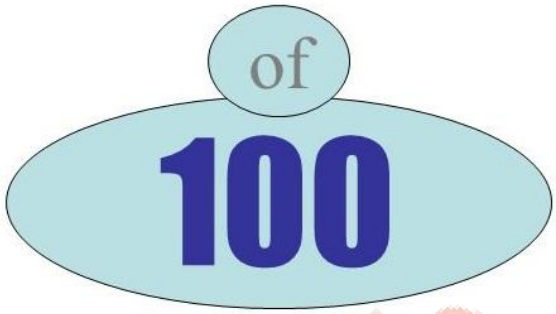
Percentage
Ex 9A

Definition

Percent can be defined as "of one hundred."



PERCENTAGE:

$$\frac{x}{n} \times 100 = p$$

where:

x = *given quantity*
n = *total amount*
p = *percentage of the quantity compared to the total*

$$\text{Percentage increase} = \frac{\text{actual increase}}{\text{original amount}} \times 100\%$$

$$\text{Percentage decrease} = \frac{\text{actual decrease}}{\text{original amount}} \times 100\%$$

Percent	Decimal	Fraction
50%	= 0.50	= $\frac{50}{100}$

$$60\% = \frac{60}{100} = 0.6$$

Percent means "per one hundred", so to convert a percent to a fraction, divide it by 100.

Q1

Answer :

$(i)\ 48\%$
$= \frac{48}{100}$
$= \frac{12}{25}$

$(ii)\ 220\%$
$= \frac{220}{100}$
$= \frac{11}{5}$

$(iii)\ 2.5\%$
$= \frac{2.5}{100}$
$= \frac{25}{1000}$
$= \frac{1}{40}$

Q2

Answer :

$(i)\ \ 6\% = \frac{6}{100} = 0.06$

$(ii)\ \ 72\% = \frac{72}{100} = 0.72$

$(iii)\ \ 125\% = \frac{125}{100} = 1.25$

Q3

Answer :

(i) $\frac{9}{25}$
$= \left(\frac{9}{25} \times 100\right)\%$
$= \left(9 \times 4\right)\%$
$= 36\%$

(ii) $\frac{3}{125}$
$= \left(\frac{3}{125} \times 100\right)\%$
$= 2.4\%$

(iii) $\frac{12}{5}$
$= \left(\frac{12}{5} \times 100\right)\%$
$= 240\%$

Q4

Answer :

$4 : 5 = \frac{4}{5} = \left(\frac{4}{5} \times 100\right)\%$

$= 80\%$

Q5

Answer :

125%

$= \frac{125}{100}$

$= \frac{5}{4} = 5 : 4$

Q6

Answer :

We have :

$6\frac{2}{3}\% = \frac{20}{3}\%$

$= \left(\frac{20}{3} \times \frac{1}{100}\right)$

$= \frac{1}{15}$

$= 0.06$

Also, $\frac{3}{20} = 0.15$

The third number is 0.14.

Clearly, 0.15 is the largest.

Hence, $\frac{3}{20}$ is the largest.

Q7

Answer :

(i) Required percentage $= \left(\frac{96}{150} \times 100\right)\% = 64\%$

(ii) Required percentage $= \left(\frac{200}{5 \times 1000} \times 100\right)\% = 4\%$

(iii) Required percentage $= \left(\frac{250}{2 \times 1000} \times 100\right)\% = 12.5\%$

Q8

Answer :

$4\frac{1}{2}\% = \frac{9}{2 \times 100}$

$\therefore \frac{9}{200}$ of Rs $3600 = \frac{9}{200} \times 3600 =$ Rs 162

Q9

Answer :

Let the number be x.

16% of x is 72.

$\Rightarrow \frac{16}{100} \times x = 72$

$\Rightarrow 16x = 72 \times 100$

$\Rightarrow 16x = 7200$

$\Rightarrow x = \frac{7200}{16} = 450$

$\therefore$ The required number is 450.

Q10

Answer :

Let Rs x be his monthly income.
His savings $= 18\%$ of Rs x

$$= \text{Rs } \left(x \times \frac{18}{100}\right)$$
$$= \text{Rs } \frac{9x}{50}$$

Now, $\frac{9x}{50} = 1890$

$\Rightarrow x = \text{Rs } \left(1890 \times \frac{50}{9}\right)$

$\Rightarrow x = \text{Rs } 10500$

$\therefore$ His monthly income is Rs. 10500.

Q11

Answer :

Let x be the total number of games played.
Percentage of games won $= 35\%$ of x

$$= \left(x \times \frac{35}{100}\right)$$
$$= \frac{35x}{100}$$

Now, $\frac{35x}{100} = 7$

$\Rightarrow x = \left(7 \times \frac{100}{35}\right)$

$\Rightarrow x = 20$

$\therefore$ The total number games played is 20.

Q12

Answer :

Let $Rs\ x$ be Amit's old salary.

His salary after increment will be Rs $\left(x + \frac{20}{100}x\right)$

According to the question, we have :

$\Rightarrow x + \frac{20}{100}x = 15300$

$\Rightarrow \frac{100x+20x}{100} = 15300 \quad (\text{LCM} = 100)$

$\Rightarrow \frac{120x}{100} = 15300$

$\Rightarrow 120x = 15300 \times 100$

$\Rightarrow x = \frac{15300 \times 100}{120}$

$\Rightarrow x = 12750$

$\therefore$ The old salary is Rs 12,750.

Q13

Answer :

Let x be the number of days the school was opened.
Number of days Sonal attended school $= 204$ days
Percentage of her attendance $= 85\%$ of x

$$= \left(x \times \frac{85}{100}\right)$$
$$= \frac{85x}{100}$$

Now, $\frac{85x}{100} = 204$

$\Rightarrow x = \left(204 \times \frac{100}{85}\right)$

$\Rightarrow x = 240$

$\therefore$ The school was opened for 240 day.

Q14

Answer :

Let B's income be Rs 100
Then, A's income = Rs 80

Therefore, B's income is more than A's income by $= \frac{(100-80)}{80} \times 100\%$

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

$$= Rs125$$

$\therefore$ B's income is more than that of A's by $(125 - 100)\%$, i.e., 25%.

Q15

Answer :

Let the consumption of petrol originally be 1 unit and let its cost be Rs 100.
New cost of 1 unit of petrol = Rs 110
Now, Rs 110 will yield 1 unit of petrol.
i.e., Rs 100 will yield $\left(\frac{1}{110} \times 100\right)$, i.e., $\frac{10}{11}$ units of petrol.

Now, reduction in consumption = $\left(1 - \frac{10}{11}\right) = \frac{1}{11}$ unit
Percentage of reduction = $\left(\frac{1}{11} \times \frac{1}{1} \times 100\right)\% = 9\frac{1}{11}\%$
∴ A motorist must reduce the consumption of petrol by $9\frac{1}{11}\%$.

Q16

Answer :

Let x be the population of the town a year ago. Then, present population = 108% of x
$= \left(x \times \frac{108}{100}\right) = \frac{27x}{25}$
Now, $\frac{27x}{25} = 54000 \quad \Rightarrow x = \left(54000 \times \frac{25}{27}\right) \quad \Rightarrow x = 50000$
Hence, the population of the town a year ago was 50000.

Q17

Answer :

Let Rs x be the value of the machine last year.
Then, present value = 80% of Rs x
$= \text{Rs}\left(x \times \frac{80}{100}\right)$
$= \text{Rs}\ \frac{4x}{5}$
Now, $\frac{4x}{5} = 160000$
$\Rightarrow x = \left(160000 \times \frac{5}{4}\right)$
$\Rightarrow x = 40000 \times 5 = 200000$
Hence, the value of the machine last year was Rs 2,00,000.

Q18

Answer :

Mass of the alloy = 1 kg
Percentage of copper = 40%
Percentage of nickel = 32%
Percentage of zinc = $\{100 - (40 + 32)\}\%$
$= 28\%$
∴ Mass of zinc in 1 kg of alloy = $\left(\frac{28}{100} \times 1\right)$ kg
$= 0.28\ \text{kg} = 0.28 \times 1000\ \text{g} = 280\ \text{g}$

Q19

Answer :

Amount of protein = 12% of 2600
$= \left(2600 \times \frac{12}{100}\right)$
$= 312$ cal
Amount of fat = 25% of 2600
$= \left(2600 \times \frac{25}{100}\right)$
$= 650$ cal
Amount of carbohydrate = 63% of 2600
$= \left(2600 \times \frac{63}{100}\right)$
$= 1638$ cal

Q20

Answer :

Let x be the amount of gunpowder.
Amount of nitre $= 75\%$
Let x kg be the amount of gunpowder containing 9 kg of nitre.
i.e., $(75\% \text{ of } x) = 9$ kg

$$\Rightarrow \left(x \times \frac{75}{100}\right) = 9$$
$$\Rightarrow \frac{75x}{100} = 9$$
$$\Rightarrow x = \left(9 \times \frac{100}{75}\right)$$
$$\Rightarrow x = 12 \text{ kg}$$

Hence, 12 kg of gunpowder contains 9 kg of nitre.
Now, amount of sulphur $= 10\%$
Let x kg be the amount of gunpowder containing 2.5 kg of sulphur.
i.e., $(10\% \text{ of } x) = 2.5$ kg

$$\Rightarrow \left(x \times \frac{10}{100}\right) = 2.5$$
$$\Rightarrow \frac{10x}{100} = 2.5$$
$$\Rightarrow \frac{x}{10} = 2.5$$
$$\Rightarrow x = (2.5 \times 10)$$
$$\Rightarrow x = 25 \text{ kg}$$

Hence, 25 kg of gunpowder contains 2.5 kg of sulphur.

Q21

Let Rs x be the amount of money recieved by C.
Then, amount of money B gets $= (50\% \text{ of Rs } x)$
Amount of money A gets $= (50\% \text{ of B})$
$= (25\% \text{ of Rs } x)$
Now, $x + (50\% \text{ of Rs } x) + (25\% \text{ of Rs } x) = \text{Rs } 7000$

$$\Rightarrow x + \left(x \times \frac{50}{100}\right) + \left(x \times \frac{25}{100}\right) = \text{Rs } 7000$$
$$\Rightarrow x + \frac{50x}{100} + \frac{25x}{100} = \text{Rs } 7000$$
$$\Rightarrow \left(x + \frac{50x}{100} + \frac{25x}{100}\right) = \text{Rs } 7000$$
$$\Rightarrow \frac{175x}{100} = \text{Rs } 7000$$
$$\Rightarrow x = \text{Rs } \left(7000 \times \frac{100}{175}\right)$$
$$\Rightarrow x = \text{Rs } 4000$$

$\therefore$ C gets Rs 4000.
Amount of money B gets $= (50\% \text{ of Rs } x)$
$= (50\% \text{ of Rs } 4000)$
$= \text{Rs } \left(4000 \times \frac{50}{100}\right)$
$= \text{Rs } 2000$

Amount of money A gets $= (25\% \text{ of Rs } x)$
$= (25\% \text{ of Rs } 4000)$
$= \text{Rs } \left(4000 \times \frac{25}{100}\right)$
$= \text{Rs } 1000$

Q22

Answer :

22 carat gold contains 22 parts pure gold out of 24 parts.
Also, 24 carat gold is given to be 100% pure.
$\therefore$ Percentage of pure gold in 22 carat gold $= \left(\frac{22}{24} \times 100\right)\%$
$= 91\frac{2}{3}\%$
Hence, 22 carat gold contains $91\frac{2}{3}\%$ of pure gold.

Q23.

Answer :

Let the original salary be Rs 100
Then, after increment of 25% the salary becomes
$= 100\left(1+\frac{25}{100}\right) = 100\left(\frac{125}{100}\right) = \boldsymbol{Rs}\ 125$

To restore the original salary, let the new salary be decreased by x%.
Thus, we get

$125\left(1-\frac{x}{100}\right) = 100$
$\Rightarrow \left(1-\frac{x}{100}\right) = \frac{100}{125} = \frac{4}{5}$
$\Rightarrow \frac{x}{100} = \frac{1}{5}$
$\Rightarrow x = \frac{100}{5} = 20\ \%$
Therefore, the new salary must be reduced by 20% to restore the original salary.