Percent and Percentage

POINTS TO REMEMBER

1. The cent means hundred. Therefore percent means after hundred and notation % is used for it.
2. **To express an ordinary given statement as percent.**
   (i) Express the given statement as a fraction.
   (ii) Convert this fraction into an equivalent fraction with denominator 100.
   Therefore to express a fraction or a decimal as percent, multiply it by 100.
3. **To Express-One quantity as a percent of the other.**
   (i) If necessary, convert with the quantitities into the same units.
   (ii) From the fraction with the number to be compared as numerator and the number with which it is to be compared as denominator.
   (iii) Multiply the fraction obtained by 100 and at the same time write the percent sign (%).

EXERCISE 8 (A)

Question 1.
Express each of the following as percent :

$(i)\ \frac{3}{4}$ $(ii)\ \frac{2}{3}$

$(iii)\ 0{\cdot}025$ $(iv)\ 0{\cdot}125$

$(v)\ \frac{3}{8}$ $(vi)\ 0{\cdot}25$

Solution :

$(i)\ \frac{3}{4} = \frac{3}{4} \times 100 = 75\%$

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

$(iii)\ 0{\cdot}025 = \frac{25}{1000} \times 100 = \frac{25}{10}\% = 2{\cdot}5\%$

$(iv)\ 0{\cdot}125 = \frac{125}{1000} \times 100 = \frac{125}{10} = 12{\cdot}5\%$

$(v)\ \frac{3}{8} = \frac{3}{8} \times 100 = \frac{75}{2} = 37\frac{1}{2}\%$

$(vi)\ 0{\cdot}25 = \frac{25}{100} \times 100 = 25\%$

Question 2.

Express the following percentages as fractions and as decimal numbers :

$(i)\ 7\frac{1}{2}\%$ $(ii)\ 2{\cdot}50\%$ $(iii)\ 0{\cdot}02\%$

$(iv)\ 175\%$ $(v)\ 5\%$

$(vi)\ 25\%$

Solution :

$$(i)\ 7\frac{1}{2}\% = \frac{15}{2\times 100} = \frac{3}{40}$$

$$= \frac{15}{200} = 0{\cdot}075$$

$$\begin{array}{r} 0{\cdot}075 \\ 200\overline{)\ 15{\cdot}000} \\ -1400 \\ \hline 1000 \\ -1000 \\ \hline \times \end{array}$$

$$(ii)\ 2{\cdot}50\% = \frac{250}{100\times 100} = \frac{1}{40}$$

$$= \frac{250}{10000} = 0{\cdot}0250$$

$$= 0{\cdot}025$$

$$(iii)\ 0{\cdot}02\% = \frac{0{\cdot}02}{100}$$

$$= \frac{2}{100\times 100} = \frac{2}{10000} = \frac{1}{5000}$$

$$= \frac{2}{10000} = 0{\cdot}0002$$

$$(iv)\ 175\% = \frac{175}{100} = \frac{7}{4} = 1{\cdot}75$$

$$(v)\ 5\% = \frac{5}{100} = \frac{1}{20} \text{ and } \frac{5}{100} = 0{\cdot}05$$

$$(vi) 25\% = \frac{25}{100} = \frac{1}{4} = 0{\cdot}25$$

Question 3.

What percent is :

(i) 16 hours of 2 days ?

(ii) 40 paisa of Rs. 2 ?

(iii) 25 cm of 4 metres

(iv) 600 gm of 5 kg ?

Solution :

Sol. (*i*) 16 hours of 2 days

$$= \frac{16}{2 \times 24} = \frac{16}{48} \times 100\%$$

$$= \frac{100}{3}\% = 33\frac{1}{3}\%$$

(*ii*) 40 paise of Rs. 2

$$= \frac{40}{2 \times 100} = \frac{40}{200} \times 100\%$$

$= 20\%$ **Ans.**

(*iii*) 25 cm of 4 metres

$$= \frac{25}{4 \times 100} = \frac{1}{16} \times 100\%$$

$$= \frac{25}{4}\% = 6\frac{1}{4}\%$$

(*iv*) 600 gm of 5 kg $= \frac{600}{5 \times 1000} \times 100\%$

$= 12\%$

Question 4.

Find the value of:

(*i*) 5% of Rs. 350 (*ii*) 10% of Rs. 400·40

(*iii*) 1% of Rs. 500 (*iv*) $12\frac{1}{2}\%$ of 80 kg

(*v*) $\frac{5}{8}\%$ of Rs. 600 (*vi*) $33\frac{1}{3}\%$ of 27 m

Solution :

(*i*) 5% of Rs. 350

$= \text{Rs. } 350 \times \frac{5}{100} = \text{Rs.} \frac{35}{2}$

$= \text{Rs. } 17{\cdot}50$

(*ii*) 10% of Rs. 400·40 $= \text{Rs. } 400{\cdot}40 \times \frac{10}{100}$

$= \text{Rs. } 40{\cdot}04$

(*iii*) 1% of Rs. 500 $= \text{Rs. } 500 \times \frac{1}{100}$

$= \text{Rs. } 5$

(*iv*) $12\frac{1}{2}\%$ of 80 kg $= 80 \text{ kg} \times \frac{25}{2 \times 100}$

$= 10 \text{ kg}$

(*v*) $\frac{5}{8}\%$ of Rs. 600 $= \text{Rs. } 600 \times \frac{5}{8 \times 100}$

$= \text{Rs.} \frac{15}{4} = \text{Rs. } 3{\cdot}75$

(*vi*) $33\frac{1}{3}\%$ of 27 m

$= 27 \text{ m} \times \frac{100}{3 \times 100}$

$= 9 \text{ m}$

Question 5.

In a class of 60 children, 30% are girls. How many boys are there ?

Solution :

Total children = 60,
Girls = 30%

∴Total girls = 30% of 60 = 60 x $\frac{30}{100}$= 18
∴ No. of boys = 60 – 18 = 42

Question 6.

In an election, two candidates A and B contested. A got 60% of the votes. The total votes polled were 8000. How many votes did each get ?

Solution :

Total number of votes polled = 8000
A got 60% of the votes

A got total votes = 60% of 8000 = 8000 x $\frac{60}{100}$ = 4800
∴ B got total votes = 8000 – 4800 = 3200

Question 7.

A person saves 12% of his salary every month. If his salary is ₹2,500, find his expenditure.

Solution :

Total salary = ₹2500
Saving = 12% of the salary
∴ Total savings = 12% of ₹2500
= ₹2500 x$\frac{12}{100}$ = ₹300
∴Total expenditure = ₹2500 – ₹300 = ₹2200

Question 8.

Seeta got 75% marks out of a total of 800. How many marks did she lose ?

Solution :

Total marks = 800
Marks Seeta got = 75% of total marks
∴ Total marks Seeta got = 75% of 800
= 800 x $\frac{75}{100}$ = 600
∴ Marks Seeta lose = 800 – 600 = 200

Question 9.

A shop worth ₹25,000 was insured for 95% of its value. How much would the owner get in case of any mishappening ?

Solution :

Value of shop =₹25,000

Insured amount = 95% of total value

=95% of ₹25,000

= ₹25,000 x $\frac{95}{100}$

= ₹ 23,750

Question 10.

A class has 30 boys and 25 girls. What is the percentage of boys in the class ?

Solution :

No. of boys = 30

No. of girls = 25

Total number of children = 30 + 25 = 55

∴Percentage of boys in the class

= $\frac{30}{55}$ x 100

= $\frac{600}{11}$=54$\frac{6}{11}$ %

Question 11.

Express :

(i) $3\frac{2}{5}$ as a percent

(ii) 0.0075 as percent

(iii) 3 : 20 as percent

(iv) 60 cm as percent of 1 m 25 cm

(v) 9 hours as a percent of 4 days.

Solution :

(*i*) $3\frac{2}{5}$ as a percent

$3\frac{2}{5} = \frac{3\times5+2}{5} = \frac{17}{5}$

Now, convert $\frac{17}{5}$ as a percent

$= \frac{17}{5} \times 100 = 340\%$

(*ii*) 0.0075 as percent

$.0075 \times 100 = 0.75\%$

or $\frac{0.0075}{10000} \times 100 = 0.75\%$

(*iii*) 3 : 20 as percent

$$= \frac{3}{20} \times 100 = 15\%$$

(*iv*) 60 cm as percent of 1 m 25 cm

60 cm as percent of $(1 \times 100 + 25)$ cm

$\because$ 1 metre = 100 cm

$$= \frac{60}{125} \times 100 = 12 \times 4 = 48\%$$

(*v*) 9 hours as a percent of 4 days

= 1 days = 24 hours

$\therefore$ 4 days = $4 \times 24 = 96$ hours

$$= \frac{9}{96} \times 100 = \frac{75}{8}\%$$

$$\text{or } 9\frac{3}{8}\%$$

Question 12.

(i) Find 2% of 2 hours 30 min.

(ii) What percent of 12 kg is 725 gm?

Solution :

(*i*) 2% of 2 hours 30 min

$\because$ 1 hour = 60 minutes

$\therefore$ 2 hours 30 min. = 2 × 60 min. + 30 min.

= 120 + 30 = 150 min

$$= 150 \times \frac{2}{100} = \frac{30}{10}$$

= 3 minutes

(*ii*) 12 kg is 725 gm

1 kg = 1000 gm

$\therefore$ 12 kg = 12 × 1000 = 12000 gm

$$\frac{725}{12000} \times 100 = \frac{725}{120}$$

$$= \frac{145}{24}\% \text{ or } 6\frac{10}{24}\%$$

EXERCISE 8 (B)

Question 1.

Deepak bought a basket of mangoes containing 250 mangoes 12% of these were found to be rotten. Of the remaining, 10% got crushed. How many mangoes were in good condition ?

Solution :

Total mangoes = 250

Rotten mangoes = 12% of 250

$$= 250 \times \frac{12}{100} = 30$$

Remaining mangoes = 250 – 30 = 220

Mangoes which were crushed = 10% of 220

$$= 220 \times \frac{10}{100} = 22$$

$\therefore$ Balance = 220 – 22 = 198

Hence 198 mangoes were in good condition.

Question 2.

In a Maths Quiz of 60 questions, Chandra got 90% correct answers and Ram got 80% correct answers. How many correct answers did each give ?
What percent is Ram's correct answers to Chandra's correct answers ?

Solution :

No. of total questions = 60

Chandra got correct answers of the questions

= 90% of 60

$$= \frac{60 \times 90}{100} = 54$$

Ram got correct answers of the questions

= 80% of 60

$$= 60 \times \frac{80}{100} = 48$$

$\therefore$ Percentage of Ram's correct answer of

that of Chandra's $= \frac{48}{54} \times 100 = \frac{800}{9}\%$

$= 88\frac{8}{9}\%$

Question 3.

In an examination, the maximum marks are 900. A student gets 33% of the maximum marks and fails by 45 marks. What is the passing mark ? Also, find the pass percentage.

Solution :

Maximum marks = 900

A student got 33% of 900 marks

$= 900 \times \frac{33}{100} = 297$

No. of marks by which he failed = 45

$\therefore$ Pass marks = 297 + 45 = 342

Percentage of pass marks $= \frac{342 \times 100}{900}$

$= 38\%$

Question 4.

In a train, 15% people travel in first class, 35% travel in second class. The balance travel in the A.C. class ? Calculate the percentage of A.C. class travellers ?

Solution :

Let no. of people = 100

No. of people in first class = 15

and no. of people travel in second class

$= 35$

$\therefore$ Balance $= 100 - (15 + 35) = 100 - 50 = 50$

$\therefore$ Percent of people travel in AC class

$= 50\%$

Question 5.

A boy eats 25% of the cake and gives away 35% of it to his friends. What percent of the cake is still left with him ?

Solution :

Let total cake = 100

Cake which was eaten by the boy = 25

Cake which was given to his friends = 35

$\therefore$ Balance cake = 100 – (25 + 35)

= 100 – 60 = 40

Hence he has 40% of the cake with him.

Question 6.

What is the percentage of vowels in the English alphabet ?

Solution :

There are 5 vowels in 26 English alphabets

$$\therefore \text{Percentage of vowels} = \frac{5 \times 100}{26}$$

$$= \frac{250}{13} = 19\frac{3}{13}\%$$

Question 7.

(*i*) $6\frac{1}{4}\%$ of what number is 375 ?

(*ii*) 0·2% of a number is 5. Find the number.

(*iii*) 30 is $16\frac{2}{3}\%$ of a number. Find the number.

Solution :

(*i*) Let number be x.

Then $6\frac{1}{4}\%$ of $x = 375$

$\Rightarrow \quad \frac{25}{4 \times 100}$ of $x = 375$

$\Rightarrow \quad \frac{1}{16}x = 375$

$\therefore \; x = \frac{375 \times 16}{1} = 6000$

Hence number = 6000

(*ii*) Let number = x

then $0{\cdot}2\%$ of $x = 5$

$\Rightarrow \frac{2}{10 \times 100}$ of $x = 5 \quad \Rightarrow \frac{1}{500}$ of $x = 5$

$\Rightarrow \quad x = \frac{5 \times 500}{1}$

$\Rightarrow \quad x = 2500$

$\therefore$ Number = 2500

(*iii*) Let the number = x

then $16\frac{2}{3}\%$ of $x = 30$

$\Rightarrow \frac{50}{3 \times 100}$ of $x = 30 \quad \Rightarrow \frac{1}{6}$ of $x = 30$

$\Rightarrow x = 30 \times 6 = 180$

Hence number = 180

Question 8.

The money spent on the repairs of a house was 1% of its value. If the repair, costs Rs. 5,000, find the cost of the house.

Solution :

Let cost of house $= x$

Then cost of repairs $= 1\%$ of x

$\therefore\ 1\%$ of $x = 5000$

$$\Rightarrow \frac{1}{100} \times x = 5000 \Rightarrow x = 5{,}000 \times \frac{100}{1}$$

$$x = 5{,}00{,}000$$

Hence cost of house = Rs. 5,00,000

Question 9.

In a school out of300 students, 70% are girls and 30% are boys. If 30 girls leave and no new boy is admitted, what is the new percentage of girls in the school ?

Solution :

Total number of children in a school = 300

No. of boys = 30% of 300

$$= \frac{30}{100} \times 300 = 90$$

and no. of girls = 70% of 300

$$= \frac{70}{100} \times 300 = 210$$

Now no. of girls left = 30

$\therefore$ No. of girls after leaving 30 girls

$$= 210 - 30 = 180$$

and No. of children in the school

$$= 180 + 90 = 270$$

$$\therefore\ \%\text{ of girls now} = \frac{180}{270} \times 100 = \frac{200}{3}\%$$

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

Question 10.

Kumar bought a transistor for Rs. 960. He paid $12\frac{1}{2}$ % cash money. The rest he agreed to pay in 12 equal monthly instalments. How much will he pay each month ?

Solution :

Price of transistor = Rs. 960

Amount paid in cash = $12\frac{1}{2}\%$ of Rs. 960

$$= \frac{25}{2 \times 100} \times 960 = \text{Rs. } 120$$

Balance amount = Rs. 960 – Rs. 120

= Rs. 840

No. of instalments = 12

$\therefore$ Amount of each instalment

= Rs. 840 ÷ 12 = Rs. 70

Question 11.

An ore contains 20% zinc. How many kg of ore will be required to get 45 kg of zinc ?

Solution :

In an ore, zinc = 20%

Let quantity of ore = x

$\therefore$ 20% of x = 45 kg

$$\Rightarrow \frac{20}{100} \times x = 45 \quad \Rightarrow \frac{x}{5} = 45$$

$$\Rightarrow x = 45 \times 5 = 225$$

$\therefore$ quantity of ore = 225 kg

EXERCISE 8 (C)

Question 1.

The salary of a man is increased from Rs. 600 per month to Rs. 850 per month. Express the increase in salary as percent.

Solution :

Original salary of a man = Rs. 600

Increased salary = Rs. 850

$\therefore$ Amount of increase = Rs. 850 – 600

= Rs. 250

$$\text{Percentage increase} = \frac{250 \times 100}{600} = \frac{125}{3}$$

$$= 41\frac{2}{3}\%$$

Question 2.

Increase :

(i) 60 by 5%

(ii) 20 by 15%

(iii) 48 by 121 %

(iv) 80 by 140%

(v) 1000 by 3.5%

Solution :

(*i*) Rate of increase = 5%

$$\therefore \text{Total increase} = 5\% \text{ of } 60 = \frac{5}{100} \times 60$$

$$= 3$$

$\therefore$ Increased number = 60 + 3 = 63

(*ii*) Increase on 20 at the rate of 15%

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

$\therefore$ Increased number $= 20 + 3 = 23$

(*iii*) Increase on 48 by $12\frac{1}{2}\% = 48 \times \frac{25}{2}\%$

$$= 48 \times \frac{25}{2 \times 100} = 48 \times \frac{1}{8} = 6$$

$\therefore$ Increased number $= 48 + 6 = 54$

(*iv*) Increase on 80 by $140\% = 80 \times \frac{140}{100}$

$$= 112$$

$\therefore$ Increased number $= 80 + 112 = 192$

(*v*) Increase on 1000 by $3{\cdot}5\% = 1000 \times \frac{3{\cdot}5}{100}$

$$= 1000 \times \frac{35}{10 \times 100} = 35$$

$\therefore$ Increased number $= 1000 + 35$

$= 1035$

Question 3.

Decrease :

(i)80 by 20%

(ii) 300 by 10%

(iii) 50 by 12.5%

Solution :

(*i*) Decrease on 80 by $20\% = 80 \times \frac{20}{100} = 16$

$\therefore$ Decreased number $= 80 - 16 = 64$

(*ii*) Decrease on 300 by $10\% = 300 \times \frac{10}{100} = 30$

$\therefore$ Decreased number $= 300 - 30 = 270$

(*iii*) Decrease on 50 by $12{\cdot}5\% = 50 \times \frac{12{\cdot}5}{100}$

$$= \frac{50 \times 125}{10 \times 100} = \frac{25}{4} = 6{\cdot}25\%$$

$\therefore$ Decrease number $= 50 - 6{\cdot}25$

$= 43{\cdot}75$

Question 4.

What number :

(i) When increased by 10% becomes 88 ?

(ii) When increased by 15% becomes 230 ?

(iii) When decreased by 15% becomes 170 ?

(iv) When decreased by 40% becomes 480 ?

(v) When increased by 100% becomes 100 ?

(vi) When decreased by 50% becomes 50 ?

Solution :

(*i*) Let the number be = 100

Increase = 10% = 10

$\therefore$ Increased number = 100 + 10

= 110

If increased number is 110, then original number = 100

and if increased number is 88, then original

number $= \frac{100}{110} \times 88 = 80$

(*ii*) Let the number be = 100

Increase = 15% = 15

$\therefore$ Increased number = 100 + 15 = 115

If increased number is 115, then original number = 100

and if increased number is 230, then original

number $= \frac{100 \times 230}{115} = 200$

(*iii*) Let the number be = 100

Decrease = 15% = 15

$\therefore$ Decreased number = 100 – 15 = 85

If decreased number is 85, then original number = 100

and if decreased number is 170, then original

number $= \frac{100}{85} \times 170 = 200$

(*iv*) Let the number be = 100

Decrease = 40% = 40

∴ Decreased number = 100 – 40 = 60

If decreased number is 60, then original number = 100

and if decreased number is 480, then original

$$\text{number} = \frac{100 \times 480}{60} = 800$$

(*v*) Let the number be = 100

Increase = 100% = 100

∴ Increased number = 100 + 100 = 200

If increased number is 200, then original number = 100

and if increased number is 100, then original

$$\text{number} = \frac{100 \times 100}{200} = 50$$

(*vi*) Let the number be = 100

Decrease = 50% = 50

∴ Decreased number = 100 – 50 = 50

If decreased number is 50, then original number = 100

and if decreased number is 50, then original

$$\text{number} = \frac{100 \times 50}{50} = 100$$

Question 5.

The price of a car is lowered by 20% to Rs. 40,000. What was the original price ? Also, find the reduction in price.

Solution :

Let original price of the car = Rs. 100

Reduction = 20%' = Rs. 20

∴ Reduced price = Rs. 100 – 20 = Rs. 80

If reduced price is Rs. 80, then original price = Rs. 100

and if reduced price is Rs. 40,000 then original price = $\frac{Rs.100x40000}{80}$

= Rs. 50,000
and reduction = Rs. 50000 – Rs. 40000
= Rs. 10,000

Question 6.
If the price of an article is increased by 25%, The increase is Rs. 10. Find the new price.

Solution :
Let the price of an article = Rs. 100
Increase = 25%
∴Increase = Rs. 25
If an increased price = Rs. 100 + 25 = Rs. 125
If increase is Rs. 25 then new price = Rs. 125
and if increase is Rs. 10, then new price = Rs. $\frac{125x10}{25}$
= Rs. 50

Question 7.
If the price of an article is reduced by 10%, the reduction is Rs. 40. What is the old price ?

Solution :
Let the original (old) price = Rs. 100
Reduction = 10% = Rs. 10
∴If reduction is Rs. 10, then old price = Rs. 100
and if reduction is Rs. 40, then old price = Rs. $\frac{100x40}{10}$ = Rs. 400

Question 8.
The price of a chair is reduced by 25%. What is the ratio of:
(i) Change in price to the old price.
(ii) Old price to the new price.

Solution :
Let old (original) price of a chair = Rs. 100
Reduction = 25% = Rs. 25
∴Reduced price = Rs. 100 – Rs. 25 = Rs. 75
(i) Ratio between change in price and old price = 25 : 100
= 1:4 (Dividing by 25)
(ii) Ratio between old price and new price = 100 : 75
= 4:3 (Dividing by 25)

Question 9.

If x is 20% less than y, find :

$(i)\ \frac{x}{y}$ $(ii)\ \frac{y-x}{y}$ $(iii)\ \frac{x}{y-x}$

Solution :

Let $y = 100$

then reduction $= 20\% = 20$

then $x = 100 - 20 = 80$

$(i)\ \frac{x}{y} = \frac{80}{100} = \frac{4}{5}$ (Dividing by 20)

$(ii)\ \frac{y-x}{y} = \frac{100-80}{100} = \frac{20}{100} = \frac{1}{5}$

(Dividing by 20)

$(iii)\ \frac{x}{y-x} = \frac{80}{100-80} = \frac{80}{20} = \frac{4}{1} = 4$

(Dividing by 20)

Question 10.

If x is 30% more than y; find :

$(i)\ \frac{x}{y}$ $(ii)\ \frac{y+x}{x}$ $(iii)\ \frac{y}{y-x}$

Solution :

Let $y = a$

Then $x = a \times \frac{100+30}{100} = a \times \frac{130}{100} = \frac{13}{10}a$

Now, $(i)\ \frac{x}{y} = \frac{a}{\frac{13}{10}a} = \frac{a \times 10}{13a} = \frac{10}{13}$

$(ii)\ \frac{y+x}{x} = \frac{a+\frac{13}{10}a}{\frac{13}{10}a}$

$= \frac{(10+13)a}{10 \times \frac{13}{10}a} = \frac{23\,a}{10} \times \frac{10}{13\,a} = \frac{23}{13}$

$(iii)\ \frac{y}{y-x} = \frac{a}{a-\frac{13}{10}a} = \frac{a}{\frac{-3}{10}a}$

$= \frac{a \times 10}{-3a} = -\frac{10}{3}$

Question 11.

The weight of a machine is 40 kg. By mistake it was weighed as 40.8 kg. Find the error percent.

Solution :

Actual weight of machine = 40 kg

Errored weight = 40·8 kg

$\therefore$ Error in weight = 40·8 – 40 = 0·8 kg

$$\text{Error \%} = \frac{0{\cdot}8 \times 100}{40} = \frac{8 \times 100}{10 \times 40} = 2\%$$

Question 12.

From a cask, containing 450 litres of petrol, 8% of the petrol was lost by leakage and evaporation. How many litres of petrol was left in the cask ?

Solution :

Original petrol in the cask = 450 litres

Leakage and evaporation = 8%

$$\therefore \text{Lost petrol} = 8\% \text{ of } 450 \text{ litres} = \frac{8 \times 450}{100}$$

$$= 36 \text{ litres}$$

Question 13.

An alloy consists of 13 parts of copper, 7 parts of zinc and 5 parts of nickel. What is the percentage of each metal in the alloy?

Solution :

Copper = 13 parts, Zinc = 7 parts

Nickel = 5 parts

Total alloy = 13 + 7 + 5 = 25 parts

$$\text{Now, percentage of copper} = \frac{13}{25} \times 100 = 52\%$$

$$\text{Percentage of zinc} = \frac{7}{25} \times 100 = 28\%$$

$$\text{and percentage of nickel} = \frac{5}{25} \times 100 = 20\%$$

Question 14.

In an examination, first division marks are 60%. A student secures 538 marks and misses the first division by 2 marks. Find the total marks of the examination.

Solution :

Percentage for first division = 60%

A student secures 538 marks but misses the first division by 2 marks.

$\therefore$ Marks for first division = 538 + 2 = 540

$\therefore$ 60% of total marks = 540

$$\Rightarrow \quad \frac{60}{100} \times \text{total marks} = 540$$

$$\Rightarrow \quad \text{total marks} = \frac{540 \times 100}{60} = 900$$

Question 15.

Out of 1200 pupils in a school, 900 are boys and the rest are girls. If 20% of the boys and 30% of the girls wear spectacles, find :

(i) how many pupils in all, wear spectacles ?

(ii) what percent of the total number of pupils wear spectacles ?

Solution :

Total number of pupils = 1200

No. of boys = 900

and no. of girls = 1200 – 900 = 300

No. of boys who wear spectacles

$$= 20\% \text{ of } 900 = \frac{20}{100} \times 900 = 180$$

No. of girls who wear spectacles

$$= 30\% \text{ of } 300 = \frac{30}{100} \times 300 = 90$$

(*i*) $\therefore$ Total number of pupils who wear spectacles = 180 + 90 = 270

(*ii*) Percentage of pupils who wear spectacles

$$= \frac{270 \times 100}{1200} = \frac{270}{12} = 22{\cdot}5\%$$

Question 16.

Out of 25 identical bulbs, 17 are red, 3 are black and the remaining are yellow. Find the difference between the numbers of red and yellow bulbs and express this difference as percent.

Solution :

Total number of bulbs = 25

Number of red bulbs = 17

Number of black bulbs = 3

$= 17 + 3 = 20$

$\therefore$ Number of yellow bulbs $= 25 - 20 = 5$ bulbs

Difference between the number of red and yellow bulbs

= No. of red bulbs – No. of yellow bulbs

$= 17 - 5 = 12$

$\therefore$ Percentage difference

$$= \frac{\text{Difference in red and yellow bulbs}}{\text{Total number of bulbs}}$$

$$= \frac{12}{25} \times 100 = 48\%$$

Question 17.

A number first increases by 20% and then decreases by 20%. Find the percentage increase or decrease on the whole.

Solution :

Let the number be 100

In 1st condition,

Increase = 20% of 100

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

$\therefore$ Number after this increase = 100 + 20

= 120

In 2nd condition,

Decrease = 20% of 120

$$= \frac{20}{100} \times 120 = 24$$

$\therefore$ Number after this decrease = 120 – 24 = 96

$\Rightarrow$ Total decrease on the whole = 24 – 20 = 4

and the percentage decrease on the whole

$$= \frac{4}{100} \times 100 = 4\%$$

Question 18.

A number is first decreased by 40% and then again decreased by 60%. Find the percentage increase or decrease on the whole.

Solution :

Let the number be 100

In first condition :

Decrease = 40% of 100

$$= \frac{40}{100} \times 100 = 40$$

$\therefore$ Number after this decrease

$$= 100 - 40 = 60$$

In Second condition :

Decrease = 60% of 40

$$= \frac{60}{100} \times 40 = 24$$

$\therefore$ Number after the 2nd decrease

$$= 40 - 24 = 16$$

$\Rightarrow$ Total decrease on the whole

$$= 40 + 24 = 64$$

$\therefore$ Percentage decrease on the whole

$$= \frac{64}{100} \times 100 = 64\%$$

Question 19.

If 150% of a number is 750, find 60% of this number.

Solution :

Let the required number be x

Now, 150% of $x = 750$

$$\Rightarrow \frac{150}{100} \times x = 750$$

$$\Rightarrow x = \frac{750 \times 100}{150} = 500$$

Hence, the required number = 500

Now, 60% of $500 = 500 \times \frac{60}{100} = 300$