{100}$ x 120= 120-24=Rs 96 100

Question 39:

Mohini bought a cow for Rs 9000 and Sold it at a loss of Rs 900. The selling price of the cow is_____.

Solution :

Given, CP of cow=Rs 9000 and loss = Rs 900

We know that, SP = CP – Loss = 9000 – 900=Rs 8100

Hence, the selling price of the cow is Rs 8100.

Question 40:

Devangi buys a chair for Rs 700 and sells it for Rs 750. She earns a profit of_____% in the transaction.

Solution :

Given, CP of chair = ₹ 700

and SP of chair = ₹ 750

We know that, Profit = SP – CP = 750 – 700 = ₹ 50

Also, profit % = $\frac{\text{Profit}}{\text{CP}} \times 100\% = \frac{50}{700} \times 100\,\% = 7\frac{1}{7}\%$

Hence, profit earned by Devangi is $\mathbf{7\frac{1}{7}\%}$.

Question 41:

Sonal bought a bed sheet for Rs 400 and sold it for Rs 440. Her____ % is___%.

Solution :

Given, CP of a bed sheet = ₹ 400 and SP of a bed sheet = ₹ 440

Since, SP > CP,

∴ Profit = SP – CP = 440 – 400 = ₹ 40

Now, profit % = $\frac{\text{Profit}}{\text{CP}} \times 100 = \frac{40}{400} \times 100 = 10\%$

Hence, Sonal's **profit**% is 10%.

Question 42:

Nasim bought a pen for Rs 60 and sold it for Rs 54. His_____ % is

Solution :

Given, CP of a pen = ₹ 60

and SP of a pen = ₹ 54

Since, CP > SP

∴ Loss = CP – SP = 60 – 54 = ₹ 6

Now, loss% = $\frac{\text{Loss}}{\text{CP}} \times 100\% = \frac{6}{60} \times 100\,\% = 10\,\%$

Hence, Nasim's **loss**% is **10%**.

Question 43:

Aahuti purchased a house for Rs 5059700 and spent Rs 40300 on its repairing. To make a profit of 5%, she should sell the house for Rs_____ .

Solution :

Given, CP of house = ₹ 5059700

and amount spent on repairing = ₹ 40300

So, total CP of house = 5059700 + 40300 = ₹ 5100000

We know that, profit % $= \frac{\text{Profit}}{\text{CP}} \times 100\,\%$

$\Rightarrow \quad 5 = \frac{SP - CP}{CP} \times 100$ [$\because$ profit = SP − CP and profit % = 5, given]

$\Rightarrow \quad 5 = \frac{SP - 5100000}{5100000} \times 100$

$\Rightarrow \quad \frac{5 \times 5100000}{100} = SP - 5100000$

$\Rightarrow \quad 255000 = SP - 5100000$

$\Rightarrow \quad SP = 5100000 + 255000$

$\therefore \quad SP = ₹\ 5355000$

Question 44:

If 20 lemons are bought for Rs 10 and sold at 5 for three rupees, then_____in the transaction is_____%.

Solution :

CP of 20 lemons = ₹ 10

By unitary method,

If SP of 5 lemons = ₹ 3

Then, SP of 1 lemon = $₹ \frac{3}{5}$

$\therefore$ SP of 20 lemons $= \frac{3}{5} \times 20 = ₹\ 12$

Now, CP = ₹ 10 and SP = ₹ 12

Since, SP > CP

$\therefore$ Profit = SP − CP = 12 − 10 = ₹ 2

We know that, Profit % $= \frac{\text{Profit}}{\text{CP}} \times 100\,\% = \frac{2}{10} \times 100\% = 20\%$

Hence, **profit** in the transaction is **20%**.

Question 45:

Narain bought 120 oranges at Rs 4 each. He sold 60% of the oranges at Rs 5 each and the remaining at Rs 3.50 each. His_____is_____%.

Solution :

Given, CP of 1 orange = ₹ 4

CP of 120 oranges = 4 × 120 = ₹ 480

Now, 60% of 120 oranges $= \frac{60}{100} \times 120 = 72$

$\therefore$ SP of 72 oranges = 72 × 5 = ₹ 360

and SP of remaining oranges = (120 − 72) × 3.50 = 48 × 3.50 = ₹ 168

$\therefore$ Total SP of 120 oranges = 360 + 168 = ₹ 528

Since, SP > CP

Profit = SP − CP = 528 − 480 = ₹ 48

We know that, Profit % $= \frac{\text{Profit}}{\text{CP}} \times 100\,\% = \frac{48}{480} \times 100\,\% = 10\%$

Hence, his **profit** is **10%**.

Question 46:

A fruit seller purchased 20 kg of apples at Rs 50 per kg. Out of these, 5% of the apples were found to be rotten. If he sells the remaining apples at Rs 60 per kg, then his_____is_____% .

Solution :

We have, price for per kg apples = ₹ 50
Total purchased apples = 20 kg
Since, 5% were rotten, so good apples = 20 kg – 5% of 20 kg (rotten)

$$= 20 - \frac{5}{100} \times 20 = 20 - 1 = 19 \text{ kg}$$

Also, he sells 19 kg apples at ₹ 60 per kg.
∴ Total selling price = 19 × 60 = ₹ 1140
∵ Cost price was 20 kg apples = 20 × 50 = ₹ 1000
∴ Profit = SP – CP = 1140 – 1000 = ₹ 140

$$\text{Now, profit \%} = \frac{\text{Profit}}{\text{CP}} \times 100\% = \frac{140}{1000} \times 100\% = \frac{140}{10} = 14\%$$

So, his **profit** is **14%**.

Question 47:

Interest on Rs 3000 at 10% per annum for a period of 3 yr is_____ .

Solution :

Given, P = ₹ 3000, R = 10% and T = 3 yr

$$\text{We know that, } I = \frac{P \times R \times T}{100}$$

$$= \frac{3000 \times 10 \times 3}{100} = ₹\ 900$$

Hence, interest is **₹ 900**.

Question 48:

Amount obtained by depositing Rs 20000 at 8% per annum for six months, is_____.

Solution :

Deposited amount = ₹ 20000
Rate of interest = 8%

$$\text{Time period} = 6 \text{ months} = \frac{6}{12} \text{yr} = \frac{1}{2} \text{yr}$$

$$I = \frac{P \times R \times T}{100} = \frac{20000 \times 8 \times \frac{1}{2}}{100} = \frac{20000 \times 8}{200} = 100 \times 8 = ₹\ 800$$

∴ Amount received = Principal + Interest = 20000 + 800 = **₹ 20800**

Question 49:

Interest on Rs 12500 at 18% per annum for a period of 2 yr and 4 months is_____.

Solution :

Given, P = ₹ 12500 and R = 18%

$$T = 2 \text{ yr } 4 \text{ months} = \left(2 + \frac{4}{12}\right) \text{yr} = \left(2 + \frac{1}{3}\right) \text{yr} = \frac{7}{3} \text{yr}$$

$$\text{We know that, } I = \frac{P \times R \times T}{100} = \frac{12500 \times 18 \times 7}{3 \times 100} = ₹\ \mathbf{5250}$$

Question 50:

25 mL is_____% of 5 L.

Solution :

Let 25 mL be x% of 5 L.

Then, 25 mL = x% of 5L

$$\Rightarrow \quad 25 = \frac{x}{100} \times 5 \times 1000 \qquad [\because 1\text{L} = 1000 \text{ mL}]$$

$$\Rightarrow \quad \frac{25 \times 100}{5 \times 1000} = x$$

$$\Rightarrow \quad x = 0.5$$

Hence, 25 mL is **0.5%** of 5 L.

Question 51:

If A is increased by 20%, it equals B. If B is decreased by 50%, it equals C. Then,_____% of

A is equal to C.

Solution :

Given, if A is increased by 20%, then it is equal to B.

$$\therefore \quad A + 20\% \text{ of } A = B$$

$$\Rightarrow \quad A\left(1 + \frac{20}{100}\right) = B$$

$$\Rightarrow \quad \frac{120}{100} A = B$$

$$\Rightarrow \quad B = \frac{6}{5} A \qquad \ldots(i)$$

If B is decreased by 50%, then it is equal to C.

$$\therefore \quad B - 50\% \text{ of } B = C$$

$$\Rightarrow \quad B\left(1 - \frac{50}{100}\right) = C$$

$$\Rightarrow \quad B \times \frac{50}{100} = C$$

$$\Rightarrow \quad \frac{1}{2} B = C$$

$$\Rightarrow \quad B = 2C \qquad \ldots(ii)$$

On comparing Eqs. (i) and (ii), we get

$$\frac{6}{5} A = 2C$$

$$\Rightarrow \quad \frac{A}{C} = \frac{10}{6}$$

$$\Rightarrow \quad C = \frac{6}{10} \therefore$$

$$\Rightarrow \quad C = \frac{3}{5} A$$

$$\therefore \text{In percentage, } \frac{C}{A} \times 100 = \frac{\frac{3}{5} A}{A} \times 100\%$$

$$= \frac{3}{5} \times 100\%$$

$$= 60\%$$

Hence, **60%** of A is equal to C.

Question 52:

Interest = $\frac{P \times R \times T}{100}$, where T is_____,R% is____ and P is____.

Solution :

Here, T is **time period**, R% is **rate of interest** and P is **Principal.**

Question 53:

The difference of interests for 2 yr and 3 yr on a sum of Rs 2100 at 8% per annum is_____.

Solution :

Given, $P = ₹\,2100$ and $R = 8\%$

For $T = 2$ yr,

$$I = \frac{P \times R \times T}{100} = \frac{2100 \times 8 \times 2}{100} = ₹\,336$$

For 3 yr,

$$I = \frac{P \times R \times T}{100} = \frac{2100 \times 8 \times 3}{100} = ₹\,504$$

$\therefore$ Difference between both interests = 504 − 336 = ₹ 168

Question 54:

To convert a fraction into a per cent, we_____ it by 100.

To convert a fraction into a per cent, we multiply it by 100.

Solution :

Question 55:

To convert a decimal into a per cent, we shift the decimal point two places to the_____.

Solution :

To convert a decimal into a per cent, we shift the decimal point into places to the right.

Question 56:

The_____of interests on a sum of Rs 2000 at the rate of 6% per annum for $1\frac{1}{2}$ yr and 2 yr is Rs 420.

Solution :

Given, $P = ₹\,2000$ and $R = 6\%$

For $1\frac{1}{2}$ yr, $I = \frac{P \times R \times T}{100}$

$= \frac{2000 \times 6 \times 3}{100 \times 2}$

$= ₹\,180$

For 2 yr, $I = \frac{P \times R \times T}{100}$

$= \frac{2000 \times 6 \times 2}{100}$

$= ₹\,240$

∴The **sum** of both interests is ₹ (180 + 240), i.e. ₹420.

Question 57:

When converted into percentage, the value of 6.5 is_____than 100%.

Solution :

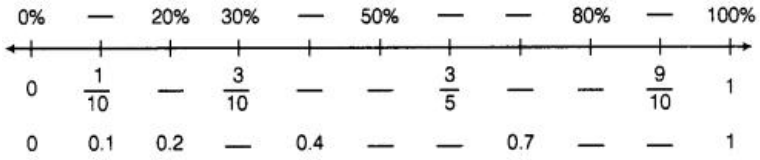
We have, 6.5

In percentage, 6.5 x 100% = 650%

Hence, when converted into percentage, the value of 6.5 is more than 100%.

In questions 68 and 59, copy each number line. Fill in the blanks, so that each mark on the number line is labelled with a per cent, a fraction and a decimal. Write all fractions in lowest terms.

Question 58:



Solution :

We know,

Percentage = Fraction ×100

$\text{Fraction} = \frac{\text{Percentage}}{100}$

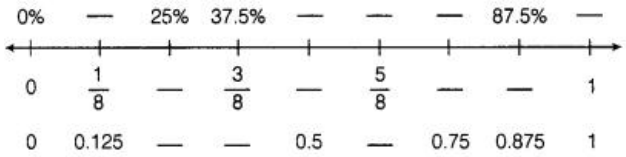
$\text{Decimal} = \frac{\text{Percentage}}{100}$

Now, according to these formulae, we have

Percentage	Fraction	Decimal
0%	0	0
10%	$\frac{1}{10}$	0.1
20%	$\frac{1}{5}$	0.2
30%	$\frac{3}{10}$	**0.3**

Percentage	Fraction	Decimal
40%	$\frac{2}{5}$	0.4
50%	$\frac{1}{2}$	**0.5**
60%	$\frac{3}{5}$	**0.6**
70%	$\frac{7}{10}$	0.7
80%	$\frac{4}{5}$	**0.8**
90%	$\frac{9}{10}$	**0.9**
100%	1	1

Question 59:



Solution :

We know,

Percentage = Fraction ×100

$\text{Fraction} = \frac{\text{Percentage}}{100}$

$\text{Decimal} = \frac{\text{Percentage}}{100}$

Now, according to these formulae, we have

Percentage	Fraction	Decimal
0%	0	0
12.5%	$\frac{1}{8}$	0.125
25%	$\frac{1}{4}$	**0.25**
37.5%	$\frac{3}{8}$	**0.375**
50%	$\frac{1}{2}$	0.5
62.5%	$\frac{5}{8}$	**0.625**
75%	$\frac{3}{4}$	0.75
87.5%	$\frac{7}{8}$	0.875
100%	1	1

True/False

In questions 60 to 79, state whether the statements are True or False.

Question 60:

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

Solution :

True

Given, fraction $= \frac{2}{3}$

In percentage, $\frac{2}{3} \times 100\,\% = \frac{200}{3}\% = 66\frac{2}{3}\%$

Question 61:

When an improper fraction is converted into percentage, then the answer can also be less than 100.

Solution :

False

Consider, an improper fraction = $\frac{12}{5}$ (N > D)

In percentage, $\frac{12}{5}$ x 100% = 240%

Hence, when an improper fraction is converted into percentage, then the answer is always greater than 100.

Question 62:

8 h is 50% of 4 days.

Solution :

False

Let 8 h be x% of 4 days.

Then, $8\text{ h} = x\%$ of 4 days

$\Rightarrow \quad 8 = \frac{x}{100} \times 4 \times 24$ [$\because$ 1 day = 24 h $\Rightarrow$ 4 days = 4 × 24 h]

$\Rightarrow \quad \frac{8 \times 100}{4 \times 24} = x$

$\Rightarrow \quad x = \frac{25}{3} = 8\frac{1}{3}$

Hence, 8 h is $8\frac{1}{3}\%$ of 4 days.

Question 63:

The interest on Rs 350 at 5% per annum for 73 days is Rs 35.

Solution :

False

Given, $P = ₹\,350$, $R = 5\%$

and $T = 73\text{ days} = \frac{73}{365}\text{ yr}$

$\therefore \quad I = \frac{P \times R \times T}{100}$

$I = \frac{350 \times 5 \times 73}{100 \times 365} = \frac{127750}{36500}$

$I = ₹\,3.5$

Question 64:

The simple interest on a sum of Rs P for T yr at R% per annum is given by the formula Simple Interest= $\frac{TXPXR}{100}$

Solution :

True

SI = $\frac{PXRXT}{100}$

We can also write it as,SI = $\frac{TXPXR}{100}$ [since, multiplication is commutative]

Question 65:

75% = 4/3

Solution :

False

We have, 75%

In fraction, $\frac{75}{100} = \frac{3}{4}$

$\therefore \quad 75\% = \frac{3}{4}$

Question 66:

12% of 120 is 100.

Solution :

False

$$\text{Since, 12\% of 120} = \frac{12}{100} \times 120 = \frac{1440}{100} = 14.4$$

Therefore, 12% of 120 is 14.4.

Question 67:

If Ankita obtains 336 marks out of 600, then percentage of marks obtained by her is 33.6%.

Solution :

False

Marks obtained by Ankita out of 600 = 336

Percentage, marks = $\frac{336}{600}$ x 100% = 56%

Hence, Ankita got 56% marks.

Question 68:

0.018 is equivalent to 8%.

Solution :

False

Given, decimal = 0.018

In percentage, 0.018 x 100= 1.8%

Hence, 0.018 is equivalent to 1.8%

Question 69:

50% of Rs 50 is Rs 25.

Solution :

True

Since, 50% of Rs 50 = $\frac{50}{100}$ x 50= Rs 25

Hence, 50% of Rs 50 is Rs 25.

Question 70:

250 cm is 4% of 1 km.

Solution :

False

$$\because \quad 250\text{ cm} = \frac{250}{100} = 2.5\text{ m} \qquad [\because 1\text{ m} = 100\text{ cm}]$$

$$\text{Now, 4\% of 1 km} = \frac{4}{100} \times 1000\text{ m} \qquad [\because 1\text{ km} = 1000\text{ m}]$$

$$= 40\text{ m}$$

Hence, 250 cm ≠ 4% of 1 km.

Question 71:

Out of 600 students of a school, 126 go for a picnic. The percentage of students that did not go for the picnic, is 75.

Solution :

False

Total students =600 Students went for picnic = 126

∴ Students did not go for picnic = 600 -126= 474

In percentage, $\frac{474}{600}$ x 100% = 79%

Hence, 79% of students did not go for picnic.

Question 72:

By selling a book for Rs 50, a shopkeeper suffers a loss of 10%. The cost price of the book is Rs 60.

Solution :

False

Given, SP = ₹ 50 and loss per cent = 10%

We know that,

$$\text{Loss}\% = \frac{\text{Loss}}{\text{CP}} \times 100\%$$

$$\Rightarrow \quad \text{Loss}\% = \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100 \qquad [\because \text{Loss} = \text{CP} - \text{SP}]$$

$$\Rightarrow \quad 10 = \frac{(\text{CP} - 50)}{\text{CP}} \times 100$$

$$\Rightarrow \quad 10\,\text{CP} = 100\,\text{CP} - 5000$$

$$\Rightarrow \quad 90\text{CP} = 5000$$

$$\Rightarrow \quad \text{CP} = \frac{5000}{90}$$

$$\therefore \quad \text{CP} = ₹\,55.55$$

Hence, the cost price of the book is ₹ 55.55.

Question 73:

If a chair is bought for Rs 2000 and is sold at a gain of 10%, then selling price of the chair is Rs 2010.

Solution :

False

Given, CP = ₹ 2000 and profit % = 10%

We know that, $\text{Profit}\% = \frac{\text{Profit}}{\text{CP}} \times 100\%$

$$\Rightarrow \quad \text{Profit}\% = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100\% \qquad [\because \text{Profit} = \text{SP} - \text{CP}]$$

$$\Rightarrow \quad 10 = \frac{\text{SP} - 2000}{2000} \times 100$$

$$\Rightarrow \quad \frac{10 \times 2000}{100} = \text{SP} - 2000$$

$$\Rightarrow \quad 200 = \text{SP} - 2000$$

$$\therefore \quad \text{SP} = ₹\,2200$$

Hence, the SP of chair is ₹ 2200.

Question 74:

If a bicycle was bought for Rs 650 and sold for Rs 585, then the percentage of profit is 10%.

Solution :

False

Given, CP = ₹ 650 and SP = ₹ 585

Since, CP > SP

$$\text{Loss} = \text{CP} - \text{SP} = 650 - 585 = ₹\,65$$

Now, $\text{Loss}\% = \frac{\text{Loss}}{\text{CP}} \times 100 = \frac{65}{650} \times 100 = 10\%$

Hence, the percentage of loss is 10%.

Question 75:

Sushma sold her watch for Rs 3320 at a gain of Rs 320. For earning a gain of 10%, she should have sold the watch for Rs 3300.

Solution :

True

Given that, SP = ₹ 3320 and profit = ₹ 320

CP = SP − Profit = 3320 − 320 = ₹ 3000

Now, for earning profit 10%, we have to find new SP.

$$\therefore \quad \text{Profit \%} = \frac{\text{Profit}}{\text{CP}} \times 100\,\% = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100\,\% \qquad [\because \text{Profit} = \text{SP} - \text{CP}]$$

$$10 = \frac{\text{SP} - 3000}{3000} \times 100$$

$$300 = \text{SP} - 3000$$

$$\text{SP} = ₹\,3300$$

Question 76:

Interest on Rs 1200 for $1\frac{1}{2}$ yr at the rate of 15% per annum is Rs 180.

Solution :

False

Given, $P = ₹\,1200$, $T = 1\frac{1}{2}\text{ yr} = \frac{3}{2}\text{ yr}$ and $R = 15\%$

$$\therefore \quad I = \frac{P \times R \times T}{100} = \frac{1200 \times 15 \times 3}{2 \times 100} = ₹\,270$$

So, the interest is ₹ 270.

Question 77:

Amount received after depositing Rs 800 a period of 3 yr at the rate of 12% per annum is Rs 896.

Solution :

False

Given, $P = ₹\,800$, $T = 3\text{ yr}$ and $R = 12\%$

$$\therefore \quad I = \frac{P \times R \times T}{100} = \frac{800 \times 12 \times 3}{100} = ₹\,288$$

Also, amount, $(A) = P + I = 800 + 288 = ₹\,1088$

Hence, the amount received is ₹1088.

Question 78:

Rs 6400 were lent to Feroz and Rashmi at 15% per annum for $3\frac{1}{2}$ and 5 yr, respectively. The difference in the interests paid by them is Rs 150.

Solution :

False

Given, Feroz borrowed ₹ 6400 for $3\frac{1}{2}$ yr at 15%.

Here, $P_1 = ₹\,6400$, $T_1 = 3\frac{1}{2} = \frac{7}{2}\text{ yr}$ and $R_1 = 15\%$

$$\therefore \quad I_1 = \frac{P_1 \times R_1 \times T_1}{100}$$

$$= \frac{6400 \times 15 \times 7}{100 \times 2} = ₹\,3360$$

Rashmi borrowed ₹ 6400 for 5 yr at 15%.

Here, $P_2 = ₹\,6400$, $R_2 = 15\%$ and $T_2 = 5\text{ yr}$

$$\therefore \quad I_2 = \frac{P_2 \times R_2 \times T_2}{100} = \frac{6400 \times 15 \times 5}{100} = ₹\,4800$$

$\therefore$ Difference between interests = 4800 − 3360 = ₹ 1440

Hence, the difference in interest, paid by them is ₹ 1440.

Question 79:

A vendor purchased 720 lemons at Rs 120 per hundred. 10% of the lemons were found rotten, which he sold at Rs 50 per hundred. If he sells the remaining lemons at Rs 125 per hundred, then his profit will be 16%.

Solution :

False

Given, cost price of 100 lemons = ₹ 120

Cost price of 1 lemon = ₹ $\frac{120}{100}$

and cost price of 720 lemons = $\frac{120}{100} \times 720 = ₹\ 864$

According to the question, 10% of the lemons were rotten.

∴ 10% of 720 lemons = $\frac{10}{100} \times 720 = 72$ lemons

Also, given, selling price of 100 rotten lemons = ₹ 50

Selling price of 1 rotten lemon = ₹ $\frac{50}{100}$

and selling price of 72 rotten lemons = $\frac{50}{100} \times 72 = ₹\ 36$

Also, selling price of 100 good lemons = ₹ 125

∴ Selling price of good lemon = ₹ $\frac{125}{100}$

and selling price of (720 – 72) good lemons = $\frac{125}{100} \times (720 - 72) = \frac{125}{100} \times 648 = ₹\ 810$

Now, total selling price of 720 lemons = 36 + 810 = ₹ 846

Clearly, selling price < cost price.

Therefore, vendor will bear loss.

Question 80:

Find the value of x, if

(a) 8% of Rs x is ? 100.

(b) 32% of x kg is 400 kg.

(c) 35% of Rs x is ?280.

(d) 45% of marks x is 405.

Solution :

(a) Given, 8% of ₹ x is ₹ 100.

$\therefore \quad \frac{8}{100} \times x = 100$

$\Rightarrow \quad x = \frac{100 \times 100}{8}$

$\Rightarrow \quad x = ₹\ 1250$

(b) Given, 32% of x kg is 400 kg.

$\therefore \quad \frac{32}{100} \times x = 400$

$\Rightarrow \quad x = \frac{400 \times 100}{32}$

$\Rightarrow \quad x = 1250\,\text{kg}$

(c) Given, 35% of ₹ x is ₹280.

$\therefore \quad \frac{35}{100} \times x = 280$

$\Rightarrow \quad x = \frac{280 \times 100}{35}$

$\Rightarrow \quad x = ₹\ 800$

(d) Given, 45% of marks x is 405.

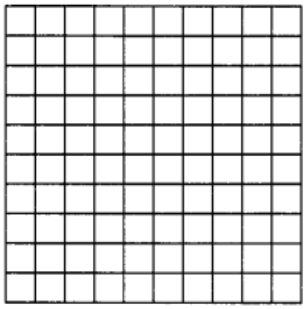
$\therefore \quad \frac{45}{100} \times x = 405$

$\Rightarrow \quad x = \frac{405 \times 100}{45}$

$\Rightarrow \quad x = 900\,\text{marks}$

Question 81:

Imagine that, a 10 x 10 grid has value 300 and that this value is divided evenly among the small squares. In other words, each small square is worth 3. Use a new grid for each part of this problem and label each grid “Value : 300”.



(a) Shade 25% of the grid. What is 25% of 300? Compare the two answers.

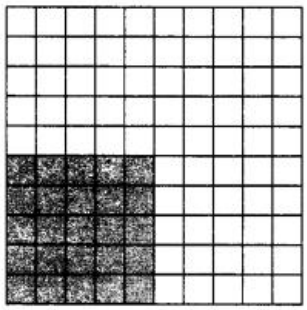
(b) What is the value of 25 squares?

(c) Shade 17% of the grid. What is 17% of 300? Compare the two answers.

(d) What is the value of 1/10 of the grid?

Solution :

(a) We have to shade 25% of the grid, i.e. $\left(\frac{1}{4}\right)$ th part of grid.



$\left(\frac{1}{4}\right)$ th of grid covers 25 squares. Since, one square worth 3.

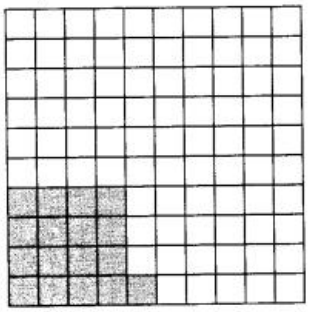
So, total value of 25 such squares $= 25 \times 3 = 75$

Now, 25% of 300 $= \frac{25}{100} \times 300 = 25 \times 3 = 75$

Hence, the above two values are equal.

(b) Value of 25 squares $= 25 \times 3 = 75$

(c) 17% of grid means 17 squares. So, we will shade 17 squares.



Total value of these 17 squares $= 17 \times 3 = 51$

Now, 17% of 300 $= \frac{17}{100} \times 300 = 17 \times 3 = 51$

Hence, the above two values are equal.

(d) Value of $\frac{1}{10}$ of the grid in percentage $= \frac{1}{10} \times 100\% = 10\%$

So, $\frac{1}{10}$ of the grid means 10% value of 300 $= \frac{10}{100} \times 300 = 30$

Question 82:

Express $\frac{1}{6}$ as a per cent.

Solution :

We have, $\frac{1}{6}$

In percentage, $\frac{1}{6} \times 100\% = \frac{50}{3} = 16.6\%$ [to convert in per cent, multiply by 100]

Question 83:

Express $\frac{9}{40}$ as a per cent.

Solution :

We have, $\frac{9}{40}$

In percentage, $\frac{9}{40}$x 100%=$22\frac{1}{2}$%

Question 84:

Express $\frac{1}{100}$ as a per cent.

Solution :

We have, $\frac{1}{100}$

In percentage, $\frac{1}{100}$x 100%= 1%

Question 85:

Express 80% as a fraction in its lowest form.

Solution :

We have, 80%

For fraction, $80 \times \frac{1}{100} = \frac{80}{100} = \frac{4}{5}$ $\left[\text{to convert in fraction, multiply by } \frac{1}{100}\right]$

Question 86:

Express $33\frac{1}{3}$ % as a ratio in the lowest form.

Solution :

We have, $33\frac{1}{3}$ %

For ratio, $33\frac{1}{3}\% : 1 = \frac{100}{3} \times \frac{1}{100} : 1 = \frac{1}{3} : 1 = \frac{1}{3} \times 3 : 1 \times 3 = 1 : 3$

Question 87:

Express $16\frac{2}{3}$ % as a ratio in the lowest form.

Solution :

We have, $16\frac{2}{3}\% = \frac{50}{3}\%$

For ratio, $\frac{50}{3}\% : 1 = \frac{50}{3} \times \frac{1}{100} : 1 = \frac{1}{6} : 1 = \frac{1}{6} \times 6 : 1 \times 6 = 1 : 6$

Question 88:

Express 150% as a ratio in the lowest form.

Solution :

We have, 150%

For ratio, $150\% : 1 = \frac{150}{100} : 1 = \frac{3}{2} : 1 = \frac{3}{2} \times 2 : 1 \times 2 = 3 : 2$

Question 89:

Sachin and Sanjana are calculating 23% of 800.

Now, calculate 52% of 700 using both the ways described above. Which way do you find

easier?

Solution :

First way $52\%\text{ of }700 = (1\%\text{ of }700)\times 52$

$$= \left(\frac{1}{100}\times 700\right)\times 52$$

$$= (0.01\times 700)\times 52$$

$$= 7\times 52$$

$$= 364$$

Second way

$$52\%\text{ of }700 = \frac{52}{100}\times 700 = 0.52\times 700$$

$$= 364$$

So, second way, we have to find easier.

Question 90:

Write 0.089 as a per cent.

Solution :

We have, 0.089

In percentage, 0.089 x 100% = 8.9% [to convert in per cent, multiply by 100]

Question 91:

Write 1.56 as a per cent.

Solution :

We have, 1.56

In percentage, 1.56 x 100%= 156%

Question 92:

What is 15% of 20?

Solution :

We have, 15% of 20

= $\frac{15}{100}$ x 20 = 3

Question 93:

What is 800% of 800?

Solution :

We have, 800% of 800

= $\frac{800}{100}$ x 800 = 6400

Question 94:

What is 100% of 500?

Solution :

We have, 100% of 500

= $\frac{100}{100}$ x 500= 500

Question 95:

What per cent of 1 h is 30 min?

Solution :

Let x% of 1 h be 30 min.

Then, $\frac{x}{100}\times 1\text{ h} = 30\text{ min}$

$\Rightarrow$ $\frac{x}{100}\times 60\text{ min} = 30\text{ min}$ [$\because$ 1 h = 60 min]

$\Rightarrow$ $x = \frac{30\times 100}{60}$

$\therefore\ x = 50\%$

Hence, 50% of 1 h is 30 min.

Question 96:

What per cent of 1 day is 1 min?

Solution :

Let x% of 1 day be 1 min.

Then, $\frac{x}{100} \times 1\,\text{day} = 1\,\text{min}$ [$\because$ 1 day = 24 h and 1 h = 60 min]

$\Rightarrow \frac{x}{100} \times 24\,\text{h} = 1\,\text{min}$

$\Rightarrow \frac{x}{100} \times 1440\,\text{min} = 1\,\text{min}$

$\Rightarrow x = \frac{100}{1440} = \frac{10}{144}$

$\therefore x = 0.069\%$

Hence, 0.069% of 1 day is 1 min.

Question 97:

What per cent of 1 km is 1000 m?

Solution :

Let x% of 1 km be 1000 m.

Then, $\frac{x}{100} \times 1\,\text{km} = 1000\,\text{m}$

$\Rightarrow \frac{x}{100} \times 1000\,\text{m} = 1000\,\text{m}$ [$\because$ 1 km = 1000 m]

$\Rightarrow x \times 10 = 1000$

$\therefore x = 100\,\%$

Hence, 100% of 1 km is 1000 m.

Question 98:

Find out 8% of 25 kg.

Solution :

We have, 8% of 25 kg $= \frac{8}{100} \times 25 = 2\,\text{kg}$

Question 99:

What per cent of Rs 80 is Rs 100?

Solution :

Let x% of ₹ 80 be ₹ 100.

Then, $\frac{x}{100} \times 80 = 100$

$\Rightarrow x = \frac{100 \times 10}{8}$

$\therefore x = 125\%$

Hence, 125% of ₹ 80 is ₹ 100.

Question 100:

45% of the population of a town are men and 40% are women. What is the percentage of children?

Solution :

We have,

Percentage of men in town = 45%

Percentage of women in town = 40%

So, percentage of children in town = 100 – 45 – 40= 100 – 85= 15%

Hence, 15% of the population of a town are children.

Question 101:

The strength of a school is 2000. If 40% of the students are girls, then how many boys are

there in the school?

Solution :

As per the given information in the question,

The strength of school = 2000 Percentage of girls in school = 40%

Percentage of boys in school = 100- 40 = 60%

Number of boys in school = 60% of 2000 = $\frac{60}{100}$ x 2000= 60 x 20 = 1200

Hence, number of boys in school is 1200.

Question 102:

Chalk contains 10% calcium, 3% carbon and 12% oxygen. Find the amount of carbon and calcium (in grams) in $2\frac{1}{2}$ kg of chalk.

Solution :

We have,

Percentage of calcium in chalk = 10%

Percentage of carbon in chalk = 3%

Percentage of oxygen in chalk = 12%

$\because$ Weight of chalk $= 2\frac{1}{2}\text{ kg} = \frac{5}{2}\text{ kg} = 2.5\text{ kg} = 2.5 \times 1000\text{ g} = 2500\text{ gm}$ [$\because 1\text{ kg} = 1000\text{ g}$]

$\therefore$ Amount of carbon in chalk = 3% of 2500 g $= \frac{3}{100} \times 2500 = 25 \times 3 = 75\text{ g}$

$\therefore$ Amount of calcium in chalk = 10% of 2500 g $= \frac{10}{100} \times 2500 = 10 \times 25 = 250\text{ g}$

Hence, amount of carbon and calcium are 75 g and 250 g, respectively.

Question 103:

800 kg of mortar consists of 55% sand, 33% cement and rest lime. What is the mass of lime in mortar?

Solution :

We have,

Percentage of sand in mortar = 55%

Percentage of cement in mortar = 33%

So, percentage of lime in mortar = 100 – 55 – 33 = 100 – 88 = 12%

$\therefore$ Weight of mortar = 800 kg

$\therefore$ Mass of lime in mortar = 12% of 800 kg = $\frac{12}{100}$ x 800 = 12 x 8 = 96 kg

Hence, weight of lime in mortar is 96 kg.

Question 104:

In a furniture shop, 24 tables were bought at the rate of Rs 450 per table. The shopkeeper sold 16 of them at the rate of Rs 600 per table and the remaining at the rate of 400 per table. Find her gain or loss per cent.

Solution :

As per the given information in question,

Cost Price (CP) of per table = ₹ 450

Number of tables = 24

So, cost price of 24 tables = 24 × 450 = ₹ 10800

Since, 16 tables sold at the rate of ₹ 600.

$\therefore$ Selling price of 16 tables = 16 × 600 = ₹ 9600

$\therefore$ Remaining tables = 24 – 16 = 8

Since, 8 tables sold at the rate of ₹ 400.

Selling Price (SP) for 8 tables = 8 × 400 = ₹ 3200

Total selling price = 9600 + 3200 = ₹ 12800

$\therefore$ Profit or gain = SP – CP = 12800 – 10800 = ₹ 2000

Now, gain $= \frac{\text{Gain}}{\text{Cost price}} \times 100\,\% = \frac{2000}{10800} \times 100\% = \frac{2000}{108}\% = 18.51\%$

Hence, her gain is 18.51%.

Question 105:

Medha deposited 20% of her money in a bank. After spending 20% of the remainder, she has Rs 4800 left with her. How much did she originally have?

Solution :

Let medha has originally ₹ x.

Money deposited in bank = 20% of $x = \frac{20}{100} \times x = ₹ \frac{1}{5}x$

Remaining money $= x - \frac{1}{5}x = ₹ \frac{4}{5}x$

Money spent = 20% of remaining money $= \frac{20}{100} \times \frac{4}{5}x = \frac{1}{5} \times \frac{4}{5}x = ₹ \frac{4}{25}x$

Now, money left $= \frac{4}{5}x - \frac{4}{25}x = ₹ \frac{16}{25}x$

But given that, money = ₹ 4800

According to the question,

$$\frac{16}{25}x = 4800 \quad \Rightarrow \quad x = \frac{4800 \times 25}{16}$$

$$\Rightarrow \quad x = ₹ 7500$$

Hence, Medha has ₹ 7500 in original.

Question 106:

The cost of a flower vase got increased by 12%. If the current cost is Rs 896, what was its original cost?

Solution :

Let the original cost be ₹ x.

Now, the cost of flower vase is increased by 12%.

So, x + 12% of x = ₹ 896

$$\Rightarrow \quad x + \frac{12}{100}x = 896$$

$$\Rightarrow \quad \frac{112x}{100} = 896$$

$$\Rightarrow \quad x = \frac{896 \times 100}{112}$$

$$\therefore \quad x = ₹ 800$$

Hence, original lost of flower vase is ₹ 800.

Question 107:

Radhika borrowed Rs 12000 from her friends. Out of which Rs 4000 were borrowed at 18% and the remaining at 15% rate of interest per annum. What is the total interest after 3 yr?

Solution :

For first year interest, we have

$P_1 = ₹ 4000$, $R_1 = 18\%$ and $T_1 = 3$ yr

$$\because \quad I_1 = \frac{P_1 \times R_1 \times T_1}{100}$$

$$\therefore \quad I_1 = \frac{4000 \times 18 \times 3}{100} = ₹ 2160$$

For second year interest,

$$P_2 = 12000 - 4000 = ₹ 8000$$

$R_2 = 15\%$ and $T_2 = 3$ yr

$$\because \quad I_2 = \frac{P_2 \times R_2 \times T_2}{100}$$

$$\therefore \quad I_2 = \frac{8000 \times 15 \times 3}{100} = ₹ 3600$$

Hence, after 3 yr, total interest = $I_1 + I_2$ = 2160 + 3600 = ₹ 5760

Question 108:

A man travelled 60 km by car and 240 km by train. Find what per cent of total journey did he travel by car and what per cent by train?

Solution :

Distance covered by car = 60 km

Distance covered by train = 240 km

∴ Total journey = 60 + 240= 300 km

Let x% of total journey is travelled by car.

Then, $x\%$ of $300 = 60$

$\Rightarrow \quad \frac{x}{100} \times 300 = 60 \Rightarrow x = \frac{60 \times 100}{300}$

$\Rightarrow \quad x = 20\%$

Let y% of total journey is travelled by train.

Then, $y\%$ of $300 = 240$

$\Rightarrow \quad \frac{y}{100} \times 300 = 240 \Rightarrow y = \frac{240 \times 100}{300}$

$\Rightarrow \quad y = 80\%$

Hence, 20% distance is travelled by car and 80% distance is travelled by train.

Question 109:

By selling a chair for Rs 1440, a shopkeeper loses 10%. At what price, did he buy it?

Solution :

Given, SP = ₹ 1440 and loss = 10%

We know that, $\text{Loss}\% = \frac{\text{Loss}}{\text{CP}} \times 100\%$

$\Rightarrow \quad \text{Loss}\% = \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100\% \quad [\because \text{Loss} = \text{CP} - \text{SP}]$

$\Rightarrow \quad 10 = \frac{\text{CP} - 1440}{\text{CP}} \times 100$

$\Rightarrow \quad \frac{10}{100}\text{CP} = \text{CP} - 1440$

$\Rightarrow \quad \text{CP} - \frac{10}{100}\text{CP} = 1440$

$\Rightarrow \quad \frac{9}{10}\text{CP} = 1440$

$\Rightarrow \quad \text{CP} = \frac{1440 \times 10}{9}$

$\therefore \quad \text{CP} = ₹\ 1600$

Hence, the cost price of chair is ₹ 1600.

Question 110:

Dhruvika invested money for a period from May 2006 to April 2008 at the rate of 12% per annum. If interest received by her is Rs 1620, then find the money invested.

Solution :

Given, I = ₹ 1620 and $R = 12\%$

Time = From May 2006 to April 2008 = 2 yr

$\because \quad I = \frac{P \times R \times T}{100}$

$\therefore \quad P = \frac{I \times 100}{R \times T} = \frac{1620 \times 100}{12 \times 2}$

$\Rightarrow \quad P = ₹\ 6750$

Hence, the invested money is ₹ 6750.

Question 111:

A person wanted to sell a scooter at a loss of 25%. But at the last moment, he changed his mind and sold the scooter at a loss of 20%. If the difference in the two SP's is Rs 4000, then find the CP of the scooter.

Solution :

Let cost price of the scooter be ₹ x.

If he sells the scooter at a loss of 25%, then

$$SP = x - 25\% \text{ of } x = x - \frac{25}{100}x = ₹\frac{75}{100}x$$

and if he sells the scooter at a loss of 20%, then

$$SP = x - 20\% \text{ of } x = x - \frac{20}{100}x = \frac{80}{100}x$$

It is given that the difference in the two SP's is ₹ 4000.

$$\therefore \quad \frac{80}{100}x - \frac{75}{100}x = 4000$$

$$\Rightarrow \quad \frac{80x - 75x}{100} = 4000$$

$$\Rightarrow \quad \frac{5x}{100} = 4000$$

$$\Rightarrow \quad x = \frac{4000 \times 100}{5} = ₹\,80000$$

Hence, cost price of scooter is ₹ 80000.

Question 112:

The population of a village is 8000. Out of these, 80% are literate and of these literate people, 40% are women. Find the ratio of the number of literate women to the total population.

Solution :

We have, total population = 8000

$$\text{Literate people} = 80\% \text{ of total population} = \frac{80}{100} \times 8000 = 6400$$

$$\text{Literate women} = 40\% \text{ of literate people} = \frac{40}{100} \times 6400 = 2560$$

$$\text{Ratio of literate women to total population} = 2560 : 8000 = \frac{2560}{320} : \frac{8000}{320} = 8 : 25$$

Hence, the ratio of women to total population is 8 : 25.

Question 113:

In an entertainment programme, 250 tickets of Rs 400 and 500 tickets of Rs 100 were sold. If the entertainment tax is 40% on ticket of Rs 400 and 20% on ticket of Rs 100, then find how much entertainment tax was collected from the programme?

Solution :

It is given that, 250 tickets of Rs 400 were sold, Therefore, total amount received by selling these tickets = 250 x 400= Rs 100000

Similarly, amount received by selling 500 tickets of Rs 100 = 500 x 100= Rs 50000

It is also given that, 40% and 20% of entertainment tax is on Rs 400 and Rs 100 tickets, respectively.

So, total entertainment tax collected

$$= 40\% \text{ of total amount received by selling tickets of } ₹\,400 + 20\% \text{ of total amount received by selling tickets of } ₹\,100$$

$$= 40\% \text{ of } 100000 + 20\% \text{ of } 50000$$

$$= \frac{40}{100} \times 100000 + \frac{20}{100} \times 50000$$

$$= 40000 + 10000$$

$$= ₹\,50000$$

Hence, the total collected entertainment tax was ₹ 50000.

Question 114:

Bhavya earns Rs 50000 per month and spends 80% of it. Due to pay revision, her monthly income increases by 20% but due to price rise, she lias to spent 20% more. Find her new savings.

Solution :

Given, Bhavya earns per month = ₹ 50000

She spends per month = 80% of 50000 = $\frac{80}{100} \times 50000 = ₹\ 40000$

Then, her per month savings = 50000 – 40000 = ₹ 10000

[∵ saving = total income – expenditure]

Also, given increment in monthly income = 20% of 50000

$= \frac{20}{100} \times 50000 = ₹\ 10000$

∴ Bhavya's new income = 50000 + 10000 = ₹ 60000

Increase in expenditure = 20% of 40000 = $\frac{20}{100} \times 40000 = ₹\ 8000$

So, new expenditure = 40000 + 8000 = ₹ 48000

Now, Bhavya's new savings = 60000 – 48000 = ₹ 12000

Question 115:

In an examination, there are three papers each of 100 marks. A candidate obtained 53 marks in the first paper and 75 marks in the second paper. How many marks must the candidate obtain in the third paper to get an overall of 70% marks?

Solution :

Let x be the marks of candidate in third paper.

Then, total marks secured in all three papers = 53 + 75 + x

Total marks of three papers = 100 + 100 + 100 = 300

$$\therefore \text{Percentage of maks} = \left(\frac{\text{Total marks secured}}{\text{Total marks}}\right) \times 100\,\% = \frac{53 + 75 + x}{300} \times 100\,\%$$

But it is given that, he obtained overall of 70% marks.

$$\therefore \quad \frac{53 + 75 + x}{300} \times 100 = 70$$

$$\Rightarrow \quad \frac{128 + x}{3} = 70$$

$$\Rightarrow \quad 128 + x = 210 \Rightarrow x = 210 - 128$$

$$\therefore \quad x = 82$$

Hence, he must secure 82 marks in the third paper to get an overall of 70% marks.

Question 116:

Health Application

A doctor reports blood pressure in millimetres of mercury (mm Hg) as a ratio of systolic blood pressure to diastolic blood pressure (such as 140 over 80). Systolic pressure is measured when the heart beats and diastolic pressure is measured when it rests. Refer to the table of blood pressure ranges for adults.

	Blood Pressure Ranges		
	Normal	**Prehypertension**	**Hypertension (Very High)**
Systolic	Under 120 mm Hg	120-139 mm Hg	140 mm Hg and above
Diastolic	Under 80 mm Hg	80-89 mm Hg	90 mm Hg and above

Manohar is a healthy 37 yr old man whose blood pressure is in the normal category.

(a) Calculate an approximate ratio of systolic to diastolic blood pressures in the normal range.

(b) If Manohar's systolic blood pressure is 102 mm Hg, then use the ratio from part (a) to predict his diastolic blood pressure.

(c) Calculate ratio of average systolic to average diastolic blood pressures in the prehypertension category.

Solution :

(a) Systolic blood pressure in the normal range = 120 mm Hg

Diastolic blood pressure in the normal range = 80 mm Hg

Approximate ratio of systolic to diastolic blood pressure

$$= \frac{\text{Systolic blood pressure in normal range}}{\text{Diastolic blood pressure in normal range}} = \frac{120}{80} = \frac{3}{2}$$

[dividing numerator and denominator by 40]

Hence, approximate ratio is 3:2.

(b) Manohar's systolic blood pressure = 102 mm Hg

Let diastolic blood pressure = x mm Hg

According to the question,

$$\frac{\text{Systolic blood pressure}}{\text{Diastolic blood pressure}} = \frac{3}{2} \quad \text{[from part (a)]}$$

$$\Rightarrow \quad \frac{102}{x} = \frac{3}{2}$$

$$\Rightarrow \quad x = \frac{102 \times 2}{3}$$

$$\therefore \quad x = 68 \text{ mm Hg}$$

Hence, Manohar's diastolic blood pressure is 68 mm Hg.

(c) Average systolic blood pressure in prehypertension category $= \frac{120 + 139}{2}$

$$= \frac{259}{2} \text{ mm Hg}$$

Average diastolic blood pressure in prehypertension category $= \frac{80 + 89}{2}$

$$= \frac{169}{2} \text{ mm Hg}$$

Hence, ratio of average systolic to average diastolic blood pressures

$$= \frac{\text{Average systolic blood pressure}}{\text{Average diastolic blood pressure}} = \frac{\frac{259}{2}}{\frac{169}{2}} = \frac{259}{2} \times \frac{2}{169} = \frac{259}{169}$$

Hence, required ratio is 259 : 169.

Question 117:

(a) Science Application

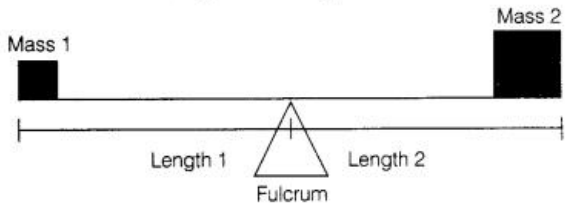
The king cobra can reach a Length of 558 cm. This is only about 60% of the length of the largest reticulated python. Find the length of the largest reticulated python.

(b) Physical Science Application

Unequal masses will not balance on a fulcrum, if they are at equal distance from it, one side will go up and the other side will go down.

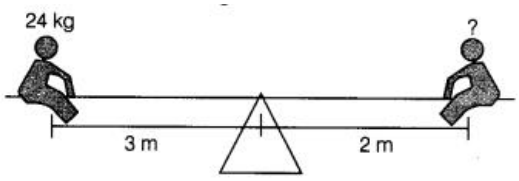
Unequal masses will balance when the following proportion is true.

$$\frac{\text{Mass 1}}{\text{Length 2}} = \frac{\text{Mass 2}}{\text{Length 1}}$$



Two children can be balanced on a see saw, when $\frac{\text{mass 1}}{\text{length 2}} = \frac{\text{mass 2}}{\text{length 1}}$.

The child on the left and child on the right are balanced. What is the mass of the child on the right?



(c) Life Science Application

A DNA model was built using the scale 2 cm : 0.0000001 mm. If the model of the DNA chain is 17 cm long, what is the length of the actual chain?

Solution :

(a) Length of the king cobra = 558 cm

According to the question,

60% of length of reticulated python = 558 cm

$\Rightarrow \frac{60}{100} \times$ Length of reticulated python = 558 cm

$\therefore$ Length of reticulated python $= 558 \times \frac{100}{60} = 930$ cm

(b) It is given that, for balancing, $\frac{\text{Mass 1}}{\text{Length 2}} = \frac{\text{Mass 2}}{\text{Length 1}}$

According to the question,

Mass 1 = 24 kg, length 1 = 3 m and length 2 = 2 m

$\therefore \quad \frac{24}{2} = \frac{\text{Mass 2}}{3}$ [by cross-multiplication]

$\Rightarrow \quad \text{Mass 2} = \frac{24 \times 3}{2} = 36$ kg

(c) Let the length of the actual chain be x mm. Therefore,

$$\frac{2 \text{ cm}}{0.0000001 \text{ mm}} = \frac{17 \text{ cm}}{x \text{ mm}}$$

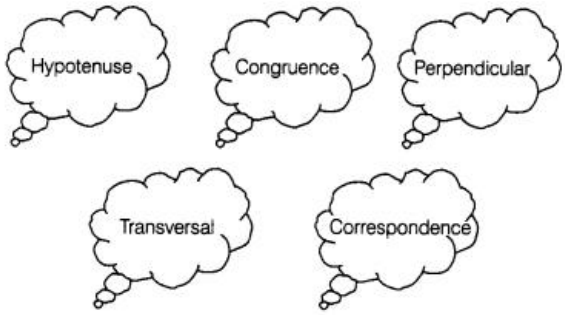
$$\Rightarrow \quad x = \frac{17 \times 0.0000001}{2}$$

$$= 8.5 \times 0.0000001 = 0.00000085 \text{ mm}$$

Question 118:

Language Application

Given below are few mathematical terms.



Find

(a) The ratio of consonants to vowels in each of the terms.

(b) The percentage of consonants in each of the terms.

Solution :

(a) In mathematical term "Hypotenuse",

Number of consonants = 6, i.e. (h, y, p, t, n, s)

Number of vowels = 4, i.e. (o, e, u, e)

$$\text{Ratio of consonants to vowels} = \frac{\text{Number of consonants}}{\text{Number of vowels}} = \frac{6}{4} = \frac{3}{2}$$

Hence, ratio is 3 : 2.

In mathematical term "Congruence,"

Number of consonants = 6, i.e. (c, n, g, r, n, c)

Number of vowels = 4, i.e. (o, u, e, e)

$$\text{Ratio of consonants to vowels} = \frac{\text{Number of consonants}}{\text{Number of vowels}} = \frac{6}{4} = \frac{3}{2}$$

Hence, ratio is 3 : 2.

In mathematical term "Perpendicular",

Number of consonants = 8, i.e. (p, r, p, n, d, c, l, r)

Number of vowels = 5, i.e. (e, e, i, u, a)

$$\text{Ratio of consonants to vowels} = \frac{\text{Number of consonants}}{\text{Number of vowels}} = \frac{8}{5}$$

Hence ratio is 8 : 5.

In mathematical term "Transversal",

Number of consonants = 8, i.e. (t, r, n, s, v, r, s, l)

Number of vowels = 3, i.e. (a, e, a)

$$\text{Ratio of consonants to vowels} = \frac{\text{Number of consonants}}{\text{Number of vowels}} = \frac{8}{3}$$

Hence, ratio is 8 : 3.

In mathematical term "Correspondence",

Number of consonants = 9, i.e. (c, r, r, s, p, n, d, n, c)

Number of vowels = 5, i.e. (o, e, o, e, e)

$$\text{Ratio of consonants to vowels} = \frac{\text{Number of consonants}}{\text{Number of vowels}} = \frac{9}{5}$$

Hence, ratio is 9 : 5.

(b) In mathematical term "Hypotenuse",

Number of consonants = 6

Number of vowels = 4 (already calculated)

Total number of letters = Number of consonants + Number of vowels = 6 + 4 = 10

$$\text{Percentage of consonants} = \frac{\text{Number of consonants}}{\text{Total number of letters}} \times 100\% = \frac{6}{10} \times 100\,\% = 60\%$$

Hence, percentage of consonants is 60%.

In mathematical term "Congruence",

Number of consonants = 6

Number of vowels = 4 (already calculated)

Total number of letters = Number of consonants + Number of vowels = 6 + 4 = 10

$$\text{Percentage of consonants} = \frac{\text{Number of consonants}}{\text{Total number of letters}} \times 100\% = \frac{6}{10} \times 100\% = 60\%$$

Hence, percentage of consonants is 60%.

In mathematical term "Perpendicular",

Number of consonants = 8

Number of vowels = 5 (already calculated)

Total number of letters = Number of consonants + Number of vowels = 8 + 5 = 13

$$\text{Percentage of consonants} = \frac{\text{Number of consonants}}{\text{Total number of letters}} \times 100\,\% = \frac{8}{13} \times 100\,\% = 61.53\%$$

Hence, percentage of consonants is 61.53%.

In mathematical term "Transversal",

Number of consonants = 8

Number of vowels = 3 (already calculated)

Total number of letters = Number of consonants + Number of vowels = 8 + 3 = 11

$$\text{Percentage of consonants} = \frac{\text{Number of consonants}}{\text{Total number of letters}} \times 100\,\% = \frac{8}{11} \times 100\,\% = 72.72\%$$

Hence, percentage of consonants is 72.72%.

In mathematical term "Correspondence",

Number of consonants = 9

Number of vowels = 5 (already calculated)

Total number of letters = Number of consonants + Number of vowels = 9 + 5 = 14

$$\text{Percentage of consonants} = \frac{\text{Number of consonants}}{\text{Total number of letters}} \times 100\,\% = \frac{9}{14} \times 100\% = 64.28\%$$

Hence, percentage of consonants is 64.28%.

Question 119:

What's the Error? An analysis showed that 0.06% of the T-shirts made by one company were defective. A student says this is 6 out of every 100. What is the student's error?

Solution :

According to the analysis,

Defective T-shirts made by one company = 0.06%

$$= \frac{0.06}{100} = \frac{6}{10000}$$

But according to the student, defective T-shirts = 6 out of every 100 = $\frac{6}{100}$

Hence, student's error is that, the defective T-shirts are 6 out of every 10000 (not 100).

Question 120:

What's the Error? A student said that the ratios $\frac{3}{4}$ and $\frac{9}{16}$ were proportional. What error did the student make?

Solution :

Two ratios $a : b$ and $c : d$ are said to be proportional, if $\frac{a}{b} = \frac{c}{d}$ or $ad = bc$.

But in the given ratios $\frac{3}{4}$ and $\frac{9}{16}$, $3 \times 16 \neq 4 \times 9$.

Hence, the ratios are not proportional. To make a ratio proportional to another ratio, we just simply multiply both numerator and denominator by same number.

In our given case, student had multiply numerator by 3 and denominator by 4, which is incorrect.

Question 121:

What's the Error? A clothing store charges Rs 1024 for 4 T-shirts. A student says that the unit price is Rs 25.6 per T-shirt. What is the error? What is the correct unit price?

Solution :

By unitary method,

Cost of 4 T-shirts = ₹ 1024

Cost of 1 T-shirt = $\frac{1024}{4}$ = ₹ 256

Hence, the correct unit price is ₹ 256.

Question 122:

A tea merchant blends two varieties of tea in the ratio of 5:4. The cost of first variety is Rs 200 per kg and that of second variety is Rs 300 per kg. If he sells the blended tea at the rate of Rs 275 per kg, then find out the percentage of his profit or loss.

Solution :

Given, ratio of blended two varieties of tea (green tea : lemon tea) = 5:4

Cost of green tea = Rs 200 per kg

Cost of lemon tea = Rs 300 per kg

SP of blended tea = Rs 275 per kg

According to the ratio,

Let green tea be 5x kg and lemon tea be 4x kg.

Then, cost of green tea = 5x x 200 = Rs 1000x

Cost of lemon tea = 4x x 300 = Rs 1200x

Total CP = 1000x + 1200x = Rs 2200x

Total quantity = 4x + 5x = 9x kg So,

So, for $9x$ kg,

$\therefore$ SP of blended tea $= 275 \times 9x = ₹\, 2475x$

$\because$ CP < SP

So, there is profit on blended tea.

Profit = SP − CP

$= 2475x - 2200x = ₹\, 275x$

$$\text{Profit \%} = \frac{\text{Profit}}{\text{CP}} \times 100\,\% = \frac{275x}{2200x} \times 100\% = \frac{275}{22} = 12.5\%$$

Hence, there is 12.5% profit on blended tea (new variety).

Question 123:

A piece of cloth 5 m long shrinks 10% on washing. How long will the cloth be after washing?

Solution :

$$\text{Length of shrink cloth} = 10\% \text{ of } 5\text{ m} = \frac{10}{100} \times 5 = \frac{1}{2}\text{ m}$$

$$\therefore \text{Length of cloth after wash} = 5 - \frac{1}{2} = \frac{9}{2} = 4.5\text{ m}$$

Question 124:

Nancy obtained 426 marks out of 600 and the marks obtained by Rohit are 560 out of 800. Whose performance is better?

Solution :

Nancy got marks = 426 out of 600.

$$\text{Percentage marks} = \frac{426}{600} \times 100\,\% = 71\%$$

Rohit got marks = 560 out of 800.

$$\text{Percentage marks} = \frac{560}{800} \times 100\,\% = 70\%$$

Hence, Nancy's performance is better, since she got 1% more than Rohit.

Question 125:

A memorial trust donates Rs 500000 to a school, the interest on which is to be used for awarding 3 scholarships to students obtaining first three positions in the school examination every year. If the donation earns an interest of 12% per annum and the values of the second and third scholarships are Rs 20000 and Rs 15000 respectively, then find out the value of the first scholarship.

Solution :

Donation amount = ₹ 500000

Rate of interest for each year = 12% per annum

Time period = 1 yr

$$\text{Interest received after 1 yr} = \frac{500000 \times 12 \times 1}{100} = 5000 \times 12 = ₹\, 60000$$

Scholarship amount for second position = ₹ 20000

Scholarship amount for third position = ₹ 15000

$\therefore$ Remaining amount for first position student = 60000 − (20000 + 15000)

$= 60000 - 35000 = ₹\, 25000$

Question 126:

Ambika got 99% marks in Mathematics, 76% marks in Hindi, 61% in English, 84% in Science and 95% in Social Science. If each subject carries 100 marks, then find the percentage of marks obtained by Ambika in the aggregate of all the subjects.

Solution :

It is given that, each subject carries 100 marks.

∴ Ambika got marks in

Mathematics = 99

Hindi = 76

English = 61

Science = 84

Social Science = 95

Now, aggregate percentage of marks $= \frac{\text{Marks obtained by Ambika}}{\text{Total marks}} \times 100\%$

$= \frac{(99 + 76 + 61 + 84 + 95)}{500} \times 100\% = \frac{415}{5} = 83\%$

Question 127:

What sum of money lent out at 16% per annum simple interest, so that it would produce Rs 9600 as interest in 2 yr?

Solution :

Here, $I = ₹\ 9600$, $T = 2$ yr and $R = 16\%$

$\because \quad I = \frac{P \times R \times T}{100}$

$\therefore \quad P = \frac{I \times 100}{R \times T} = \frac{9600 \times 100}{16 \times 2}$

$\Rightarrow \quad P = ₹\ 30000$

Hence, the sum/principal is ₹ 30000.

Question 128:

Harish bought a gas-chullah for Rs 900 and later sold it to Archana at a profit of 5%. Archana used it for a period of two years and later sold it to Babita at a loss of 20%. For how much did Babita get it?

Solution :

It is given that, Harish bought the chullah for Rs 900 and sold it to Archana at a profit of 5%.

∴ Cost price of chullah for Archana = 900 + 5% of 900

$= 900 + \frac{5}{100} \times 900 = 900 + 45 = 945$

Now, Archana sold it to Babita at a loss of 20%.

∴ Cost price of chullah for Babita = 945 – 20% of ₹ 945

$= 945 - \frac{20}{100} \times 945 = 945 - 189 = ₹\ 756$

Hence, Babita got chullah at ₹ 756.

Question 129:

Match each of the entries in Column I with the appropriate entries in Column II

	Column I		Column II
(i)	3 : 5	A.	₹ 54
(ii)	2.5	B.	₹ 47
(iii)	100%	C.	₹ 53
(iv)	$\frac{2}{3}$	D.	₹ 160
(v)	$6\frac{1}{4}\%$	E.	60%
(vi)	12.5%	F.	25%
(vii)	SP when CP = ₹ 50 and loss = 6%	G.	$\frac{1}{16}$
(viii)	SP when CP = ₹ 50 and profit = ₹ 4	H.	250%
(ix)	Profit % when CP = ₹ 40 and SP = ₹ 50	I.	₹ 159
(x)	Profit % when CP = ₹ 50 and SP = ₹ 60	J.	$66\frac{2}{3}\%$
(xi)	Interest when principal = ₹ 800, rate of interest = 10% per annum and period = 2 yr	K.	20%
(xii)	Amount when principal = ₹ 150, Rate of interest = 6% per annum and period = 1yr	L.	0.125
		M.	3 : 2
		N.	₹ 164
		O.	3 : 3

Solution :

(i) → (E)

Given, ratio = 3 : 5

In percentage, $\frac{3}{5} \times 100\% = 60\%$

(ii) → (H)

We have, 2.5

In percentage, $2.5 \times 100\% = 250\%$

(iii) → (O)

We have, 100%

$$\text{Ratio} = 100\% : 1$$
$$= \frac{100}{100} : 1$$

$\therefore$ $\text{Ratio} = 1 : 1$

$= 1 \times 3 : 1 \times 3$ [multiplying by 3 on both sides]

$= 3 : 3$

(iv) → (J)

We have, $\frac{2}{3}$

In percentage, $\frac{2}{3} \times 100\% = 66\frac{2}{3}\%$

(v) → (G)

We have, $6\frac{1}{4}\% = \frac{25}{4}\%$

For fraction, $\frac{25}{4} \times \frac{1}{100} = \frac{1}{16}$

(vi) → (L)

We have, 12.5%

For fraction, $\frac{125}{10} \times \frac{1}{100} = \frac{125}{1000}$

For decimal, $\frac{125}{1000} = 0.125$

(vii) → (B)

Given, CP = ₹ 50, Loss% = 6%, SP = ?

We know that,

$$\text{Loss\%} = \frac{\text{Loss}}{\text{CP}} \times 100\,\%$$

$\Rightarrow$ $\text{Loss\%} = \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100\%$ [$\because$ Loss = CP – SP]

$\Rightarrow$ $6 = \frac{(50 - \text{SP}}{50} \times 100$

$\Rightarrow$ $\frac{6 \times 50}{100} = 50 - \text{SP}$

$\therefore$ SP = ₹ 47

(viii) → (A)

Given, CP = ₹ 50, Profit = ₹ 4, SP = ?

We know that, Profit = SP − CP

⇒ SP = Profit + CP

∴ SP = 4 + 50 = ₹ 54

(ix) → (F)

Given, CP = ₹ 40, SP = ₹ 50, Profit% = ?

We know that, Profit = SP − CP = 50 − 40 = ₹ 10

Now, $\text{Profit \%} = \frac{\text{Profit}}{\text{CP}} \times 100\% = \frac{10}{40} \times 100\%$

∴ Profit% = 25%

(x) → (K)

Given, CP = ₹ 50, SP = ₹ 60, Profit% = ?

We know that,

Profit = SP − CP

Profit = 60 − 50 = ₹ 10

Now, $\text{Profit \%} = \frac{\text{Profit}}{\text{CP}} \times 100\% = \frac{10}{50} \times 100\%$

∴ Profit% = 20%

(xi) → (D)

Given, P = ₹ 800, R = 10%, T = 2 yr, I = ?

∴ $I = \frac{P \times R \times T}{100} = \frac{800 \times 10 \times 2}{100} = 160$

= ₹ 160

(xii) → (I)

Given, P = ₹ 150, R = 6%, T = 1 yr, A = ?

∵ $I = \frac{P \times R \times T}{100}$

∴ $I = \frac{150 \times 6 \times 1}{100} = ₹ 9$

Now, $A = P + I$

= 150 + 9

= ₹ 159

Question 130:

In a debate competition, the judges decide that 20% of the total marks would be given for accent and presentation. 60% of the rest are reserved for the subject matter and the rest are for rebuttal. If this means 8 marks for rebuttal, then find the total marks.

Solution :

Let x be the total marks.

Marks given for accent and presentation = 20% of $x = \frac{20}{100} \times x = \frac{x}{5}$

Remaining marks $= x - \frac{x}{5} = \frac{4x}{5}$

Marks reserved for subject matter = 60% of rest marks $= \frac{60}{100} \times \frac{4x}{5} = \frac{12x}{25}$

Now, remaining marks $= \frac{4x}{5} - \frac{12x}{25} = \frac{20x - 12x}{25} = \frac{8x}{25}$

According to the question,

$\frac{8x}{25} = 8$

⇒ $x = \frac{8 \times 25}{8} = 25$

Hence, total marks are 25.

Question 131:

Divide Rs 10000 in two parts, so that the simple interest on the first part for 4 yr at 12% per annum may be equal to the simple interest on the second part for 4.5 yr at 16% per annum.

Solution :

Given, money= Rs 10000

Now, we have divide Rs 10000 in two parts such that SI on first part for 4 yr at 12%

per annum may be equal to the SI on second part for 4.5 yr at 16%.

Let first part = 7 x

Then, second part = Rs (10000 – x)

For first part, we have $P_1 = ₹\ x, T_1 = 4$ yr and $R_1 = 12\%$

$$\therefore \quad SI_1 = \frac{P_1 \times R_1 \times T_1}{100} = \frac{x \times 12 \times 4}{100}$$

For second part $(10000 - x)$, we have

$$P_2 = ₹\ (10000 - x), T_2 = 4.5 \text{ yr and } R_2 = 16\%$$

$$\therefore \quad SI_2 = \frac{P_2 \times R_2 \times T_2}{100} = \frac{(10000 - x) \times 16 \times 4.5}{100}$$

Since, SI_1 is equal to SI_2.

Then, according to the question,

$$\frac{x \times 12 \times 4}{100} = \frac{(10000 - x) \times 16 \times 4.5}{100}$$

$$\Rightarrow \quad 48x = (10000 - x) \times 16 \times 4.5$$

$$\Rightarrow \quad \frac{48x}{4.5 \times 16} = (10000 - x)$$

$$\Rightarrow \quad \frac{48x \times 10}{45 \times 16} = 10000 - x$$

$$\Rightarrow \quad \frac{2}{3}x = 10000 - x \Rightarrow \frac{2}{3}x + x = 10000$$

$$\Rightarrow \quad \frac{5x}{3} = 10000 \Rightarrow x = 10000 \times \frac{3}{5} = 6000$$

First part $= x = ₹\ 6000$

Second part $= 10000 - x = 10000 - 6000 = ₹\ 4000$

Hence, two parts of the sum are ₹ 6000 and ₹ 4000.

Question 132:

Rs 9000 becomes Rs 18000 at simple interest in 8 yr. Find the rate per cent per annum.

Solution :

Given, $P = ₹\ 9000$, $A = ₹\ 18000$ and $T = 8$ yr

As we know, $A = P + I$

$$\Rightarrow \quad I = A - P = 18000 - 9000$$

$$\Rightarrow \quad I = ₹\ 9000$$

Now, $$I = \frac{P \times R \times T}{100}$$

$$\Rightarrow \quad R = \frac{I \times 100}{P \times T} = \frac{9000 \times 100}{9000 \times 8}$$

$$\therefore \quad R = 12.5\%$$

Hence, the rate of interest per annum is 12.5%.

Question 133:

In how many years, will the simple interest on a certain sum be 4.05 times the principal at 13.5% per annum?

Solution :

Let principal $= P$

$R = 13.5\%$

$I = 4.05$ times principal $= 4.05 \times P$

$T = ?$

We know that, $I = \frac{P \times R \times T}{100} \Rightarrow 4.05 \times P = \frac{P \times 13.5 \times T}{100}$

$$\Rightarrow \quad T = \frac{405P}{P \times 13.5} \Rightarrow \frac{405 \times 10}{135} = 30 \text{ yr}$$

Question 134:

The simple interest on a certain sum for 8 yr at 12% per annum is Rs 3120 more than the simple interest on the same sum for 5 yr at 14% per annum. Find the sum.

Solution :

Given, $I_1 - I_2 = ₹\,3120$,

$T_1 = 8$ yr, $R_1 = 12\%$

$T_2 = 5$ yr, $R_2 = 14\%$

and $P_1 = P_2 = P$

According to the question,

$$I_1 - I_2 = 3120$$

$$\Rightarrow \frac{P_1 \times R_1 \times T_1}{100} - \frac{P_2 \times R_2 \times T_2}{100} = 3120$$

$$\Rightarrow \frac{P \times 12 \times 8}{100} - \frac{P \times 14 \times 5}{100} = 3120$$

$$\Rightarrow \frac{P}{100}[12 \times 8 - 14 \times 5] = 3120$$

$$\Rightarrow P[96 - 70] = 3120 \times 100$$

$$\Rightarrow 26P = 312000$$

$$\Rightarrow P = \frac{312000}{26}$$

$$\therefore P = ₹\,12000$$

Hence, the sum is ₹ 12000.

Question 135:

The simple interest on a certain sum for 2.5 yr at 12% per annum is Rs 300 less than the simple interest on the same sum for 4.5 yr at 8% per annum. Find the sum.

Solution :

Let the sum be x.

Given that, $P_1 = x, R_1 = 12\%$ and $T_1 = 2.5\,\text{yr} = \frac{5}{2}\,\text{yr}$

and $P_2 = x, R_2 = 8\%$ and $T_2 = 4.5\,\text{yr} = \frac{9}{2}\,\text{yr}$

According to the question,

$$I_2 - I_1 = 300$$

$$\Rightarrow \frac{P_2 \times R_2 \times T_2}{100} - \frac{P_1 \times R_1 \times T_1}{100} = 300$$

$$\Rightarrow \frac{x \times 8 \times 9}{2 \times 100} - \frac{x \times 12 \times 5}{2 \times 100} = 300$$

$$\Rightarrow 72x - 60x = 300 \times 200$$

$$\Rightarrow 12x = 60000$$

$$\therefore x = ₹\,5000$$

Hence, the sum/principal is ₹ 5000.

Question 136:

Designing a Healthy Diet

When you design your healthy diet, you want to make sure that you meet the dietary requirements to help you grow into a healthy adult. As you plan your menu, follow the following guidelines.

1. Calculate your ideal weight as per your height from the table given at the end of this question.
2. An active child should eat around 55.11 calories for each kilogram desired weight.
3. 55% of calories should come from carbohydrates. There are 4 calories in each gram of carbohydrates.
4. 15% of your calories should come from proteins. There are 4 calories in each gram of proteins.
5. 30% of your calories may come from fats. There are 9 calories in each gram of fats.

Following is an example to design your own healthy diet.

1. Ideal weight = 40 kg
2. The number of calories needed = $40 \times 55.11 = 2204.4$ calories
3. Calories that should come from carbohydrates = 2204.4×0.55
   $= 1212.42$ calories
   Therefore, required quantity of carbohydrates = $\frac{1212.42}{4}$
   $= 303.105\,g = 300\,g$ (approx.)
4. Calories that should come from proteins $= 2204.4 \times 0.15$
   $= 330.66$ calories
   Therefore, required quantity of proteins = $\frac{330.66}{4} = 82.66\,g$
5. Calories that may come from fats $= 2204.4 \times 0.3$
   $= 661.3$ calories
   Therefore, required quantity of fats = $\frac{661.3}{9} = 73.48\,g$

Answer the given questions.

(i) Your ideal desired weight is .....kg.
(ii) The quantity of calories you need to at is ..... .
(iii) The quantity of proteins needed is ..... g.
(iv) The quantity of fats required is ..... g.
(v) The quantity of carbohydrates required is ..... g.

Ideal Height and Weight Proportion

Men			Women		
Height		Weight	Height		Weight
Feet	Centimetres	Kilograms	Feet	Centimetres	Kilograms
5′	152	48	4′7″	140	34
5′1″	155	51	4′8″	142	36
5′2″	157	54	4′9″	145	39
5′3″	160	56	4′10″	147	41
5′4″	163	59	4′11″	150	43
5′5″	165	62	5′	152	45
5′6″	168	65	5′1″	155	48
5′7″	170	67	5′2″	157	50
5′8″	173	70	5′3″	160	52
5′9″	175	73	5′4″	163	55
5′10″	178	75	5′5″	165	57
5′11″	180	78	5′6″	168	59
6′	183	81	5′7″	170	61
6′1″	185	84	5′8″	173	64
6′2″	188	86	5′9″	175	66
6′3″	191	89	5′10″	178	68
6′4″	193	92	5′11″	180	70

Solution :

(i) Let my height be 5 ft.
Then, according to the table, my ideal weight = 48 kg
(ii) The quantity of calories needed = $48 \times 55.11 = 2645.28$ calories
(iii) Calorie that should come from proteins = $2645.28 \times 0.15 = 396.79$ calories
Therefore, required quantity of protein = $\frac{396.79}{4} = 99.19\,g$
(iv) Calories that may come from fats = $2645.28 \times 0.3 = 793.5$ calories
Therefore, required quantity of fats = $\frac{793.5}{9} = 88.17\,g$
(v) Calorie that should come from carbohydrates = $2645.28 \times 0.55 = 1454.90$ calories
Therefore, required quantity of carbohydrates = $\frac{1454.90}{4} = 363.72\,g = 360\,g$ (approx.)

Question 137:

150 students are studying English, Maths or both. 62% of students study English and 68% are studying Maths. How many students are studying both?

Solution :

Total students = 150

Students who study English = 62% of 150 = $\frac{62}{100} \times 150 = 93$

Students who study Maths = 68% of 150 = $\frac{68}{100} \times 150 = 102$

Total students studying English or Maths = 93 + 102 = 195

∴ Students who study English and Maths both = 195 – 150 = 45

Question 138:

Earth Science

The table lists the world's 10 largest deserts.

Largest Deserts in the World	
Desert	**Area (in km^2)**
Sahara (Africa)	8800000
Gobi (Asia)	1300000
Australian Desert (Australia)	1250000
Arabian Desert (Asia)	850000
Kalahari Desert (Africa)	580000
Chihuahuan Desert (North America)	370000
Takla Makan Desert (Asia)	320000
Kara Kum (Asia)	310000
Namib Desert (Africa)	310000
Thar Desert (Asia)	260000

(a) What are the mean, median and mode of the areas listed?

(b) How many times the size of the Gobi Desert is the Namib Desert?

(c) What percentage of the deserts listed are in Asia?

(d) What percentage of the total area of the deserts listed is in Asia?

Solution :

(a) $\text{Mean} = \frac{\text{Total area of all deserts}}{\text{Number of deserts}}$

$= \left[\frac{8800000 + 1300000 + 1250000 + 850000 + 580000 + 370000 + 320000 + 310000 + 310000 + 260000}{10}\right]$

$= \frac{14350000}{10} = 1435000 \text{ km}^2$

$\text{Median} = \frac{\left(\frac{N}{2}\right)\text{th term} + \left(\frac{N}{2}+1\right)\text{th term}}{2} = \frac{\frac{10}{2}\text{th term} + \left(\frac{10}{2}+1\right)\text{th term}}{2}$

$= \frac{5\text{th term} + 6\text{th term}}{2} = \frac{580000 + 370000}{2}$

$= \frac{950000}{2} = 475000 \text{ km}^2$ [here, $N = 10$]

Mode = Most frequent observation = 310000 km^2

(b) Let the size of Gobi desert is x times the Namib desert.

∴ Gobi desert = $x \times$ Namib desert

$\Rightarrow \quad 1300000 = x \times 310000$

$x = \frac{1300000}{310000} \Rightarrow x = 4.19$

Hence, the size of Gobi desert is 4.19 times of Namib desert.

(c) Total number of deserts = 10

Number of deserts in Asia (Gobi, Arabian, Takla Makan, Kara Kum, Thar) = 5

Hence, percentage of deserts in Asia = $\frac{5}{10} \times 100\% = 50\%$

(d) Total area of all deserts = 14350000 km^2 [as calculated in part (a)]

Total area of Asia's deserts = 1300000 + 850000 + 320000 + 310000 + 260000

= 3040000 km^2

Hence, percentage of the total area of the deserts listed in Asia

$= \frac{\text{Total area of Asia's deserts}}{\text{Total area of all deserts}}$

$= \frac{3040000}{14350000} \times 100\% = 21.1\%$

Question 139:

Geography Application

Earth's total land is about 148428950 km^2. The land area of Asia is about 30% of this total. What is the approximate land area of Asia to the nearest square kilometre?

Solution :

Total land area of Earth = 148428950 km^2

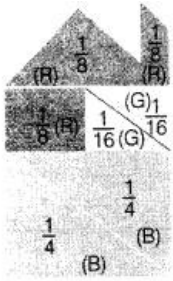
$\therefore$ Land area of Asia = 30% of land area of Earth [given]

$$= \frac{30}{100} \times 148428950 = 3 \times 14842895$$

$$= 44528685\ km^2$$

Question 140:

The pieces of Tangrams have been rearranged to make the given shape.



By observing the given shape, answer the following questions.

(a) What percentage of total has been coloured?

(i) Red (R) =_____

(ii) Blue (B) =_____

(iii) Green (G) =_____

(b) Check that the sum of all the percentages calculated above should be 100.

(c) If we rearrange the same pieces to form some other shape, will the percentage of colours change?

Solution :

(a) Total coloured shape $= \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{16} + \frac{1}{16} + \frac{1}{4} + \frac{1}{4} = 1$

(i) Red coloured shape $= \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$ [by observation]

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

Hence, percentage of red coloured $= \frac{\text{Red coloured shape}}{\text{Total coloured shape}} \times 100\%$

$$= \frac{3/8}{1} \times 100\,\% = \frac{3}{8} \times 100\,\% = 37.5\%$$

(ii) Blue coloured shape $= \frac{1}{4} + \frac{1}{4} = \frac{1+1}{4}$ [by observation]

$$= \frac{2}{4} = \frac{1}{2}$$

Hence, percentage of blue coloured shape $= \frac{\text{Blue coloured shape}}{\text{Total coloured shape}} \times 100\%$

$$= \frac{1/2}{1} \times 100\,\% = \frac{1}{2} \times 100\,\% = 50\%$$

(iii) Green coloured shape $= \frac{1}{16} + \frac{1}{16} = \frac{1+1}{16} = \frac{2}{16} = \frac{1}{8}$ [by observation]

Hence, percentage of green coloured shape $= \frac{\text{Green coloured shape}}{\text{Total coloured shape}} \times 100\%$

$$= \frac{1/8}{1} \times 100\% = \frac{1}{8} \times 100\,\% = 12.5\%$$

(b) Sum of all percentages calculated

= Percentage of red coloured + Percentage of blue coloured + Percentage of green coloured

$= 37.5 + 50 + 12.5$ [already calculated]

$= 100\%$

(c) If we rearrange the same pieces to form some other shape, the percentage of colours will not change, because we just rearrange the parts and not changing the percentage of colours.