12. Percentage

Exercise 12.1

1. Question

Write each of the following as percentage.

(i) 7/25

(ii) 14/625

(iii) 5/8

(iv) 0.8

(v) 5/8

(vi) 0.8

(vii) 11 : 80

(viii) 111 : 125

(ix) 13 : 75

(x) 15 : 16

(xi) 0.18

(xii) 7/125

Answer

(i) 7/25

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{7}{25} \times 100 = 28\%.$

(ii) 14/625

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{14}{625} \times 100 = \frac{56}{25} = 2.24\%$

(iii) 5/8

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{5}{8} \times 100 = \frac{125}{2} = 62.5\%$

(iv) 0.8

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{8}{10} \times 100 = 80\%$

(v) 5/8

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{5}{8} \times 100 = \frac{125}{2} = 62.5\%$

(vi) 0.8

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{8}{10} \times 100 = 80\%$

(vii) 11 : 80

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{11}{80} \times 100 = \frac{55}{4} = 13.75\%$

(viii) 111 : 125

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{111}{125} \times 100 = \frac{444}{5} = 88.8\%$

(ix) 13 : 75

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{13}{75} \times 100 = \frac{52}{3} = 17.33\%$

(x) 15 : 16

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{15}{16} \times 100 = \frac{375}{4} = 93.75\%$

(xi) 0.18

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{18}{100} \times 100 = 18\%$

(xii) 7/125

We know that while changing in percentage we have to multiplied by 100, so,

$= \frac{7}{125} \times 100 = \frac{28}{5} = 5.6\%$

2. Question

Convert the following percentages to fractions and ratios.

(i) 25%

(ii) 2.5%

(iii) 0.25%

(iv) 0.3%

(v) 125%

Answer

(i) 25%

The required fraction is,

$= \frac{25}{100} = \frac{1}{4} \text{ or } 1:4.$

(ii) 2.5%

The required fraction is,

$= \frac{25}{10} = \frac{5}{2} \text{ or } 5:2$

(iii) 0.25%

The required fraction is,

$= \frac{25}{100} = \frac{1}{4}$ or $1:4$

(iv) 0.3%

The required fraction is,

$= \frac{3}{10}$ or $3:10$

(v) 125%

The required fraction is,

$= \frac{125}{100} = \frac{5}{4}$ or $5:4.$

3. Question

Express the following as decimal fractions.

(i) 27%

(ii) 6.3%

(iii) 32%

(iv) 7.5%

(v) 1/8%

Answer

(i) 27%

The required decimal fraction is,

$= \frac{27}{100} = 0.27.$

(ii) 6.3%

The required decimal fraction is,

$= \frac{63}{10 \times 100} = 0.063.$

(iii) 32%

The required decimal fraction is,

$= \frac{32}{100} = \frac{8}{25} = 0.32.$

(iv) 7.5%

The required decimal fraction is,

$= \frac{75}{10 \times 100} = \frac{3}{40} = 0.075.$

(v) $\frac{1}{8}\%$

The required decimal fraction is,

$= \frac{1}{8 \times 100} = 0.00125.$

Exercise 12.2

1. Question

Find:

(i) 22% of 120

(ii) 25% of Rs 1000

(iii) 25% of 10 kg

(iv) 16.5% of 5000 metre

(v) 135% of 80 cm

(vi) 2.5% of 10000 ml

Answer

(i) 22% of 120

$$= \frac{120 \times 22}{100} = \frac{264}{10} = 26.40$$

(ii) 25% of Rs 1000

$$= \frac{1000 \times 25}{100} = \text{Rs. } 250$$

(iii) 25% of 10 kg

$$= \frac{10 \times 25}{100} = \frac{250}{100} = 2.5 \text{ kg}$$

(iv) 16.5% of 5000 metre

$$= \frac{5000 \times 16.5}{100} = 16.5 \times 50 = 825 \text{ m}$$

(v) 135% of 80 cm

$$= \frac{80 \times 135}{100} = \frac{135 \times 4}{5} = 108 \text{ cm}$$

(vi) 2.5% of 10000 ml

$$= \frac{10000 \times 2.5}{100} = 250 \text{ml}$$

2. Question

Find the number a, if

(i) 8.4% of a is 42

(ii) 0.5 of a is 3

(iii) $\frac{1}{2}$ of a is 50

(iv) 100% of a is 100

Answer

(i) 8.4% of a is 42

$$= \frac{(a \times 8.4)}{100} = 42$$

$$= a = \frac{42 \times 100}{8.4} = \frac{42 \times 100 \times 10}{84} = 500$$

(ii) 0.5 of a is 3

$= \frac{a \times 0.5}{100} = 3$

$= a = \frac{3 \times 100}{0.5} = \frac{3 \times 100 \times 10}{5} = 600$

(iii) $\frac{1}{2}$ of a is 50

$= \left(a \times \frac{1}{2}\right) = 50$

= a = 50×2 = 100

(iv) 100% of a is 100

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

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

3. Question

x is 5% of y, y is 24% of z. If x = 480, find the values of y and z.

Answer

Given x = 480

Ans, x is 5% of y.

So, we write it as:

$$x = \ y \times \frac{5}{100}$$

$$480 \ = \ y \times \frac{5}{100}$$

solving for y, we get,

$$y = \frac{480 \times 100}{5}$$

or **y = 9600**

Now, It is also given that: y is 24% of z

Therefore, we can write it as:

$$y = z \times \frac{24}{100}$$

or 9600 = 24z/ 100

Solving it for z we get, z = 960000/24

z = 40000

4. Question

A coolie deposits Rs 150 per month in his post office Savings Bank account. If this is 15% of his monthly income, find his monthly income.

Answer

Let his monthly income be = Rs. x

$= \left(x \times \frac{15}{100}\right) = 150$

$= x = \frac{150 \times 100}{15} = Rs. 1000$

5. Question

Asha got 86.875% marks in the annual examination. If she got 695 marks, find the total number of marks of the examination.

Answer

Marks got by asha = 695

Percentage of marks got by asha = 86.875%

Let total marks are = x

Hence,

$= \frac{x \times 86.875}{100} = 695$

$= x = \frac{695 \times 100 \times 1000}{86875} = 800$

∴ Total number of marks = 800

6. Question

Deepti went to school for 216 days in a full year. If her attendance is 90%, find the number of days on which the school was opened.

Answer

Number of days she went to school = 216 days

Attendence percentage = 90%

Let number of days for which school was opened = x

Hence,

$= \frac{x \times 90}{100} = 216$

$= x = \frac{216 \times 100}{90} = 240 \text{ days}$

7. Question

A garden has 2000 trees. 12% of these are mango trees 18% lemon and the rest are orange trees. Find the number of orange trees.

Answer

Given,

Total number of trees = 2000

Number of mango trees = $12\% \text{ of } 2000 = \frac{2000 \times 12}{100} = 240$

Number of lemon trees = $18\% \text{ of } 2000 = \frac{2000 \times 18}{100} = 360$

Hence,

Number of orange trees = 2000 – (no.of mango trees+ no. of lemon trees)

= 2000 – (240+360)

= 2000 – 600 = 1400 trees

8. Question

Balanced diet should contain 12% of proteins, 25% of fats and 63% of carbohydrates. If a child needs 2600 calories in this food daily, find in calories the amount of each of these in his daily food intake.

Answer

Amount of calorie daily needed = 2600 calorie

Amount of protein needed = $12\ \%\ \text{of}\ 2600 = \frac{2600\times12}{100} = 312$ calorie

Amount of fats needed = $25\ \%\ \text{of}\ 2600 = \frac{2600\times25}{100} = 650$ calorie

Amount of carbohydrate needed = $63\%\ \text{of}\ 2600 = \frac{2600\times63}{100} = 1638$ calorie

9. Question

A cricketer scored a total of 62 runs in 96 balls. He hit 3 sixes, 8 fours, 2 twos and 8 singles. What percentage of the total runs came in

(i) Sixes

(ii) 4's

(iii) 2's

(iv) singles

Answer

Total runs scored by cricketer = 62

(i) Run scored in 3 sixes = 3×6 = 18

Percentage of runs scored in sixes = $\frac{18}{62}\times100 = 29.03\%$

(ii) Run scored in 8 fours = 8×4 = 32

Percentage of runs scored in fours = $\frac{32}{62}\times100 = 51.61\%$

(iii) Run scored in 2 two's = 2×2 = 4

Percentage of runs scored in two's = $\frac{4}{62}\times100 = 6.45\%$

(iv) Run scored in singles = 8

Percentage of runs scored in singles = $\frac{8}{62}\times100 = 12.9\%$

10. Question

A cricketer hit 120 runs in 150 balls during a test match. 20% of the runs came in 6's, 30% in 4's, 25% in 2's and the rest in 1's. How many runs did he score in

(i) 6's (ii) 4's

(iii) 2's (iv) singles

What % of his shots were scoring ones?

Answer

Total number of runs scored by cricketer = 120

i) Number of runs he scored in 6's = $\frac{120\times20}{100} = 24$

ii) Number of runs he scored in 4's = $\frac{120\times30}{100} = 36$

iii) Number of runs he scored in 2's = $\frac{120\times25}{100} = 30$

iv) Number of runs he scored in singles = 120 – (24+36+30)

= 120 – 90 = 30

Percentage of shots scoring ones: $\frac{Runs\ came\ in\ singles \times 100}{Total\ runs\ scored} = \frac{30 \times 100}{120} = 25\%$

11. Question

Radha earns 22% of her investment. If she earns Rs 187, Then how much did she invest?

Answer

Percentage earn of Radha = 22% of investment

Let total investment = Rs. X

So,

$= \frac{x \times 22}{100} = 187$

$= x = \frac{187 \times 100}{22} = 350$

∴ Total investment made by Radha = Rs.350

12. Question

Rohit deposits 12% of his income in a bank. He deposited Rs 1440 in the bank during 1997. What was his total income for the year 1997?

Answer

Percentage deposit by Rohit in bank = 12% of total income

Money actually deposited by him = Rs. 1440

Let total income of Rohit = Rs. X

So,

$\frac{x \times 12}{100} = 1440$

$x = \frac{1440 \times 100}{12} = Rs.\ 12000$

∴ Total income of Rohit = Rs.12000

13. Question

Gunpowder contains 75% nitre and 10% sulphur. Find the amount of the gunpowder which carries 9 kg nitre. What amount of gunpowder would contain 2.3 kg sulphur?

Answer

Amount of nitre in gunpowder = 9 kg

Percentage of nitre in gunpowder = 75%

Let amount of gunpowder = x kg

So,

$= \frac{x \times 75}{100} = 9$

$= x = \frac{9 \times 100}{75} = 12\ kg$

Amount of sulphur in gunpowder = 2.3 kg

Percentage of sulphur in gunpowder = 10%

Let amount of gunpoder = x kg

So,

$=\frac{x\times10}{100}=2.3$

$=x=\frac{2.3\times100}{10}=23\ kg$

14. Question

An alloy of tin and copper consists of 15 parts of tin and 105 parts of copper. Find the percentage of copper in the alloy?

Answer

In an alloy,

Amount of tin = 15 part

Amount of copper = 105 part

Total weight of alloy = 15+105 = 120

Hence,

Percentage of copper in alloy = $\frac{105}{120}\times100=\frac{525}{6}=87.50\%$

15. Question

An alloy contains 32% copper, 40% nickel and rest zinc. Find the mass of the zinc in 1 kg of the alloy.

Answer

Mass of alloy = 1kg = 1000 gm

Mass of copper in alloy = $\frac{1000\times32}{100}=320\ gm$

Mass of nickel in alloy = $\frac{1000\times40}{100}=400\ gm$

So, amount of zinc in alloy = 1000 - (320 + 400) = 1000 – 720 = 280 gm

16. Question

A motorist travelled 122 kilometres before his first stop. If he had 10%of his journey to complete at this point, how long was the total ride?

Answer

Total distance travelled before first stop = 122 km

Distance completed at first stop = 10 %

Let total distance to be travelled = x km

So,

$=x=\frac{122\times100}{10}=1220\ km$

∴ Total distance = 1220 km

17. Question

A certain school has 300 students, 142 of whom are boys. It has 30 teachers, 12 of whom are men. What percent of the total number of students and teaachers in the school is female?

Answer

Number of students in school = 300

Number of boys = 142

∴ Number of girls = 300 – 142 = 158

Number of teachers in school = 30

No. of male teachers = 12

∴ No. of female teachers = 30 – 12 = 18

Total no. of students and teachers = 300+30 = 330

Total numbers of females = 158+18 = 176

Percentage of females in school = $\frac{176}{330} \times 100 = \frac{160}{3}\ \%$

18. Question

Aman's income is 20% less than that of Anil. How much percent is Anil's income more than Aman's income?

Answer

Let Anil's income = Rs. X

Aman's income = $x - x \times \frac{20}{100} = x - \frac{x}{5} = \frac{4x}{5}$

Difference between Anil's and Aman's income = $x - \frac{4x}{5} = \frac{x}{5}$

Hence,

Percentage in which Anil's income is more than Aman's income =

$= \frac{\frac{x}{5}}{\frac{4x}{5}} \times 100 = 25\%$

19. Question

The value of a machine depreciates every year by 5%. If the present value of the machine be Rs 100000, what will be its value after 2 years?

Answer

Present value of machine = Rs.100000

Depreciation in price every year = 5%

Hence,

$= 100000 \times \frac{100-5}{100} \times \frac{100-5}{100}$

$= 100000 \times \frac{95}{100} \times \frac{95}{100}$

= Rs.90250

20. Question

The population of a town increases by 10% annually. If the present population is 600000, what will be its population after 2 years?

Answer

Present population of town = 60000

Percentage increase in population annually = 10%

Hence ,

Population of town after 2 years = $\text{present population} \times \left[\frac{100+\%\text{increase}}{100}\right]^{\text{time}}$ (time in years)

$= 60000 \times \frac{100+10}{100} \times \frac{100+10}{100}$

$= 60000 \times \frac{110}{100} \times \frac{110}{100}$

= 72600

21. Question

The population of a town increases by 10% annually. If the present population is 22000, find its population a year ago.

Answer

Present population of town = 22000

Increase in population annually = 10%

Hence,

Population of town one year ago = $\text{present population} \times \left[\frac{(100-\%\ \text{increase})}{100}\right]^{\text{time}}$ (time in years)

$= 22000 \times \frac{100-10}{100} = 22000 \times \frac{90}{100} = 19800$

22. Question

Ankit was given an increment of 10% on his salary. His new salary is Rs3575. What was his salary before increment?

Answer

New salary of Ankit = Rs.3575

Percentage increase in salary = 10%

Let original salary of Ankit is = Rs. X

Hence,

Salary of Ankit before increment = $x \times \frac{110}{100} = 3575$

$= x = \frac{3575 \times 100}{110} = \text{Rs. } 3250$

∴ Original salary of Ankit = Rs. 3250

23. Question

In the new budget, the price of petrol rose by 10%. By how much percent must one reduce the consumption so that the expenditure does not increase?

Answer

Percentage increase in price of petrol = 10%

Hence,

Reduction in consumption while having same expenditure =

$= \frac{\%\ \text{increase}}{100 + \%\ \text{increase}} \times 100$

$= \frac{10}{100+10} \times 100 = \frac{1000}{110} = 9\frac{1}{11}\%$

24. Question

Mohan’s income is Rs 15500 per month. He saves 11%. of his income. If his income increases by 10%, then he reduces his saving by 1%, how much does he save now?

Answer

Monthly income of mohan = Rs.15500

Saving of mohan = 11% of 15500 = $15500 \times \frac{11}{100} = \text{Rs. } 1705$

Increase in monthly income = 10%

New monthly income = $15500 + 15500 \times \frac{10}{100} = 15500 + 1550 = \text{Rs. } 17050$

New saving percentage = 11 – 1 = 10%

Hence,

New amount of saving = $\frac{17050 \times 10}{100} = \text{Rs. } 1705$

∴ saving remains same.

25. Question

Shikha’s income is 60% more than that of Shalu. What percent is Shalu’s income less than Shikha’s?

Answer

Let shalu’s income = Rs. X

Hence, shikha’s income = $x + x \times \frac{60}{100} = x + \frac{3x}{5} = \frac{8x}{5}$

Difference between shikha’s and shalu’s income = $\frac{8x}{5} - x = \frac{3x}{5}$

Hence,

Percentage in which shalu’s income is less than shikha’s income =

$= \frac{\frac{3x}{5}}{\frac{8x}{5}} \times 100 = \frac{75}{2} = 37.5\%$

26. Question

Rs 3500 is to be shared among three people so that the first person gets 50%of the second, who in turn gets 50% of the third. How much will each of them get?

Answer

Total money to be shared = Rs. 3500

Let third person get = Rs. X

So, second person gets = $50\% \text{ of } x = x \times \frac{50}{100} = \text{Rs. } \frac{x}{2}$

First person gets = 50% of $\frac{x}{2} = \frac{1}{2} \times \frac{x}{2} = \text{Rs. } \frac{x}{4}$

We know that,

$= x + \frac{x}{2} + \frac{x}{4} = 3500$

$= 4x + 2x + x = 3500 \times 4 = 7x = 3500 \times 4$

$= x = \frac{3500 \times 4}{7} = 2000$

∴ third person get = Rs. 2000

∴ second person get = $\frac{x}{2} = \frac{2000}{2} = \text{Rs. } 1000$

∴ first person get = $\frac{x}{4} = \frac{2000}{4} = \text{Rs. } 500$

27. Question

After a 20% hike, the cost of Chinese Vase is Rs 2000. What was the original price of the object?

Answer

The Cost of chinese vase after hike = Rs. 2000

Percentage hike = 20%

Let original price of chinese vase = Rs. X

Hence,

$= x + x \times \frac{20}{100} = 2000$

$= x + \frac{x}{5} = 2000 = \frac{6x}{5} = 2000$

$= x = \frac{2000 \times 5}{6} = 1666.67$

∴ original price of chinese vase = Rs. 1666.67