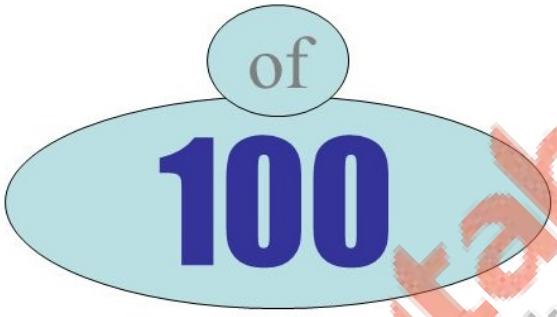
Percentage
Exercise 10B

Definition

Percent can be defined as "of one hundred."



PERCENTAGE:

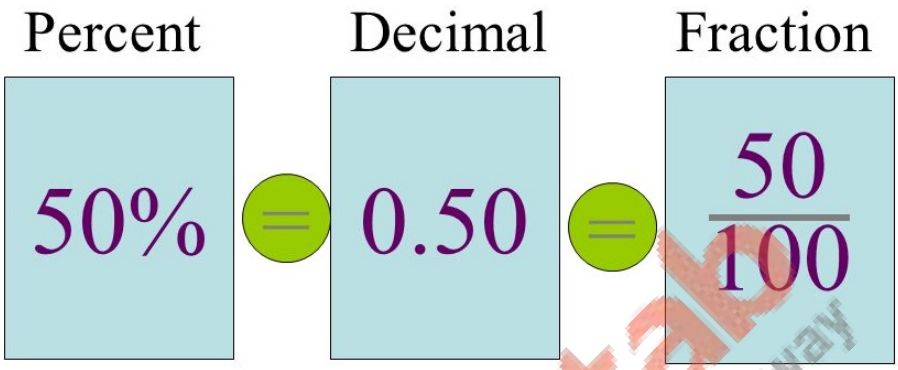
$$\frac{x}{n} \times 100 = p$$

where:

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

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

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



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

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

Q1

Answer :

Maximum marks of the examination = 750
Marks secured by Rupesh = 495
Percentage of marks secured = $\left(\frac{495}{750} \times 100\right)\%$ = 66%

Hence, Rupesh scored 66% in the examination.

Q2

Answer :

Total monthly salary = Rs 15625
Increase percentage = 12%
∴ Amount increase = 12% of Rs 15625
= Rs $\left(15625 \times \frac{12}{100}\right)$ = Rs 1875
∴ New salary = Rs 15625 + Rs 1875
= Rs 17500
Hence, the new salary of the typist is Rs 17,500.

Q3

Answer :

Original excise duty on the item = Rs 950
Amount reduced on excise duty = Rs (950 − 760) = Rs 190
∴ Reduction percent = $\left(\frac{\text{Reduction amount}}{\text{Original value}} \times 100\right)$
= $\left(\frac{190}{950} \times 100\right)$ = 20
Hence, the excise duty on that item is reduced by 20%.

Q4

Answer :

Let Rs x be the total cost of the TV set.

Now, 96% of the total cost of TV = Rs 10464
⇒ 96% of Rs x = Rs 10464
⇒ $\left(\frac{96}{100} \times x\right)$ = 10464
∴ x = $\left(\frac{10464 \times 100}{96}\right)$ = 10900
Hence, the total cost of the TV set is Rs 10900.

Q5

Answer :

Let the total number of students be 100.
Then, number of boys = 70
∴ Number of girls = (100 − 70) = 30

Now, total number of students when the number of girls is 30 = 100
Then, total number of students when the number of girls is 504 = $\left(\frac{100}{30} \times 504\right)$ = 1680
∴ Number of boys = (1680 − 504) = 1176

Hence, there are 1176 boys in the school.

Q6

Answer :

Let *x* kg be the amount of the required ore.

Then, 12% of *x* kg = 69 kg
⇒ $\left(\frac{12}{100} \times x\right)$ kg = 69 kg
⇒ *x* = $\left(\frac{69 \times 100}{12}\right)$ kg = 575 kg

Hence, 575 kg of ore is required to get 69 kg of copper.

Q7

Answer :

Let *x* be the maximum marks.
Pass marks = (123 + 39) = 162
Then, 36% of *x* = 162
⇒ $\left(\frac{36}{100} \times x\right) = 162$
⇒ *x* = $\left(\frac{162 \times 100}{36}\right)$ = 450
∴ Maximum marks = 450

Q8

Answer :

Suppose that the fruit seller initially had 100 apples.
Apples sold = 40
∴ Remaining apples = (100 − 40) = 60

Initial amount of apples if 60 of them are remaining = 100
Initial amount of apples if 1 of them is remaining = $\left(\frac{100}{60}\right)$
Initial amount of apples if 420 of them are remaining = $\left(\frac{100}{60} \times 420\right)$ = 700
Hence, the fruit seller originally had 700 apples.

Q9

Answer :

Suppose that 100 candidates took the examination.
Number of passed candidates = 72
Number of failed candidates = (100 − 72) = 28

Total number of candidates if 28 of them failed = 100
Total number of candidates if 392 of them failed = $\left(\frac{100}{28} \times 392\right)$ = 1400
Hence, the total number of examinees is 1400.

Q10

Answer :

Suppose that the gross value of the moped is Rs x.
Commission on the moped = 5%
Price of moped after deducting the commission = Rs (x – 5% of x)

$$= \text{Rs } \left(x - \frac{5x}{100}\right) = \text{Rs } \left(\frac{100x - 5x}{100}\right) = \text{Rs } \left(\frac{95x}{100}\right)$$

Now, price of the moped after deducting the commission = Rs 15200
Then, Rs $\left(\frac{95x}{100}\right)$ = Rs 15200
$\therefore x$ = Rs $\left(\frac{15200 \times 100}{95}\right)$ = Rs (160 × 100) = Rs 16000
Hence, the gross value of the moped is Rs 16000.

Q11

Answer :

Total quantity of gunpowder = 8 kg = 8000 g (1 kg = 1000 g)
Quantity of nitre in it = 75% of 8000 g

$$= \left(\frac{75}{100} \times 8000\right) \text{ g} = 6000 \text{ g} = 6 \text{ kg}$$

Quantity of sulphur in it = 10% of 8000 g

$$= \left(\frac{10}{100} \times 8000\right) \text{ g} = 800 \text{ g} = 0.8 \text{ kg}$$

$\therefore$ Quantity of charcoal in it = {8000 – (6000 + 800)} g
= (8000 – 6800) g
= 1200 g = 1.2 kg

Hence, the amount of charcoal in 8 kg of gunpowder is 1.2 kg.

Q12

Answer :

Total quantity of chalk = 1 kg = 1000 g

Now, we have the following:

Quantity of carbon in it = 3% of 1000 g

$$= \left(\frac{3}{100} \times 1000\right) = 30 \text{ g}$$

Quantity of calcium in it = 10% of 1000 g

$$= \left(\frac{10}{100} \times 1000\right) \text{ g} = 100 \text{ g}$$

Quantity of oxygen in it = 12% of 1000 g

$$= \left(\frac{12}{100} \times 1000\right) \text{ g} = 120 \text{ g}$$

Q13

Answer :

Let x be the total number of days on which the school was open.
Number of days when Sonal went to school = 219
Percentage of attendance = 75

Thus, 75% of x = 219

$$\Rightarrow \left(\frac{75}{100} \times x\right) = 219$$

$$\therefore x = \left(\frac{219 \times 100}{75}\right) = 292 \text{ days}$$

Hence, the school was open for a total of 292 days.

Q14

Answer :

Let the total value of the property be Rs x.
Percentage of commission = 3
Amount of commission = Rs 42660
Thus, 3% of Rs x = Rs 42660

$$\Rightarrow \left(\frac{3}{100} \times x\right) = 42660$$

$$\therefore x = \left(\frac{42660 \times 100}{3}\right) = 1422000$$

Hence, the total value of the property is Rs 14,22,000.

Q15

Answer :

Total number of eligible voters = 60000

Number of voters who gave their votes = 80% of 60000

$= \left(\frac{80}{100} \times 60000\right) = 48000$

Number of votes in favour of candidate A = 60% of 48000

$= \left(\frac{60}{100} \times 48000\right) = 28800$

∴ Number of votes received by candidate B = (48000 − 28800) = 19200

Hence, candidate B recieved 19,200 votes.

Q16

Answer :

Let us assume that the original price of the shirt is Rs x.

Discount on the shirt = 12%

So, value of discount on the shirt = 12% of Rs x

$= \text{Rs } \left(\frac{12}{100} \times x\right) = \text{Rs } \left(\frac{12x}{100}\right)$

Value of the shirt after discount = $\text{Rs } \left(x - \frac{12x}{100}\right)$

$= \text{Rs } \left(\frac{100x - 12x}{100}\right) = \text{Rs } \left(\frac{88x}{100}\right)$

Present price of the shirt = Rs 1188

Then, $\text{Rs } \left(\frac{88x}{100}\right) = \text{Rs } 1188$

$\Rightarrow 88x = (1188 \times 100)$

$\Rightarrow 88x = 118800$

$\therefore x = \left(\frac{118800}{88}\right) = 1350$

Hence, the original price of the shirt is Rs 1350.

Q17

Answer :

Let us assume that the original price of the sweater is Rs. x

Increased percentage = 8%

So, value of increase on the sweater = 8% of Rs x

$= \text{Rs } \left(\frac{8}{100} \times x\right) = \text{Rs } \left(\frac{2x}{25}\right)$

Increased price of the sweater = $\text{Rs } \left(x + \frac{2x}{25}\right)$

$= \text{Rs } \left(\frac{25x + 2x}{25}\right) = \text{Rs } \left(\frac{27x}{25}\right)$

However, increased price of the sweater = Rs 1566

Then, $\text{Rs } \left(\frac{27x}{25}\right) = \text{Rs } 1566$

$\therefore x = \left(\frac{1566 \times 25}{27}\right) = 1450$

Hence, the original price of the sweater is Rs 1450

Q18

Answer :

Let the income of the man be Rs x.

Then, income spent = 80% of Rs. x

$= \text{Rs } \left(\frac{80}{100} \times x\right) = \text{Rs } \left(\frac{80x}{100}\right) = \text{Rs } \left(\frac{4x}{5}\right)$

Amount left after all the expenditure = $\text{Rs } \left(x - \frac{4x}{5}\right) = \text{Rs } \left(\frac{5x - 4x}{5}\right) = \text{Rs } \left(\frac{x}{5}\right)$

Amount given to the charity = 10% of $\text{Rs } \left(\frac{x}{5}\right)$

$= \text{Rs } \left(\frac{10}{100} \times \frac{x}{5}\right) = \text{Rs } \left(\frac{10x}{500}\right) = \text{Rs } \left(\frac{x}{50}\right)$

Amount left after the charity = $\text{Rs } \left(\frac{x}{5} - \frac{x}{50}\right)$

$= \text{Rs } \left(\frac{10x - x}{50}\right) = \text{Rs } \left(\frac{9x}{50}\right)$

Now, we have:

$\text{Rs } \left(\frac{9x}{50}\right) = \text{Rs } 46260$

$\therefore x = \text{Rs } \left(\frac{46260 \times 50}{9}\right) = \text{Rs } 257000$

Hence, the income of the man is Rs 2,57,000.

Q19

Answer :

Let the number be 100.
Increase in the number = 20%
Increased number = (100 + 20) =120
Now, decrease in the number = (20% of 120)

$$= \left(\frac{20}{100} \times 120\right) = 24$$

New number = (120 − 24) = 96
Net decrease = (100 − 96) = 4
Net decrease percentage = $\left(\frac{4}{100} \times 100\right)$ = 4
Hence, the net decrease is 4%.

Q20

Answer :

Let the original salary be Rs 100.
Increase in it = 20%
Salary after increment = Rs (100 + 20) = Rs 120
To restore the original salary, reduction required = Rs (120 − 100) = Rs 20
Reduction on Rs 120 = Rs 20
∴ Reduction percentage = $\left(\frac{20}{120} \times 100\right) = \left(\frac{100}{6}\right) = 16\frac{2}{3}$
Hence, the required reduction on the new salary is $16\frac{2}{3}\%$.

Q21

Answer :

Total cost of the property = Rs 540000
Commission on the first Rs 200000 = 2% of Rs 200000

$$= \left(\frac{2}{100} \times 200000\right) = \text{Rs } 4000$$

Commission on the next Rs 200000 = 1% of Rs 200000

$$= \left(\frac{1}{100} \times 200000\right) = \text{Rs } 2000$$

Remaining amount = Rs (540000 − 400000) = Rs 140000
∴ Commission on Rs 140000 = 0.5% of Rs 140000

$$= \text{Rs } \left(\frac{0.5}{100} \times 140000\right)$$

$$= \text{Rs } \left(\frac{5}{1000} \times 140000\right) = \text{Rs } 700$$

Thus, total commission on the property worth Rs 540000 = Rs (4000 + 2000 + 700)
= Rs 6700
Hence, the commission of the property dealer on the property that has been sold for Rs 540000 is Rs 6700.

Q22

Answer :

Let Akhil's income be Rs 100.
∴ Nikhil's income = Rs 80
Akhil's income when Nikhil's income is Rs 80 = Rs 100
Akhil's income when Nikhil's income is Rs 100 = Rs $\left(\frac{100}{80} \times 100\right)$ = Rs 125
i.e., if Nikhil's income is Rs.100, then Akhil's income is Rs 125.
Hence, Akhil's income is more than that of Nikhil's by 25%.

Q23

Answer :

Let Rs 100 be the income of Mr. Thomas.
∴ John's income = Rs 120
Mr. Thomas' income when John's income is Rs 120 = Rs 100
Mr. Thomas' income when John's income is Rs 100 = Rs $\left(\frac{100}{120} \times 100\right)$ = Rs $83\frac{1}{3}$
Hence, Mr Thomas' income is less than that of John's by $16\frac{2}{3}\%$.

Q21

Answer :

Let Rs x be the value of the machine one year ago.

Then, its present value = 90% of Rs x

$$= \text{Rs } \left(\frac{90}{100} \times x\right) = \text{Rs } \left(\frac{9x}{10}\right)$$

It is given that present value of the machine = Rs 387000

$\Rightarrow x = \text{Rs} \left(\frac{387000 \times 10}{9}\right) = \text{Rs } (43000 \times 10) = \text{Rs } 430000$

Hence, the value of the machine a year ago was Rs 430000.

Q25

Answer :

The present value of the car = Rs 450000

The decrease in its value after the first year = 20% of Rs 450000

$$= \text{Rs } \left(\frac{20}{100} \times 450000\right) = \text{Rs } 90000$$

The depreciated value of the car after the first year = Rs (450000 − 90000) = Rs 360000

The decrease in its value after the second year = 20% of Rs 360000

$$= \text{Rs } \left(\frac{20}{100} \times 360000\right) = \text{Rs } 72000$$

The depreciated value of the car after the second year = Rs (360000 − 72000) = Rs 288000

Hence, the value of the car after two years will be Rs 288000.

Q26

Answer :

Present population of the town = 60000

Increase in population of the town after the 1 year = 10% of 60000

$$= \left(\frac{10}{100} \times 60000\right) = 6000$$

Thus, population of the town after 1 year = 60000 + 6000 = 66000

Increase in population after 2 years = 10% of 66000

$$= \left(\frac{10}{100} \times 66000\right) = 6600$$

Thus, population after the second year = 66000 + 6600 = 72600

Hence, the population of the town after 2 years will be 72600.

Q27

Answer :

Let the consumption of sugar originally be 1 unit and let its cost be Rs 100

New cost of 1 unit of sugar = Rs 125

Now, Rs 125 yield 1 unit of sugar

$\therefore$ Rs 100 will yield $\left(\frac{1}{125} \times 100\right)$ unit = $\left(\frac{4}{5}\right)$ unit of sugar.

Reduction in consumption = $\left(1 - \frac{4}{5}\right) = \left(\frac{1}{5}\right)$ unit

$\therefore$ Reduction percent in consumption = $\left(\frac{1}{5} \times \frac{1}{1} \times 100\right)$ %= $\left(\frac{100}{5}\right)$ %= 20%