

Percentage

IMPORTANT POINTS

1. **Percent:** Out of one hundred, is called percent and it is denoted as (%) e.g. 10%, 15%

- Percent can be expressed in fraction and decimal such as given below :

$$1\% = \frac{1}{100} \text{ or } .01$$

$$38\% = \frac{38}{100} \text{ or } 0.38$$

- A fraction or decimal can be expressed in percent.
 - We use percentage in profit and loss and also in finding interest etc.
2. **Percentage :** When a quantity is expressed in the percent form, it is called percentage.
 3. **To convert a given Fraction or Decimal into Percentage (Percent Form)**
: Multiply the given fraction or the given decimal by 100 and at the same time write the sign of percentage.
 4. **To convert a given Percentage into a Fraction or Decimal:** Remove the sign of percentage and at the same time divide by 100. Then reduce the fraction obtained to its lowest terms or decimal as required.
 5. **To Express one Quantity (number) as a percentage of the other :** Divide first quantity by the second and at the same time multiply the result by 100%.

Keep in Mind :

- Percent or percentage has no unit.
 - In order to express one quantity as a percentage of another quantity ; both the quantities must have same units.
6. **To find the Increase or Decrease Percent :**

$$\text{Increase \%} = \frac{\text{Increase in value}}{\text{Original value}} \times 100\%$$

$$\text{and Decrease \%} = \frac{\text{Decrease in value}}{\text{Original value}} \times 100\%$$

EXERCISE 16(A)

Question 1.

Express each of the following statements in the percentage form :

- (i) 13 out of 20
- (ii) 21 eggs out of 30 are good

Solution:

(i) 13 out of 20

$$\frac{13}{20} \times 100 = 13 \times 5 = 65\%$$

(ii) 21 eggs out of 30 are good

$$\frac{21}{30} \times 100 = 7 \times 10 = 70\%$$

$\therefore$ 70% are good

Question 2.

Express the following fractions as percent :

(i) $\frac{3}{200}$

(ii) $\frac{5}{6}$

(iii) $\frac{65}{80}$

(iv) $\frac{2}{3}$

Solution:

$$(i) \frac{3}{200} \times 100 = \frac{3}{2} = 1\frac{1}{2} = 1.5\%$$

$$(ii) \frac{5}{6} \times 100 = \frac{250}{3} = 83\frac{1}{3} \%$$

$$(iii) \frac{65}{80} \times 100 = \frac{65 \times 5}{4} = \frac{325}{4} \\ = 81\frac{1}{4} \% \text{ or } 81.25\%$$

$$(iv) \frac{2}{3} \times 100 = \frac{200}{3} = 66\frac{2}{3} \%$$

Question 3.

Express as percent:

(i) 0.10

(ii) 0.02

(iii) 0.7

(iv) 0.15

(v) 0.032

Solution:

$$(i) 0.10 = \frac{10}{100} \times 100 = 10\%$$

$$(ii) 0.02 = \frac{2}{100} \times 100 = 2\%$$

$$(iii) 0.7 = \frac{7}{10} \times 100 = 70\%$$

$$(iv) 0.15 = \frac{15}{100} \times 100 = 15\%$$

$$(v) 0.032 = \frac{32}{1000} \times 100 = 3.2\%$$

Question 4.

Convert into fractions in their lowest terms:

(i) 8%

(ii) 20%

(iii) 85%

(iv) 250%

(v) $12\frac{1}{2}\%$

Solution:

$$(i) 8\% = \frac{8}{100} = \frac{2}{25}$$

$$(ii) 20\% = \frac{20}{100} = \frac{1}{5}$$

$$(iii) 85\% = \frac{85}{100} = \frac{17}{20}$$

$$(iv) 250\% = \frac{250}{100} = \frac{10}{4} = \frac{5}{2} = 2\frac{1}{2}$$

$$(v) 12\frac{1}{2}\% = \frac{25}{2}\% = \frac{25}{2 \times 100} = \frac{1}{8}$$

Question 5.

Express as decimal fractions :

(i) 25%

(ii) 108%

(iii) 95%

(iv) 4.5%

(v) 29.2%

Solution:

$$(i) 25\% = \frac{25}{100} = \frac{1}{4} = 0.25$$

$$(ii) 108\% = \frac{108}{100} = \frac{54}{50} = 1.08$$

$$(iii) 95\% = \frac{95}{100} = 0.95$$

$$(iv) 4.5\% = \frac{45}{10 \times 100} = \frac{45}{1000} = 0.045$$

$$(v) 29.2\% = \frac{292}{10 \times 100} = \frac{292}{1000} = 0.292$$

Question 6.

Express each of the following natural numbers as percent :

(i) 7

(ii) 2

(iii) 19.5

(iv) 5.37

Solution:

$$(i) 7 \times 100 = 700\%$$

$$(ii) 2 \times 100 = 200\%$$

$$(iii) 19.5 = \frac{19.5}{10} \times 100\% = 1950\%$$

$$(iv) 5.37 = \frac{537}{100} \times 100\% = 537\%$$

EXERCISE 16(B)**Question 1.**

Express :

(i) Rs 5 as a percentage of Rs 25.

(ii) 80 paise as a percent of Rs 4.

(iii) 700 gm as a percentage of 2.8 kg.

(iv) 90 cm as a percent of 4.5 m.

Solution:

$$(i) \frac{5}{25} \times 100 = 20\%$$

(ii) 80 paise as a percent of 400 paise (as/rupee = 100 paise)

$$\frac{80}{400} \times 100 = \frac{100}{5} = 20\%$$

(iii) 700 gm as a percentage of 2800 gm

(2.8 × 1000 = 2800 gm, ∴ 1 kg = 1000 gm)

$$\frac{700}{2800} \times 100 = \frac{100}{4} = 25\%$$

(iv) 90 cm as a percent of 4.5 m

Or 90 cm as a percent of 450 cm

$$\frac{90}{450} \times 100 = 20\%$$

Question 2.

Express the first quantity as a percent of the second :

(i) 40 p, ₹ 2

(ii) 500 gm, 6 kg

(iii) 42 seconds, 6 minutes

Solution:

40 p, ₹ 2 = 40 p to 200 p

(1 Rupee = 100 paise)

$$= \frac{40}{200} \times 100 = 20\%$$

(ii) 500 gm, 6 kg = 500 gm 6,000 gm

(∴ 1 kg = 1,000 gm)

$$= \frac{500}{6,000} \times 100 = \frac{100}{12}$$

$$= 8\frac{4}{12} = 8\frac{1}{3}\%$$

$$= 8.33\%$$

(iii) 42 seconds, 6 minutes = 42 seconds,
360 seconds

(∴ 1 minutes = 60 seconds)

$$= \frac{42}{360} \times 100 = \frac{35}{3}$$

$$= 11\frac{2}{3}\% = 11.67\%$$

Question 3.

Find the value of each of the following:

(i) 20% of ₹ 150

(ii) 90% of 130

(iii) 15% of 2 minutes

(iv) 7.5 % of 500 kg.

Solution:

(i) 20% of ₹ 150

$$= \frac{20}{100} \times 150 = \text{₹ } 30$$

(ii) 90% of 130 = $\frac{90}{100} \times 130 = 119$

(iii) 15% of 2 minutes = $\frac{15}{100} \times 2$ minutes

$$= \frac{30}{100} \text{ minutes} = 0.3 \text{ minutes}$$

$$= 0.3 \times 60 = 18 \text{ seconds}$$

(iv) 7.5% of 500 gm = $\frac{7.5}{100} \times 500$

$$= 7.5 \times 5 = 37.5 \text{ gm}$$

Question 4.

If a man spends 70% of his income, what percent does he save?

Solution:

$$\text{Total Income} = \text{₹ } 100$$

$$70\% \text{ expenses} = 100 \times \frac{70}{100} = \text{₹ } 70$$

$$\text{His saving} = (100 - 70) = \text{₹ } 30$$

$$\therefore \text{Percentage of saving} = \frac{30}{100} \times 100 = 30\%$$

Question 5.

A girl gets 65 marks out of 80. What percent marks did she get?

Solution:

$$\text{Total marks} = 80$$

$$\text{Marks obtained} = 65$$

$$\text{Percentage} = \frac{65}{80} \times 100$$

$$= \frac{325}{4} = 81.25\% \text{ or } 81\frac{1}{4}$$

Question 6.

A class contains 25 children, of which 6 are girls. What percentage of the class are the boys.

Solution:

Total number of students = 25

Number of girls = 6

Number of boys = $(25 - 6) = 19$

$$\begin{aligned}\therefore \text{Percentage of boys} &= \frac{19}{25} \times 100 \\ &= 19 \times 4 = 76\%\end{aligned}$$

Question 7.

A tin contains 20 litres of petrol. Due to leakage, 3 litres of petrol is lost. What percent is still present in the tin ?

Solution:

Total petrol in tin = 20 litres

lost due to leakage = 3 litres

Balance petrol in tin = $(20 - 3) = 17$ litres

Percentage of petrol in tin = $\frac{17}{20} \times 100 = 85\%$

Question 8.

An alloy of copper and zinc contains 45% copper and the rest is zinc. Find the weight of zinc in 20 kg of the alloy.

Solution:

Total weight of alloy = 20 kg

Weight copper = $20 \times 45\% = 20 \times \frac{45}{100} = 9$ kg

Weight of zinc = (total weight of alloy – weight of copper) = $20 - 9 = 11$ kg

Question 9.

A boy got 60 out of 80 in Hindi, 75 out of 100 in English and 65 out of 70 in Arithmetic. In which subject his percentage of marks the best ? Also, find his overall percentage.

Solution:

A boy gets in Hindi = 60 out of 80

$$\therefore \text{Percent marks} = \frac{60}{80} \times 100 = 75\%$$

He gets in English 75 out of 100 = 75%

and he gets in Arithmetic, 65 out of 70

$$= \frac{65}{70} \times 100 = \frac{650}{7} \% = 92\frac{6}{7} \%$$

We see that he gets best marks in Arithmetic

Now total marks he gets = $60 + 75 + 65 = 200$

Total marks = $80 + 100 + 70 = 250$

Percent marks obtained = $\frac{200}{250} \times 100 = 80\%$

Question 10.

In a camp, there were 500 soldiers. 60 more soldiers joined them. What percent of the earlier (original) number have joined the camp.

Solution:

Number of soldiers = 500

More joined them = 60

Percentage to join the earlier = $\frac{60}{500} \times 100 = 12\%$

Question 11.

In a plot of ground of area 6000 sq. m, only 4500 sq. m is allowed for construction. What percent is to be left without construction ?

Solution:

Total ground area = 6000 sq. m.

Allowed for construction = 4500 sq.m.

Area left without construction = 6,000 sq. m – 4500 sq. m = 1500 sq. m

Percentage of construction left = $\frac{1500}{6000} \times 100 = 25\%$

Question 12.

Mr. Sharma has a monthly salary of ₹ 8,000. If he spends ₹ 6,400 every month; find :

(i) his monthly expenditure as percent.

(ii) his monthly savings as percent.

Solution:

Monthly salary of Mr. Sharma = ₹ 8000

He spends every month = ₹ 6400

His savings = ₹ 8000 – 6400 = ₹ 1600

(i) Percent expenditure = $\frac{6400}{8000} \times 100\% = 80\%$

(ii) Percent savings = $\frac{1600}{8000} \times 100\% = 20\%$

Question 13.

The monthly salary of Rohit is ₹ 24,000. If his salary increases by 12%, find his new monthly salary

Solution:

Salary = ₹ 24000

New salary = ₹ 24000 + 12% of 24000

= ₹ 24000 + $\frac{12}{100} \times 24000$

= ₹ 24000 + 2880 = ₹ 26880

New salary = ₹ 26880

Question 14.

In a sale, the price of an article is reduced by 30%. If the original price of the article is ₹ 1,800, find :

(i) the reduction in the price of the article

(ii) reduced price of the article.

Solution:

(i) Original price of article = ₹ 1800

Reduction = 30%

Reduction in price = 30% of 1800

$$= \frac{30}{100} \times 1800 = ₹ 540$$

(ii) Reduced price of the article = Original price – Reduction = ₹ 1800 – ₹ 540 = ₹ 1260

Question 15.

Evaluate :

(i) 30% of 200 + 20% of 450 – 25% of 600

(ii) 10% of ₹ 450 – 12% of ₹ 500 + 8% of ₹ 500.

Solution:

(i) 30% 200 + 20% of 450 – 25% of 600

$$\begin{aligned} &= \frac{30}{100} \times 200 + \frac{20}{100} \times 450 - \frac{25}{100} \times 600 \\ &= 30 \times 2 + 2 \times 45 - 25 \times 6 \\ &= 60 + 90 - 150 \\ &= 150 - 150 = 0 \end{aligned}$$

(ii) 10% of ₹ 450 – 12% of ₹ 500 + 8% of Rs. 500.

$$\begin{aligned} &= \frac{10}{100} \times ₹ 450 - \frac{12}{100} \times ₹ 500 + \frac{8}{100} \times 500 \\ &= 1 \times 45 - 12 \times 5 + 8 \times 5 \\ &= 45 - 60 + 40 = 45 + 40 - 60 \\ &= 85 - 60 \\ &= 25 \end{aligned}$$

EXERCISE 16(C)**Question 1.**

The price of rice rises from Rs. 30 per kg to Rs. 36 per kg. Find the percentage rise in the price of rice.

Solution:

First price of rice = Rs. 30 per kg

Rised price = Rs. 36 per kg

Rise per kg = 36 – 30 = Rs. 6

Percent rise = $\frac{6}{30} \times 100 = 20\%$

Question 2.

The population of a small locality was 4000 in 1979 and 4500 in 1981, By what percent

had the population increase ?

Solution:

Year 1979 population = 4,000

Year 1981 population = 4,500

Increase in population = $(4,500 - 4,000) = 500$

percentage of increase in population = $\frac{500}{4000} \times 100 = 12.5\%$

Question 3.

The price of a scooter was ₹ 8000 in 1975. It came down to ₹ 6000 in 1980. By what percent had the price of the scooter come down ?

Solution:

Original cost of scooter = ₹ 8,000

Reduced cost of scooter = ₹ 6000

Reduction in price of scooter = ₹ 8,000 – ₹ 6,000 = ₹ 2,000

Percentage of reduction = $\frac{2000}{8000} \times 100 = 25\%$

Question 4.

Find the resulting quantity when :

(i) ₹ 400 is decreased by 8%.

(ii) 25 km is increased by 5%.

(iii) a speed of 600 km/h is increased by $12\frac{1}{2}\%$

(iv) there is 2.5% increase in a salary of ₹ 62, 500.

Solution:

(i) 8 % decrease in ₹ 400

$$8 \% \text{ of ₹ } 400 = \frac{8}{100} \times 400 = ₹ 32$$

$$\begin{aligned} \text{Decreased quantity} &= ₹ 400 - ₹ 32 \\ &= ₹ 368 \end{aligned}$$

(ii) 5% increase in 25 km.

$$5\% \text{ of } 25 \text{ km} = \frac{5}{100} \times 25$$

$$= \frac{5}{4} = 1.25 \text{ km.}$$

$$\begin{aligned} \text{Increase quantity} &= 25 \text{ km} + 1.25 \text{ km} \\ &= 26.25 \text{ km.} \end{aligned}$$

(iii) $12\frac{1}{2}\%$ increase in a speed of 600 km/h

$$12\frac{1}{2}\% \text{ or } \frac{25}{2}\% \text{ of } 600 \text{ km/h}$$

$$= \frac{25}{200} \times 600 = 75 \text{ km/h}$$

$$\begin{aligned} \text{Increased speed} &= 600 \text{ km/h} + 75 \text{ km/h} \\ &= \mathbf{675 \text{ km/h}} \end{aligned}$$

(iv) Rise in salary = 2.5%

$$\text{Total salary} = ₹ 62500$$

$$\therefore \text{Total rise} = 2.5\% \text{ of } 62500$$

$$= 62500 \times \frac{25}{10 \times 100} = \frac{3125}{2}$$

$$= ₹ 1562.50$$

$$\text{Resulting quantity (salary)} = ₹ 62500 + ₹ 1562.50 = ₹ 64062.50$$

Question 5.

The population of a village decreased by 12%. If the original population was 25,000, find the population after decrease ?

Solution:

$$\text{Original population} = 25,000$$

$$\text{Decrease in population} = 12\% \text{ Population after decrease}$$

$$= 25,000 - 12\% \text{ of } 25,000$$

$$= 25,000 - \frac{12}{100} \times 25,000$$

$$= 25,000 - 3,000 = 22,000$$

Question 6.

Out of a salary of Rs. 13,500, I keep $\frac{1}{3}$ as savings. Of the remaining money, I spend 50% on food and 20% on house rent. How much do I spend on food and house rent ?

Solution:

Total salary = ₹ 13500

My savings = $\frac{1}{3}$ of ₹ 13500 = ₹ 4500

Remaining salary = ₹ 13500 – 4500
= ₹ 9000

Amount spent on food = 50% of ₹ 9000

= Rs. $\frac{50}{100} \times 9000 = ₹ 4500$

Amount spent on rent = 20% of ₹ 9000

= ₹ $\frac{20}{100} \times 9000 = ₹ 1800$

Total amount spent on food and rent
= ₹ 4500 + ₹ 1800 = ₹ 6300

Question 7.

A tank can hold 50 litres of water. At present, it is only 30% full. How many litres of water shall I put into the tank so that it becomes 50% full ?

Solution:

Capacity of tank = 50 litres

30% of capacity = 30% of 50 litres

$$= \frac{30}{100} \times 50 = 15 \text{ litres}$$

50% of capacity = 50% of 50 litres

$$= \frac{50}{100} \times 50 = 25 \text{ litres}$$

Water need to bring it to 50% capacity

$$= 25 - 15 = 10 \text{ litre}$$

Question 8.

In an election, there are a total of 80,000 voters and two candidates, A and B. 80% of the voters go to the polls out of which 60% vote for A. How many votes does B get.

Solution:

Member of voters = 80,000

Total vote polled = 80% of 80,000 = $\frac{80}{100} \times 80,000 = 64,000$

Vote polled to A = 60% of 64,000 = $\frac{60}{100} \times 64,000 = 38,400$

Vote polled to B = Total vote polled – vote polled to A = 64,000 – 38,400 = 25,600

Question 9.

70% of our body weight is made up of water. Find the weight of water in the body of a

person whose body weight is 56 kg.

Solution:

Water in human body = 70%

Weight of a man = 56 kg

Quantity of water in him = 70% of 56

$$= \frac{70}{100} \times 56 = 39.2 \text{ kg}$$

Question 10.

Only one-fifth of water is available in liquid form. This limited amount of water is replenished and used by man recurrently. Express this information as percent, showing :

(i) water available in liquid form.

(ii) water available in frozen form.

Solution:

Let total quantity of water = 1

$$\text{Water available in liquid form} = \frac{1}{5}$$

$\therefore$ Water available in frozen form

$$= 1 - \frac{1}{5} = \frac{5-1}{5} = \frac{4}{5}$$

$$\text{Water used by a man} = \frac{1}{5}$$

Percent of water available in liquid form

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

and percent of water available in frozen

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

Question 11.

By weight, 90% of tomato and 78% of potato is water. Find :

(i) the weight of water in 25 kg of tomato.

(ii) the total quantity, by weight, of water in 90 kg of potato and 30 kg of tomato

(iii) the weight of potato which contains 39 kg of water.

Solution:

Water in tomato = 90% and water in potato = 78%

(i) Weight of water in 25 kg of tomato

$$= 25 \times 90\% = \frac{25 \times 90}{100}$$

$$= \frac{90}{4} \text{ kg} = \frac{45}{2} \text{ kg} = 22.5 \text{ kg}$$

(ii) Total quantity of water in 90 kg of potato and 30 kg of tomato

$$= \left(90 \times \frac{78}{100} + 30 \times \frac{90}{100} \right) \text{ kg}$$

$$= \frac{7020}{100} \text{ kg} + 27 \text{ kg}$$

$$= 70.20 \text{ kg} + 27 \text{ kg} = 97.20 \text{ kg}$$

$$= 97.2 \text{ kg}$$

(iii) Weight of water in potato = 39 kg

$$\therefore \text{Weight of potato} = \frac{39 \times 100}{78} = 50 \text{ kg}$$

REVISION EXERCISE

Question 1.

Rohit's age is 12 years and Geeta's age is 15 years. Express :

(i) Rohit's age as a percent of Geeta's age.

(ii) Geeta's age as a percent of Rohit's age.

Solution:

$$(i) \frac{12}{15} \times 100 = \frac{4}{5} \times 100 = 80\%$$

$$(ii) \frac{15}{12} \times 100 = \frac{5}{4} \times 100 = 125\%$$

Question 2.

A class has 30 boys and 20 girls. Find:

(i) the percentage of girls in the class

(ii) the percentage of boys in the class

(iii) percentage of number of boys as compared with number of girls.

Solution:

Total students in class = Number of boys + Number of girls = 30 + 20 = 50

$$(i) \frac{20}{50} \times 100 = 40\%$$

$$(ii) \frac{30}{50} \times 100 = 60\%$$

$$(iii) \frac{30}{20} \times 100 = 150\%$$

Question 3.

Mrs. Sharma went to the market with ₹ 800 in her purse. When she returned to her home, ₹ 240 were still left in her purse. What percent of her money did she spend in the market ?

Solution:

Money in her purse = ₹ 800

Balance in her purse = ₹ 240

Money spent = ₹ 800 – ₹ 240 = ₹ 560

Percentage of money spent = $\frac{560}{800} \times 100 = 70\%$

Question 4.

In a mixture of two liquids A and B, 35% is liquid B. If the total quantity of the mixture is 20 kg, find the quantity of A, by weight.

Solution:

Total quantity of A and B = 20 kg

Quantity of B = 35% of 20 = $\frac{35}{100} \times 20 = 7\text{kg}$

Quantity of A = Total quantity – Quantity of B = 20 kg – 7 kg = 13 kg

Hence, quantity of A = 13 kg.

Question 5.

A girl got 375 marks out of 500 in the first term examination, 560 marks out of 800 in the second term examination and 840 marks out of 1200 in the third term examination.

Find:

- (i) her percentage score in the first term examination.
- (ii) her percentage score in the second term examination.
- (iii) her percentage score in the third term examination.
- (iv) the total marks secured in all the three examinations.
- (v) the total marks scored in all the three examinations.
- (vi) her percentage score on the whole in all the three examinations.

Solution:

$$(i) \frac{375}{500} \times 100 = 75\%$$

$$(ii) \frac{560}{800} \times 100 = 70\%$$

$$(iii) \frac{840}{1200} \times 100 = 70\%$$

$$(iv) \text{ Total of maximum marks} \\ = 500 + 800 + 1200 = 2500$$

$$(v) \text{ Total marks obtained in all the three term} \\ 375 + 560 + 840 = 1775$$

$$(vi) \frac{1775}{2500} \times 100 = 71\%$$

Question 6.

Out of his monthly income of ₹ 2,500; a man spends ₹ 1,750. What percent of his income does he save every month?

Solution:

Monthly income = ₹ 2,500

Spending = ₹ 1,750

Saving = monthly income – spending = 2,500 – 1,750 = ₹ 750

Percentage of income he saves = $\frac{750}{2500} \times 100 = 30\%$

Question 7.

Mr. Singh's monthly salary is ₹ 15,000. This month he was promoted with an increment of ₹ 3,000 in his salary. Express his increment as a percent of his original salary.

Solution:

Monthly salary = ₹ 15,000

Increment on promotion = ₹ 3,000

Percentage of increment to monthly salary = $\frac{3000}{15000} \times 100 = 20\%$

Question 8.

(i) The price of an article increased from ₹ 16 to ₹ 20; find the percentage increase.

(ii) The price of an article decreased from Rs 20 to Rs 16; find the percentage decrease.

Solution:

(i) Original price = ₹ 16

Increased price = ₹ 20

Amount of increase = 20 – 16 = ₹ 4

Percentage of increase = $\frac{4}{16} \times 100 = 25\%$

(ii) Original price = ₹ 20

Decrease price = ₹ 16

Amount of decrease = $20 - 16 = ₹ 4$

Percentage of decrease = $\frac{4}{20} \times 100 = 20\%$

Question 9.

(i) The salary of a man is ₹ 7,200 per month, which is now increased by 8%. Find his new salary per month.

(ii) The salary of Mr. Sahni is ₹ 8,400 per month, which is now decreased by 8%. Find his new salary per month.

Solution:

Monthly salary = ₹ 7,200

Increased by 8% = $7,200 \times \frac{8}{100} = ₹ 576$

New salary = monthly salary + increase
= ₹ 7,200 + ₹ 576 = ₹ 7,776

(ii) Monthly salary = ₹ 8,400

Decrease by 5% = $8,400 \times \frac{5}{100} = ₹ 420$

New salary = monthly salary – decrease
= $8,400 - 420 = ₹ 7,980$

Question 10.

Find the percentage change from the first quantity to the second :

(i) ₹ 80, ₹ 120

(ii) 75 kg, 60 kg

(iii) 50 cm, 45 cm

Solution:

(i) ₹ 80, ₹ 120

Increase = ₹ 120 – ₹ 80 = ₹ 40

Percentage of increase = $\frac{40}{80} \times 100 = 50\%$

Hence, increase = **50%**

(ii) 75 kg, 60 kg

Decrease = $75 - 60 = 15$ kg

Percentage decrease = $\frac{15}{75} \times 100 = 20\%$

Hence, decrease = **20%**

(iii) 50 cm, 45 cm

Decrease = $50 \text{ cm} - 45 \text{ cm} = 5 \text{ cm}$

Percentage decrease = $\frac{5}{50} \times 100 = 10\%$

Hence, decrease = **10%**

Question 11.

The original price of an article is ₹ 640. Find its new price when its price is :

- (i) increased by 30%
- (ii) decreased by 20%

Solution:

Original price of an article = ₹ 640

- (i) Increase in price = 30%

By increasing 30%, the new price will be = ₹ 640 $\times \frac{(100 + 30)}{100}$

$$= ₹ 640 \times \frac{130}{100} = ₹ 832$$

- (ii) Decrease in price = 20%

∴ Decreasing 20%, the new price will be

$$= ₹ 640 \times \frac{(100 - 20)}{100}$$

$$= ₹ 640 \times \frac{80}{100} = ₹ 512$$

Question 12.

Find the number that is :

- (i) 50% more than 48
- (ii) 30% less than 70

Solution:

- (i) Increase = 50%

$$\therefore \text{Increased number} = \frac{48 \times (100 + 50)}{100}$$

$$= 48 \times \frac{150}{100} = \frac{48 \times 3}{2} = 72$$

- (ii) Decrease = 30%

$$\text{Decreased number} = 70 \times \frac{100 - 30}{100} = \frac{70 \times 70}{100} = 49$$

Question 13.

Evaluate :

- (i) 8% of 900 – 12% of 750 + 20% of 165.
- (ii) 70% of 70 + 90% of 90 – 120% of 120.

Solution:

(i) 8% of 900 – 12% of 750 + 20% of 165

$$= \frac{8 \times 900}{100} - \frac{12 \times 750}{100} + \frac{20 \times 165}{100}$$

$$= 72 - 90 + 33 = 72 + 33 - 90$$

$$= 105 - 90 = 15$$

(ii) 70% of 70 + 90% of 90 – 120% of 120

$$= \frac{70 \times 70}{100} + \frac{90 \times 90}{100} - \frac{120 \times 120}{100}$$

$$= 49 + 81 - 144 = 130 - 144 = -14$$

Question 14.

Approximately 97.3% water on the earth is not fit for drinking. Find :

(i) the percentage of water on the earth that is fit for drinking.

(ii) The total volume of water available in certain part of the earth where there is 21,600 m³ of drinking water.

Solution:

Approximately water on earth which is not fit for drinking = 97.3%

(i) Water fit for drinking = 100 – 97.3 = 2.7%

(ii) At a certain place, the water which is fit for drinking = 21600 m³

Volume of total water on that place

$$= 21600 \times \frac{100}{2.7} \text{ m}^3 = \frac{21600 \times 100 \times 10}{27}$$

$$= 800 \times 1000 = 8,00,000 \text{ m}^3$$

Question 15.

Air is an important inexhaustible natural resource. It is essential for the survival of human beings, microbes, plants and animals. The following table shows the percentage of various gases in air.

Contents of air	Percentage (by volume)
Nitrogen	78
Oxygen	21
Other (carbon dioxide, inert gases, water vapours, etc.)	1

(i) In 800 m³ of air, calculate the approximate quantities of nitrogen, oxygen and other gases.

(ii) If a certain quantity (by volume) of air contains 4,200 litres of oxygen, find the total quantity of air taken and the amount of nitrogen in it.

Solution:

Nitrogen in air = 78%, Oxygen = 21%, Others = 1%

(i) Quantity of air = 800 m^3

$$\therefore \text{Quantity of nitrogen in it} = 800 \text{ of } 78\% = 800 \times \frac{78}{100} \text{ m}^3 = 624 \text{ m}^3$$

$$\text{Quantity of oxygen} = 800 \text{ of } 21\% = 800 \times \frac{21}{100} \text{ m}^3 = 168 \text{ m}^3$$

(ii) If the air contains 4200 litres of oxygen, then total quantity of air = $\frac{4200 \times 100}{21}$ litres

$$= 200 \times 100 \text{ litres} = 20000 \text{ litres}$$

and amount of nitrogen in it = 20000 of 78%

$$= 20000 \times \frac{78}{100} = 15600 \text{ litres}$$