7. Percent and Percentage

Question 1.
Evaluate :
(i) 55% of 160 + 24% of 50 – 36% of 150
(ii) 9.3% of 500 – 4.8% of 250 – 2.5% of 240
Solution:

(i) 55% of 160 + 24% of 50 – 36% of 150

$$= \frac{55 \times 160}{100} + \frac{24 \times 50}{100} - \frac{36 \times 150}{100}$$

$= 11 \times 8 + 12 - 18 \times 3 = 88 + 12 - 54 = 46$

(ii) 9.3% of 500 – 4.8% of 250 – 2.5% of 240

$$= \frac{9.3 \times 500}{100} - \frac{4.8 \times 250}{100} - \frac{2.5 \times 240}{100}$$

$9.3 \times 5 - 1.2 \times 10 - 0.5 \times 12$

$= 46.5 - 12 - 6 = 46.5 - 18 = 28.5$

Question 2.
(i) A number is increased from 125 to 150 ; find the percentage increase.
(ii) A number is decreased from 125 to 100 ; find the percentage decrease.
Solution:

(i) Original value = 125. New value = 150
Increase = (150 – 125) = 25

Increase % = $\dfrac{25}{125}$ × 100 = 20%

(ii) Original number = 125, New value = 100,
Decrease = (125 – 100) = 25

Decrease % = $\dfrac{25}{125}$ × 100 = 20%

Question 3.
Find :
(i) 45 is what percent of 54 ?
(ii) 2.7 is what percent of 18 ?

Solution:

Let 45 = x percent of 54 = $\dfrac{54 \times x}{100}$

$\Rightarrow x = \dfrac{45 \times 100}{54} = \dfrac{5 \times 100}{6}$

$= \dfrac{250}{3} = 83\dfrac{1}{3}\%$

$\therefore$ Reqd. percentage = $83\dfrac{1}{3}\%$

(ii) Let 2.7 = x percent of 18 = $\dfrac{18 \times x}{100}$

$\therefore x = \dfrac{2.7 \times 100}{18} = \dfrac{270}{18} = \dfrac{30}{2} = 15$

$\therefore$ Reqd. percentage = 15%

Question 4.
(i) 252 is 35% of a certain number, find the number.
(ii) If 14% of a number is 315 ; find the number.
Solution:

(i) Let the number be x

By the given condition,

$252 = \dfrac{x \times 35}{100} = \dfrac{x \times 7}{20}$

$\therefore x = \dfrac{252 \times 20}{7} = 36 \times 20 = 720$

Hence reqd. number = 720

(ii) Let the number be x

By the given condition,

$315 = \dfrac{x \times 14}{100}$

$\therefore x = \dfrac{315 \times 100}{14} = \dfrac{45 \times 100}{2} = 45 \times 50 = 2250$

Hence reqd. number = 2250.

Question 5.
Find the percentage change, when a number is changed from :
(i) 80 to 100
(ii) 100 to 80
(iii) 6.25 to 7.50

Solution:

(i) Original number = 80
New Number = 100,
Change = (100 – 80) = 20
∴ Percentage change (increase)

$$= \frac{20}{80} \times 100 = 25\%$$

(ii) Original number = 100
New number = 80
Change (100 – 80) = 20

∴ Percentage change (decrease) $= \frac{20}{100} \times 100$

$$= 20\%$$

(iii) Original number = 6.25,
New number = 7.50
Change (Increase) = (7.50 – 6.25) = 1.25

∴ increase $= \frac{1.25}{6.25} \times 100 = 20\%$

Question 6.
An auctioneer charges 8% for selling a house. If a house is sold for Rs.2, 30, 500; find the charges of the auctioneer.
Solution:

Selling price of the house = Rs.2,30,500
Rate of charges of the auctioneer
= 8% of selling price
∴ Charges of the auctioneer = 8% of 2,30,500

$$= \frac{8}{100} \times 2,30,500$$
$$= Rs.18,440$$

Question 7.
Out of 800 oranges, 50 are rotten. Find the percentage of good oranges.
Solution:
Total number of oranges = 800

$$\text{Rotten oranges} = 50$$
$$\text{Number of good oranges} = 800 - 50$$
$$= 750$$

$$\text{percentage of good oranges} = \frac{750}{800} \times 100$$

$$= \frac{750}{8} = \frac{375}{4} = 93\frac{3}{4}\%$$

Question 8.
A cistern contains 5 thousand litres of water. If 6% water is leaked. Find how many litres of water are left in the cistern.
Solution:
$$\text{Water in the cistern} = 5000 \text{ litres}$$

$$\text{Quantity of water leaked} = \frac{6}{100} \times 5000$$

$$= 300 \text{ litres}$$
Quantity of water left in the cistern
$$= (5000 - 300) \text{ litres} = 4700 \text{ litres}$$

Question 9.
A man spends 87% of his salary. If he saves Rs.325 ; find his salary.
Solution:
$$\text{Let salary} = \text{Rs}.x$$

$$\therefore \quad \text{Expenditure} = \frac{87}{100} \text{ of } x$$

$$= \text{Rs}.\frac{87x}{100}$$

$$\text{Saving} = \text{Rs}.325$$

$$\therefore \quad x - \frac{87x}{100} = 325$$

$$\Rightarrow \quad \frac{100x - 87x}{100} = 325 \Rightarrow \frac{13x}{100} = 325$$

$$\Rightarrow \quad x = \frac{325 \times 100}{13} \Rightarrow x = \frac{32500}{13}$$

$$\Rightarrow \quad x = 2500$$
$$\therefore \quad \text{Salary} = \text{Rs}.2500$$

Question 10.
(i) A number 3.625 is wrongly read as 3.265; find the percentage error.
(ii) A number 5.78 x 10³ is wrongly written as 5.87 x 10³; find the percentage error

Solution:

(i) Correct number = 3·625

Number wrongly read as = 3·265

$$\text{Error} = 3\cdot625 - 3\cdot265$$
$$= 0\cdot360$$

$$\%\ \text{Error} = \frac{0\cdot360}{3\cdot625} \times 100$$

$$= \frac{360}{3625} \times 100 = \frac{36000}{3625} = 9\cdot93\%\ \textbf{Ans.}$$

(ii) Correct number = $5\cdot78 \times 10^3$

Number wrongly written as = $5\cdot87 \times 10^3$

$$\text{Error} = 5\cdot87 \times 10^3 - 5\cdot78 \times 10^3$$
$$= 0\cdot09 \times 10^3$$

$$\%\ \text{Error} = \frac{0\cdot09 \times 10^3}{5\cdot78 \times 10^3} \times 100$$

$$= \frac{0\cdot09}{5\cdot78} \times 100 = \frac{9}{578} \times 100 = \frac{900}{578}\ \%$$

$$= 1\cdot56\%$$

Question 11.
In an election between two candidates, one candidate secured 58% of the votes polled and won the election by 18, 336 votes. Find the total number of votes polled and the votes secured by each candidate.

Solution:

Since, winning candidate secured 58% of the votes polled.

∴   Losing candidate secured

= (100 – 58)% of the votes polled

= 42% of the votes polled

Difference of votes = 58 – 42

= 16% of the votes polled

We are given :

16% of votes polled = 18,336

$\Rightarrow$ $\dfrac{16}{100}$ of votes polled = 18,336

$\Rightarrow$ Votes polled = $18,336 \times \dfrac{100}{16}$

$$\Rightarrow \qquad \text{Votes polled} \quad = \frac{18,33,600}{16}$$

$$\Rightarrow \qquad \text{Votes polled} \quad = 1,14,600$$

∴ Votes secured by winning candidate

$$= \frac{58}{100} \times 1,14,600$$

$$= 66,468$$

Votes secured by losing candidate

$$= \frac{42}{100} \times 1,14,600$$

$$= 48,132$$

Votes polled $\quad = 1,14,600$

Votes secured by winning candidate $= 66,468$

Votes secured by losing candidate $= 48,132$

Question 12.
In an election between two candidates, one candidate secured 47% of votes polled and lost the election by 12, 366 votes. Find the total votes polled and die votes secured by the winning candidate.
Solution:

Since, the losing candidate secured 47% of the votes polled

Winning candidate secures votes

$\qquad = (100 - 47)\%$ of the votes polled

$\qquad = 53\%$ of the votes polled

Difference of votes $= 53 - 47$

$\qquad\qquad\qquad = 6\%$ of the votes polled

We are given :

$\qquad 6\%$ of the votes polled $= 12,366$

$$\Rightarrow \qquad \frac{6}{100} \text{ of the votes polled} = 12,366$$

$$\Rightarrow \qquad \text{Votes polled} = 12,366 \times \frac{100}{6}$$

$$\Rightarrow \qquad\qquad\qquad = \frac{1236600}{6}$$

$$\Rightarrow \qquad\qquad\qquad = 2,06,100$$

Votes secured by winning candidate

$$= \frac{53}{100} \times 2,06,100 = 1,09,233$$

∴   Votes polled = 2,06,100

Votes secured by winning candidate

                 = 1,09,233

Question 13.

The cost of a scooter depreciates every year by 15% of its value at the beginning of the year. If the present cost of the scooter is
₹ 8,000; find its cost:
(i) after one year
(ii) after 2 years

Solution:

     Present cost of scooter = Rs.8000

     The cost of scooter depriciates by 15%
     every year

(i)   cost of scooter after one year

$$= \frac{(100-15)}{100} \times 8000 = \frac{85}{100} \times 8000$$

$$= Rs.6800$$

(ii)   Cost of scooter after 2 years

$$= \frac{(100-15)}{100} \times 6800 = \frac{85}{100} \times 6800$$

$$= Rs.5780$$

Question 14.

In an examination, the pass mark is 40%. If a candidate gets 65 marks and fails by 3 marks ; find the maximum marks.

Solution:

     Marks obtained by the candidate = 65

               Fails by = 3 marks

        Pass marks = 65+3 = 68

    %of Pass marks = 40%

∴ Required maximum marks $= \frac{100}{40} \times 68$

$$= 10 \times 17$$

$$= 170$$

Question 15.
In an examination, a candidate secured 125 marks and failed by 15 marks. If the pass percentage was 35% ; find the maximum marks.
Solution:

Total marks secured = 125

Failed by 15 marks

∴ Pass marks = 125 + 15 = 140

Let Maximum marks = x

∴ $\dfrac{x \times 35}{100} = 140$

⇒ $x = \dfrac{140 \times 100}{35} = 4 \times 100 = 400$

Hence maximum marks = 400

Question 16.
In an objective type paper of 150 questions; John got 80% correct answers and Mohan got 64% correct answers.
(i) How many correct answers did each get?
(ii) What percent is Mohan's correct answers to John's correct answers ?
Solution:

Total questions = 150

John got correct answers = 80%

Mohan got correct answers = 64%

(i) Number of correct answers got by John

$= \dfrac{80}{100} \times 150 = 120$

Number of correct answers got by Mohan

$= \dfrac{64}{100} \times 150 = \dfrac{64}{4} \times 6 = 96$

(ii) % of Mohan's correct answers to John's correct answers

$= \dfrac{96}{120} \times 100 = \dfrac{4}{5} \times 100$

$= 4 \times 20 = 80\%$

Question 17.
The number 8,000 is first increased by 20% and then decreased by 20%. Find the resulting number.

Solution:

The resulting number = The original number

$$\times \left(1 + \frac{20}{100}\right) \times \left(1 - \frac{20}{100}\right)$$

$$= 8000 \times \frac{120}{100} \times \frac{80}{100} = 7,680$$

Question 18.
The number 12,000 is first decreased by 25% and then increased by 25%. Find the resulting number.

Solution:

The resulting = The original number $\times \left(1 - \frac{25}{100}\right) \times \left(1 + \frac{25}{100}\right)$

$$= 12000 \times \frac{75}{100} \times \frac{125}{100} = 11,250$$

Question 19.
The cost of an article is first increased by 20% and then decreased by 30%, find the percentage change in the cost of the article.

Solution:

Let the original cost = ₹100

Increased by 20%

∴ New cost = 100 + 20 = ₹120

Decreased by 30% $= \dfrac{120 \times 30}{100} = ₹36$

∴ New cost = 120 − 36 = ₹84

Overall change = 100 − 84 = ₹16

Required percentage $= \dfrac{16}{100} \times 100 = 16\%$ decrease

Question 20.
The cost of an article is first decreased by 25% and then further decreased by 40%. Find the percentage change in the cost of the article.

Solution:

Let the original cost = ₹100

Decreased by 25%

∴ New cost = 100 − 25 = ₹75

Decreased by 40% = $\dfrac{75 \times 40}{100}$ = ₹30

∴ New cost = ₹75 − 30 = ₹45

Overall change = 100 − 45 = ₹55

Required percentage = $\dfrac{55}{100} \times 100$ = 55% decrease

Question 1.
A man bought a certain number of oranges ; out of which 13 percent were found rotten. He gave 75% of the remaining in charity and still has 522 oranges left. Find how many had he bought?
Solution:

Suppose number of oranges bought = 100
Number of Rotten oranges

$$= \frac{13}{100} \times 100 = 13$$

Remaining oranges = 87

Oranges given in charity $= \frac{75}{100} \times 87$

$$= 3 \times \frac{87}{4} = \frac{261}{4}$$

Net balance of oranges $= 87 - \frac{261}{4}$

$$= \frac{348 - 261}{4} = \frac{87}{4}$$

If the balance is $\frac{87}{4}$, then number of oranges

bought = 100
If the balance is 1 then number of oranges

bought $= 100 \times \frac{4}{87}$

If the balance is 522 then number of oranges

bought $= 100 \times \frac{4}{87} \times 522$

$$= \frac{100 \times 4 \times 522}{87} = 100 \times 4 \times 6 = 2400$$

Question 2.
5% pupil in a town died due to some diseases and 3% of the remaining left the town. If 2, 76, 450 pupil are still in the town; find the original number of pupil in the town.
Solution:

Let original number of pupil in the town
$$= 100$$

Number of pupil did due to desease
$$= \frac{5}{100} \times 100 = 5$$

Remaining pupil $= 100 - 5 = 95$

Number of pupil who left the town

$$= \frac{3}{100} \times 95 = \frac{3 \times 95}{100} = \frac{57}{20}$$

Actual remaining pupil $= 95 - \frac{57}{20}$

$$= \frac{1900 - 57}{20} = \frac{1843}{20}$$

If the remaining pupil in the town are $\frac{1843}{20}$,

then original number of pupil $= 100$

If the remaining pupil in the town is 1, then

original number of pupil $= 100 \times \frac{20}{1843}$

If the remaining pupil in the town are 276450, then original number of pupil

$$= 100 \times \frac{20}{1843} \times 276450 = \frac{100 \times 20 \times 276450}{1843}$$

$$= 100 \times 20 \times 150 = 300000 \text{ Ans.}$$

Question 3.
In a combined test in English and Physics ; 36% candidates failed in English ; 28% failed in Physics and 12% in both ; find:
(i) the percentage of passed candidates
(ii) the total number of candidates appeared, if 208 candidates have failed.

Solution:

Candidates failed only in English
$$= 36\% - 12\% = 24\%$$

Candidates failed only in Physics
$$= 28\% - 12\% = 16\%$$

Candidates failed in both subjects $= 12\%$

Total failed candidates $= 24\% + 16\% + 12\%$
$$= 52\%$$

(i) Percentage of passed candidates
$$= 100\% - 52\% = 48\%$$

(ii) If failed candidates are 52, then total candidates appeared $= 100$

If failed candidate is 1, then total candidates appeared $= \dfrac{100}{52}$

If failed candidates are 208, then total candidates appeared $= \dfrac{100}{52} \times 208$

$= 100 \times 4 = 400$

Question 4.

In a combined test in Maths and Chemistry; 84% candidates passsed in Maths; 76% in Chemistry and 8% failed in both. Find :
(i) the percentage of failed candidates ;
(ii) if 340 candidates passed in the test ; then how many appeared ?

Solution:

Since, candidates passed in Maths = 84%

∵ candidates failed in Maths = 100% − 84%

= 16%

Again, candidates passed in Chemistry = 76%

∴ Candidates failed in Chemistry = 100% − 76%

= 24%

Candidates failed in both = 8%

∴ Candidates failed in only Maths

= 16% − 8% = 8%

Candidates failed in only Chemistry

= 24% − 8% = 16%

Total failed candidates = 8% + 16% + 8%

= 32%

(i) Percentage of failed candidates = 32%

(ii) Passed candidates = 100% − 32% = 68%

If passed candidates are 68, then total candidates appeared = 100

If passed candidate is 1 then total candidates

appeared $= \dfrac{100}{68}$

If passed candidates are 340 total candidates

appeared $= \dfrac{100}{68} \times 340$

$= \dfrac{100 \times 340}{68} = 500$.

Question 5.

A's income is 25% more than B's. Find, B's income is how much percent less than A's.

Solution:

Let B's income = Rs.100

then   A's income = 100 + 25

                     = Rs.125

Now, difference of income of A and B

      = Rs.(125 – 100) = Rs.25

If A's income is Rs.125, then B's income less than A = Rs.25

If A's income is Re.1, then B's income less than A

$$= Rs.\frac{25}{125}$$

If A's income is Rs.100, then B's income less

than A = Rs. $\left(\frac{25}{125} \times 100\right)$

$$= \frac{1}{5} \times 100 = Rs.20$$

∴ B's income is less than A's income = 20%

Question 6.
Mona is 20% younger than Neetu. How much percent is Neetu older than Mona ?
Solution:

Let Neetu's age = 100 years

then, Mona's age = 100 – 20 = 80 years

Difference of ages = 100 – 80 = 20 years

If Mona is 80 years, then Neetu is older than Mona by = 20 years

If Mona is 1 year, then Neetu is older than

Mona by $= \frac{20}{80}$ years

If Mona is 100 years, then Neetu is older than

Mona by $= \frac{20}{80} \times 100$ years $= \frac{20 \times 100}{80}$

                      = 25%

Question 7.
If the price of sugar is increased by 25% today; by what percent should it be decreased tomorrow to bring the price back to the original ?
Solution:

Let original price of sugar = Rs.100

∴ Price of sugar for today = Rs.100 + Rs.25

= Rs.125

In order to bring down the price to original

i.e. Rs.100, its price should be decreased by

= Rs.125 – Rs.100 = Rs.25

∴ On Rs.125, the price should be decreased by

= Rs.25

On Re.1, the price should be decreased by

$$= Rs. \frac{25}{125}$$

On Rs.100, the price should be decreased by

$$= Rs. \frac{25}{125} \times 100 = Rs. \frac{1}{5} \times 100$$

$$= Rs.20$$

∴ Price should be decreased by 20%

Question 8.
A number increased by 15% becomes 391. Find the number.
Solution:

Let the required number = x

∴ According to the statement,

15% of $x + x$ = 391

$$\Rightarrow \quad \frac{15}{100} \times x + x = 391$$

$$\Rightarrow \quad x \left[\frac{15}{100} + 1 \right] = 391$$

$$\Rightarrow x \left[\frac{15 + 100}{100} \right] = 391 \Rightarrow x \times \frac{115}{100} = 391$$

$$\Rightarrow x = 391 \times \frac{100}{115} \Rightarrow x = \frac{391 \times 100}{115}$$

$$= \frac{17 \times 100}{5} \Rightarrow x = 340$$

∴ Required number = 340

Question 9.
A number decreased by 23 % becomes 539. Find the number.
Solution:

Let the number $= x$

According to the statement,

$$x - 23\% \text{ of } x = 539$$

$$\Rightarrow \quad x - \frac{23}{100} \times x = 539$$

$$\Rightarrow \quad x\left[1 - \frac{23}{100}\right] = 539$$

$$\Rightarrow \quad x\left[\frac{100 - 23}{100}\right] = 539$$

$$\Rightarrow \quad x \times \frac{77}{100} = 539 \Rightarrow x = 539 \times \frac{100}{77}$$

$$\Rightarrow x = \frac{539 \times 100}{77} = 7 \times 100 \Rightarrow x = 700$$

$\therefore$ Required number $= 700$

Question 10.
Two numbers are respectively 20 percent and 50 percent more than a third number. What percent is the second of the first ?

Solution:

Let the third number $= x$

$\therefore$ First number $= x + \dfrac{20}{100}x$

$= \dfrac{100x + 20x}{100} = \dfrac{120x}{100}$

Second number $= x + \dfrac{50}{100}x$

$= \dfrac{100x + 50x}{100} = \dfrac{150x}{100}$

Required % $= \dfrac{\dfrac{150x}{100}}{\dfrac{120x}{100}}$

$= \dfrac{150x}{100} \times \dfrac{100}{120x} \times 100 = \dfrac{150 \times 100}{120}$

$= \dfrac{1500}{12} = 125\%$

Question 11.

Two numbers are respectively 20 percent and 50 percent of a third number. What percent is the second of the first ?

Solution:

Let the third number be 100

$\therefore$ The first number $= 20\%$ of 100

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

and the second number $= 50\%$ of 100

$= \dfrac{50}{100} \times 100 = 50$

$\therefore$ The second no. as the percent of the first

$= \dfrac{50}{20} \times 100\% = 250\%$

Question 12.
Two numbers are respectively 30 percent and 40 percent less than a third number.
What percent is the second of the first ?
Solution:

Let the third number $= x$

$\therefore$ First number $= x - \dfrac{30x}{100}$

$= \dfrac{100x - 30x}{100} = \dfrac{70x}{100} = \dfrac{7x}{10}$

Second number $= x - \dfrac{40x}{100}$

$= \dfrac{100x - 40x}{100} = \dfrac{60x}{100} = \dfrac{6x}{10}$

$\therefore$ Required $\% = \dfrac{\dfrac{6x}{10}}{\dfrac{7x}{10}} \times 100$

$= \dfrac{6x}{10} \times \dfrac{10}{7x} \times 100 = \dfrac{600}{7} = 85\dfrac{5}{7}\%$

Question 1.
A bag contains 8 red balls, 11 blue balls and 6 green balls. Find the percentage of blue balls in the bag.
Solution:

Total ball = 8 + 11 + 6 = 25

Blue balls = 11

∴ Reqd. percentage = $\dfrac{11}{25}$ × 100 = 44%

Question 2.
Mohan gets Rs. 1, 350 from Geeta and Rs. 650 from Rohit. Out of the total money that Mohan gets from Geeta and Rohit. what percent does he get from Rohit ?
Solution:

Total money received = Rs. (1350 + 650)
= Rs. 2000

Amount received from Rohit = Rs. 650

∴ Reqd. percentage = $\dfrac{650}{2000}$ × 100 = 32.5%

Question 3.
The monthly income of a man is Rs. 16, 000. 15 percent of it is paid as income-tax and 75% of the remainder is spent on rent, food, clothing, etc. How much money is still left with the man?
Solution:

Monthly income = Rs. 16,000

Income -tax = Rs. $\dfrac{16,000 \times 15}{100}$ = Rs. 2,400

Remaining = (16,000 – 2,400) = Rs. 13,600
Amount spent to rent, food clothing etc.

$= \dfrac{13,600 \times 75}{100} = \dfrac{13,600 \times 3}{4}$ = 3,400 × 3

= Rs. 10,200
Balance left = 13600 – 10200 = Rs. 3400

Question 4.
A number is first increased by 20% and the resulting number is then decreased by 10%. Find the overall change in the number as percent.

Solution:

Let the original number = 100

Increased by 20%

∴ New number = 100 + 20 = 120

Decreased by 10% = $\dfrac{120 \times 10}{100} = 12$

∴ New number = 120 – 12 = 108

Overall change = 108 – 100 = 8

Reqd. percentage = $\dfrac{8}{100} \times 100 = 8\%$ (increase)

Question 5.

A number is increased by 10% and the resulting number is again increased by 20%. What is the overall percentage increase in the number ?

Solution:

Let the number be = 100

Increased by 10%

∴ New number = 100 + 10 = 110

Increased by 20%

∴ Net increase = $\dfrac{110 \times 20}{100} = 22$

∴ New number = 110 + 22 = 132

Overall change = 132 – 100 = 32 (increase)

∴ Increase % = $\dfrac{32}{100} \times 100 = 32\%$

Question 6.

During 2003, the production of a factory decreased by 25%. But, during 2004, it (production) increased by 40% of what it was at the beginning of2004. Calculate the resulting change (increase or decrease) in production during these two years.

Solution:

Let at the start of 2003, production = 100

decrease = 25%

∴ New production = 100 − 25 = 75

In 2004, it is increased by 40%

∴ Increase = $\dfrac{75 \times 40}{100}$ = 30

∴ New production = 75 + 30 = 105

∴ Resulting change in two years (Increase)

$$= 105 − 100 = 5$$

∴ precentage change in increase

$$= \dfrac{5}{100} \times 100 = 5\%$$

Question 7.
Last year, oranges were available at Rs. 24 per dozen ; but this year, they are available at Rs. 50 per score. Find the percentage change in the price of oranges.
Solution:

Price of 1 orange = $\dfrac{24}{12}$ = Rs. 2

New price = $\dfrac{50}{20}$ = Rs. 2.50   [∵ 1 score = 20]

Increase in price = Rs. 2.5 − Rs. 2.0 = Rs. 0.50

∴ % Change in price (increase)

$$= \dfrac{.50}{2} \times 100 = 0.50 \times 50 = 25\%$$

Question 8.
In an examination, Kavita scored 120 out of 150 in Maths, 136 out of 200 in English and 108 out of 150 in Science. Find her percentage score in each subject and also on the whole (aggregate).

Solution:

$$\text{In Maths percentage} = \frac{120}{150} \times 100$$

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

$$\text{In English percentage} = \frac{136}{200} \times 100 = \frac{136}{2}$$

$$= 68\%$$

$$\text{In Science percentage} = \frac{108}{150} \times 100 = \frac{108 \times 2}{3}$$

$$= 72\%$$

Total number scored = 120 + 136 + 108 = 364

Maximum marks = 150 + 200 + 150 = 500

$$\therefore \text{Overall \%} = \frac{364}{500} \times 100 = \frac{364}{5} = 72.8\%$$

Question 9.
A is 25% older than B. By what percent is B younger than A ?
Solution:

Alternative Method :

Let age of B = 100 years

$$\therefore \text{Age of A} = 100 + 100 \times \frac{25}{100} = 125 \text{ years}$$

Difference in age by which A is older than B = 125 – 100 = 25 years

$$\therefore \text{\%by which B is younger than A} = \frac{25}{125} \times 100$$

$$= 20\%$$

Question 10.
(i) Increase 180 by 25%.
(ii) Decrease 140 by 18%.

Solution:

(i) Increase 180 by 25%

New value $= 180 + \dfrac{180 \times 25}{100}$

$= 180 + 45 = 225$

(ii) Decrease 140 by 18%

New value $= 140 - \dfrac{140 \times 18}{100}$

$= 140 - \dfrac{14 \times 18}{10} = 140 - \dfrac{126}{5}$

$= 140 - 25.2 = 114.8$

Question 11.

In an election, three candidates contested and secured 29200, 58800 and 72000 votes. Find the percentage of votes scored by winning candidate.

Solution:

Total number of votes polled $= 29200 + 58800 + 72000 = 160000$

∴ Percentage of votes scored by winning candiate

$= \dfrac{72000}{160000} \times 100 = \dfrac{72 \times 10}{16} = \dfrac{9 \times 10}{2} = 45\%$

Question 12.

(i) A number when increased by 23% becomes 861 ; find the number.
(ii) A number when decreased by 16% becomes 798 ; find the number.

Solution:

(i) Let the number be x

By the given condition,

$x + \dfrac{x \times 23}{100} = 861 \Rightarrow \dfrac{100x + 23x}{100} = 861$

$$\Rightarrow x\left(\frac{123}{100}\right) = 861 \quad \Rightarrow x = \frac{861 \times 100}{123} = 7 \times 100$$
$$= 700$$

∴ the required number = 700

(ii) Let the number = 100

By the given condition,

$$x - \frac{x \times 16}{100} = 798 \quad \Rightarrow \frac{100x - 16x}{100} = 798$$

$$\Rightarrow \frac{84}{100}x = 798$$

$$\Rightarrow x = \frac{798 \times 100}{84} = \frac{114 \times 100}{12} = \frac{114 \times 25}{3}$$

$$= 38 \times 25 = 950$$

∴ The required number = 950

Question 13.
The price of sugar is increased by 20%. By what percent must the consumption of sugar be decreased so that the expenditure on sugar may remain the same ?

Solution:
Let price of x kg of sugar = Rs. 100

Increase in price = 20%

∴ New price = 100 + 20 = Rs. 120

∴ For Rs. 120, sugar obtained = x kg.

For Rs. 100, sugar obtained = $\frac{x}{120} \times 100 = \frac{5x}{6}$ kg

Original consumption = x kg

New consumption = $\frac{5x}{6}$ kg

Decrease in consumption = $x - \frac{5x}{6} = \frac{x}{6}$

Required % of decrease in consumption

$$= \frac{\frac{x}{6}}{x} \times 100 = \frac{x}{6x} \times 100 = \frac{100}{6} = \frac{50}{3} = 16\frac{2}{3}\%$$