

Chapter - 7 Comparing Quantities

Exercise

In questions 1 to 23, there are four options, out of which one is correct. Write the correct one.

1. 20% of 700 m is

- (a) 560 m (b) 70 m (c) 210 m (d) 140 m**

Solution:

$$\begin{aligned} 20\% \text{ of } 700 \text{ m} &= \frac{20}{100} \times 700 \text{ m} \\ &= 140 \text{ m} \end{aligned}$$

Hence, the correct option is (d).

2. Gayatri's income is rupees 160000 per year. She pays 15% of this as house rent and 10% of the remainder on her child education. The money left with her is.

- (a) Rupees 136000 (b) Rupees 120000**
(c) Rupees 122400 (d) Rupees 14000

Solution:

$$\text{Gayatri's income} = ₹ 160000$$

$$\text{House rent} = \frac{15}{100} \times 160000 = ₹ 24000$$

$$\text{Remaining amount} = ₹ 160000 - ₹ 24000 = ₹ 136000$$

$$\begin{aligned} \text{Expenditure on child's education} &= \frac{10}{100} \times 136000 \\ &= ₹ 13600 \end{aligned}$$

$$\begin{aligned} \text{So, money left with her} &= ₹ (160000 - 24000 - 13600) \\ &= ₹ (160000 - 37600) \\ &= ₹ 122400 \end{aligned}$$

3. The ratio of Fatima's income to her savings is 4: 1. The percentage of money saved by her is :

- (a) 20% (b) 25% (c) 40% (d) 80%**

Solution:

Suppose the income of Fatima be $4x$ and its saving is x .

$$\text{So, saving percentage} = \frac{x}{4x} \times 100\% = 25\%$$

Hence, the correct option is (b).

4. 0.07 is equal to

(a) 70% (b) 7% (c) 0.7% (d) 0.07%

Solution:

$$\begin{aligned} 0.07 &= \frac{7}{100} \\ &= 7\% \end{aligned}$$

Hence, the correct option is (b).

5. In a scout camp, 40% of the scouts were from Gujarat State and 20% of these were from Ahmedabad. The percentage of scouts in the camp from Ahmedabad is:

(a) 25 (b) 32.5 (c) 8 (d) 50

Solution:

Suppose the total scouts in camp be 100.

$$\text{So, scouts from Gujarat} = \frac{40}{100} \times 100 = 40$$

$$\text{And scouts from Ahmedabad} = \frac{20}{100} \times 40 = 8$$

$$\begin{aligned} \text{So, percentage of scouts from Ahmedabad} &= \frac{\text{Scouts from Ahmedabad}}{\text{Total scouts}} \times 100\% \\ &= \frac{8}{100} \times 100\% \\ &= 8\% \end{aligned}$$

Hence, the correct option is (c).

6. What percent of rupees 4500 is rupees 9000?

(a) 200 (b) 1/2 (c) 2 (d) 50

Solution:

Let p percent of Rs. 4500 is Rs. 9000.

So,

$$\frac{p}{100} \times 4500 = 9000$$

$$45x = 9000$$

$$x = \frac{9000}{45}$$

$$x = 200$$

Hence, the correct option is (a).

7. 5.2 is equal to

- (a) 52% (b) 5.2% (c) 520% (d) 0.52%

Solution:

$$5.2 = \frac{52}{10} \times \frac{10}{10} = \frac{520}{100} = 520\%$$

Hence, the correct option is (c).

8. The ratio 3: 8 is equal to

- (a) 3.75% (b) 37.5% (c) 0.375% (d) 267%

Solution:

$$\frac{3}{8} = 0.375 = \frac{37.5}{100} = 37.5\%$$

Hence, the correct option is (b).

9. 225% is equal to

- (a) 9 : 4 (b) 4 : 9 (c) 3 : 2 (d) 2 : 3

Solution:

$$225\% = \frac{225}{100} = \frac{9}{4} = 9 : 4$$

Hence, the correct option is (a).

10. A bicycle is purchased for rupees 1800 and is sold at a profit of 12%. Its selling price is

- (a) Rupees 1584 (b) Rupees 2016 (c) Rupees 1788 (d) Rupees 1812

Solution:

Given: Cost price of bicycle = Rs. 1800

Profit% = 12%

$$\text{So, Profit} = \frac{12}{100} \times 1800 = 216$$

Now, Selling Price = Cost Price + Profit

$$\begin{aligned} \text{Selling Price} &= 1800 + 216 \\ &= \text{Rs. 2016} \end{aligned}$$

Hence, the correct option is (b).

11. A cricket bat was purchased for rupees 800 and was sold for rupees 1600. Then profit earned is

- (a) 100% (b) 64% (c) 50% (d) 60%**

Solution:

Cost Price of bat = Rs. 800

Selling Price of bat = Rs. 1600

As we know, Profit = Selling Price - Cost Price

$$= 1600 - 800$$

$$= 800$$

$$\text{So, Profit} = \frac{800}{800} \times 100\% = 100\%$$

Hence, the correct option is (a).

12. A farmer bought a buffalo for rupees 44000 and a cow for rupees 18000. He sold the buffalo at a loss of 5% but made a profit of 10% on the cow. The net result of the transaction is

- (a) loss of rupees 200 (b) profit of rupees 400**
(c) loss of rupees 400 (d) profit of rupees 200

Solution:

Cost Price of buffalo = Rs. 44000.

Loss% = 5%

$$\text{So, Loss} = \frac{5}{100} \times 44000 = \text{Rs. } 2200$$

Selling Price of buffalo = Rs. 44000 - Rs. 2200

$$= \text{Rs. } 41800$$

Cost Price of cow = ₹ 18000

Profit % = 10%

$$\text{So, Profit} = \frac{10}{100} \times 1800 = \text{Rs. } 1800$$

$$\text{So, Selling Price of cow} = 18000 + 1800 = ₹ 19800$$

Now, Cost Price of both buffalo and cow = 44000 + 18000

$$= \text{Rs. } 62000$$

Selling Price. of both buffalo and cow = 41800 + 19800

$$= \text{Rs. } 61600$$

$$\text{So, Loss} = \text{Rs. } 62000 - \text{Rs. } 61600 = \text{Rs. } 400$$

13. If Mohan's income is 25% more than Raman's income, then Raman's income is less than Mohan's income by
(a) 25% (b) 80% (c) 20% (d) 75%

Solution:

Let Mohan's income be Rs. a and Raman's income be Rs. b .

According to question,

$$a = b + 25\% \text{ of } b$$

$$x = y + \frac{25}{100} y$$

$$x = \frac{125}{100} y$$

$$\frac{100}{125} x = y$$

$$y = x - \frac{1}{5} x$$

$$y = x - 0.20x$$

$$y = x - \frac{20}{100} x$$

$$y = x - 20\% \text{ of } x$$

Therefore, Raman's income is 20% less than Mohan's income.

Hence, the correct option is (c).

14. The interest on rupees 30000 for 3 years at the rate of 15% per annum is
(a) Rupees 4500 (b) Rupees 9000 (c) Rupees 18000 (d) Rupees 13500

Solution:

Given: principal = Rs. 30000

Time = 3 years

Rate = 15% per annum

$$\begin{aligned} \text{Interest} &= \frac{P \times R \times T}{100} \\ &= 30000 \times \frac{15}{100} \times 3 \\ &= \text{Rs. } 13500 \end{aligned}$$

Hence, the correct option is (d).

15. Amount received on rupees 3000 for 2 years at the rate of 11% per annum is

(a) Rupees 2340 (b) Rupees 3660 (c) Rupees 4320 (d) Rupees 3330

Solution:

Given: principal = Rs. 3000, Time = 2 years, Rate = 11% per annum

$$\begin{aligned}\text{As we know, interest} &= \frac{P \times R \times T}{100} \\ &= \frac{3000 \times 11 \times 2}{100} \\ &= \text{Rs. } 660\end{aligned}$$

$$\begin{aligned}\text{Also know, Amount} &= \text{Principal} + \text{Interest} \\ &= 3000 + 660 = \text{Rs. } 3660\end{aligned}$$

Hence, the correct option is (b).

16. Interest on rupees 12000 for 1 month at the rate of 10 % per annum is

(a) Rupees 1200 (b) Rupees 600 (c) Rupees 100 (d) Rupees 12100

Solution:

Given: Principal = ₹ 12000,

$$\text{Time} = 1 \text{ month} = \frac{1}{12} \text{ year}$$

Rate = 10%

$$\begin{aligned}\text{As we know, interest} &= \frac{P \times R \times T}{100} \\ &= \frac{12000 \times 10 \times 1}{100 \times 12} \\ &= \text{Rs. } 100\end{aligned}$$

Hence, the correct option is (c).

17. Rajni and Mohini deposited rupees 3000 and rupees 4000 in a company at the rate of 10% per annum for 3 years and 2(1/2) years respectively. The difference of the amounts received by them will be

(a) Rupees 100 (b) Rupees 1000 (c) Rupees 900 (d) Rupees 1100

Solution:

For Rajni : Principal = Rs. 3000, Rate = 10% per annum, Time = 3 years

$$\text{As we know, interest} = \frac{P \times R \times T}{100}$$

$$= \frac{3000 \times 10 \times 3}{100}$$

$$= \text{Rs.} 900$$

$$\text{Amount} = 3000 + 900$$

$$= \text{Rs.} 3900$$

For Mohini: Principal = Rs.4000,

Rate = 10% p.a.

$$\text{Time} = 2\frac{1}{2} \text{ years} = \frac{5}{2} \text{ years}$$

$$\text{As we know, interest} = \frac{P \times R \times T}{100}$$

$$= \frac{4000 \times 10 \times 5}{100 \times 2}$$

$$= \text{Rs.} 1000$$

$$\text{Interest} = \frac{P \times R \times T}{100} = \frac{4000 \times 10 \times 5}{100 \times 2} = ₹ 1000$$

$$\text{Amount} = 4000 + 1000 = ₹ 5000$$

$$\text{So, difference in amounts} = 5000 - 3900$$

$$= \text{Rs.} 1100$$

Hence, the correct option is (d).

18. If 90% of x is 315 km, then the value of x is

(a) 325 km (b) 350 km (c) 405 km (d) 340 km

Solution:

According to question,

$$90\% \text{ of } x = 315 \text{ km}$$

$$\frac{90}{100} \times x = 315$$

$$x = \frac{315 \times 100}{90}$$

$$x = 350 \text{ km}$$

Hence, the correct option is (b).

19. On selling an article for rupees 329, a dealer lost 6%. The cost price of the article is

(a) Rupees 310.37 (b) Rupees 348.74 (c) Rupees 335 (d) Rupees 350

Solution:

Given: Selling Price = Rs. 329,

Loss % = 6%

$$\text{Cost Price} = \frac{\text{Selling Price} \times 100}{(100 - \text{Loss}\%)}$$

$$= \frac{329 \times 100}{100 - 6}$$

$$= \frac{329 \times 100}{94}$$

$$= \text{Rs. } 350$$

Hence, the correct option is (d).

20. (25% of 50% of 100%)/25 × 50 is equal to
(a) 1.1% (b) 0.1% (c) 0.01% (d) 1%

Solution:

$$\begin{aligned} \frac{25\% \text{ of } 50\% \text{ of } 100\%}{25 \times 50} &= \frac{\frac{25}{100} \times \frac{50}{100} \times \frac{100}{100}}{25 \times 50} \\ &= \frac{1}{100 \times 100} \\ &= \frac{0.01}{100} \\ &= 0.01\% \end{aligned}$$

Hence, the correct option is (c).

21. The sum which will earn a simple interest of rupees 126 in 2 years at 14% per annum is
(a) Rupees 394 (b) Rupees 395 (c) Rupees 450 (d) Rupees 540

Solution:

I = Rs. 126, T = 2 years, R = 14% per annum.

$$\text{As we know, interest} = \frac{P \times R \times T}{100}$$

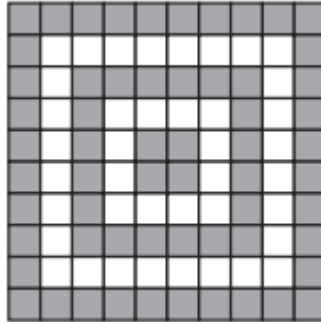
$$126 = \frac{P \times 14 \times 2}{100}$$

$$P = \frac{126 \times 100}{14 \times 2}$$

$$= \text{Rs. } 450$$

Hence, the correct option is (c).

22. The per cent that represents the unshaded region in the figure.



- (a) 75% (b) 50% (c) 40% (d) 60%

Solution:

See the given figure in the question:

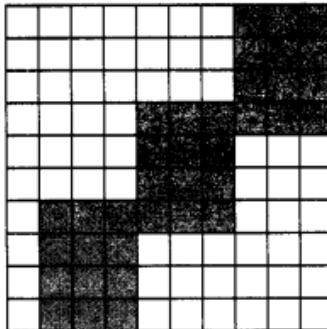
Total parts = 100

Unshaded parts = 40

So, Unshaded fraction = $\frac{40}{100} = 40\%$

Hence, the correct option is (c).

23. The per cent that represents the shaded region in the figure is



- (a) 36% (b) 64% (c) 27% (d) 48%

Solution:

Total parts = 100

Shaded parts = 36

So, Unshaded fraction = $\frac{36}{100} = 36\%$

Hence, the correct option is (a).

In each of the questions 24 to 59, fill in the blanks to make the statements true.

24. 2: 3 = _____ %

Solution:

$$2:3 = \frac{2}{3} = 0.66 = \frac{66}{100} = \underline{66\%}$$

25. 18(3/4) % = _____ : _____

Solution:

$$\begin{aligned} 18\frac{3}{4}\% &= \frac{75}{4}\% \\ &= \frac{75}{4} \times \frac{1}{100} \\ &= \frac{3}{16} \\ &= \underline{3:16} \end{aligned}$$

26. 30% of rupees 360 = _____.

Solution:

$$\begin{aligned} 30\% \text{ of Rs. } 360 &= \frac{30}{100} \times 360 \\ &= \underline{\text{Rs. } 108} \end{aligned}$$

27. 120 % of 50 km = _____.

Solution:

$$\begin{aligned} 120\% \text{ of } 50 \text{ km} &= \frac{120}{100} \times 50 \\ &= \underline{60 \text{ km}} \end{aligned}$$

28. 2.5 = _____ %

Solution:

$$\begin{aligned} 2.5 &= \frac{25}{10} \times \frac{10}{10} \\ &= \frac{250}{100} \\ &= \underline{250\%} \end{aligned}$$

29. 8 5 = _____ %

Solution:

$$\begin{aligned}\frac{8}{5} &= 1.6 \\ &= \frac{16}{10} \times \frac{10}{10} \\ &= \frac{160}{100} \\ &= \underline{160\%}\end{aligned}$$

30. A _____ with its denominator 100 is called a per cent.

Solution:

A fraction with its denominator 100 is called a percent.

31. 15 kg is _____ % of 50 kg.

Solution:

Let 15 kg is x% of 50 kg

$$\text{So, } \frac{x}{100} \times 50 = 15$$

$$x = 15 \times 2 = \underline{30}$$

32. Weight of Nikhil increased from 60 kg to 66 kg. Then, the increase in weight is _____ %.

Solution:

The increase in weight of Nikhil = $66 - 60 = 6$ kg

$$\begin{aligned}\text{So, increase \%} &= \frac{6}{60} \times 100 \\ &= 10\%\end{aligned}$$

Hence, Weight of Nikhil increased from 60 kg to 66 kg. Then, the increase in weight is 10%.

33. In a class of 50 students, 8 % were absent on one day. The number of students present on that day was _____.

Solution:

Given: Total number of students = 50

$$\begin{aligned}\text{Number of absent students} &= \frac{8}{100} \times 50 \\ &= 4\end{aligned}$$

So, number of present students = $50 - 4$

$$= \underline{46}$$

34. Savitri obtained 440 marks out of 500 in an examination. She secured _____ % marks in the examination.

Solution:

Given: Total marks = 500

Marks obtained by Savitri = 440

$$\begin{aligned}\text{So, percentage marks} &= \frac{440}{500} \times 100 \\ &= \underline{88\%}\end{aligned}$$

35. Out of a total deposit of rupees 1500 in her bank account, Abida withdrew 40% of the deposit. Now the balance in her account is _____.

Solution:

Given: Total deposit in Abida's bank account = Rs. 1500

$$\begin{aligned}\text{Withdraw amount} &= \frac{40}{100} \times 1500 \\ &= \text{Rs. } 600\end{aligned}$$

$$\begin{aligned}\text{So, balance in Abida's bank account} &= \text{Rs. } 1500 - 600 \\ &= \underline{\text{Rs. } 900}\end{aligned}$$

36. _____ is 50% more than 60.

Solution:

Let x is 50% more than 60

$$\begin{aligned}x &= \frac{50}{100} \times 60 + 60 \\ &= 30 + 60 \\ &= 90\end{aligned}$$

Hence, 90 is 50% more than 60.

37. John sells a bat for rupees 75 and suffers a loss of rupees 8. The cost price of the bat is _____.

Solution:

Given: S.P. of bat = Rs. 75

Loss = ₹ 8

$$\text{So, C.P.} = 75 + 8 = \underline{\text{Rs. } 83}$$

38. If the price of sugar is decreased by 20%, then the new price of 3kg sugar originally costing rupees 120 will be _____.

Solution:

Original cost price of 3 kg sugar = ₹ 120

$$\begin{aligned}\text{So, original cost price of 1 kg sugar} &= \frac{120}{3} \\ &= \text{Rs. } 40\end{aligned}$$

Decrease percentage = 20%

$$\begin{aligned}\text{So, decrease amount} &= \frac{20}{100} \times 40 \\ &= \text{Rs. } 8\end{aligned}$$

Now, new price of 1 kg sugar = $40 - 8 = \text{Rs. } 32$

Hence, new price of 3 kg sugar = $32 \times 3 = \underline{\text{Rs. } 96}$

39. Mohini bought a cow for rupees 9000 and sold it at a loss of rupees 900. The selling price of the cow is _____.

Solution:

Given: C.P. of the cow = Rs. 9000

Loss = Rs. 900

$$\begin{aligned}\text{So, S.P. of the cow} &= 9000 - 900 \\ &= \underline{\text{Rs. } 8100}\end{aligned}$$

40. Devangi buys a chair for rupees 700 and sells it for rupees 750. She earns a profit of _____ % in the transaction.

Solution:

Given: C.P. of chair = Rs. 700

S.P. of chair = Rs. 750

$$\begin{aligned}\text{Profit} &= 750 - 700 \\ &= \text{Rs. } 50\end{aligned}$$

$$\begin{aligned}\text{So, Profit\%} &= \frac{50}{700} \times 100 \\ &= \frac{50}{7} \\ &= 7\frac{1}{7}\end{aligned}$$

41. Sonal bought a bed sheet for rupees 400 and sold it for rupees 440. Her _____ % is _____.

Solution:

Given: Profit, 10: C.P. of bed sheet = Rs. 400

S.P. of bed sheet = Rs. 440

Now, S.P. > C.P.

Therefore, profit = 440 – 400 = ₹ 40

$$\begin{aligned}\text{So, Profit\%} &= \frac{40}{400} \times 100 \\ &= \underline{10}\end{aligned}$$

42. Nasim bought a pen for rupees 60 and sold it for rupees 54. His _____% is _____.

Solution:

Given: Loss, 10: C.P. of pen = ₹ 60

S.P. of pen = ₹ 54

S.P. < C.P.

Thus, Nasim has a loss of 60 – 54 = ₹ 6.

$$\begin{aligned}\text{So, Loss\%} &= \frac{6}{60} \times 100 \\ &= \underline{10}\end{aligned}$$

43. Aahuti purchased a house for rupees 50,59,700 and spent rupees 40300 on its repairs. To make a profit of 5%, she should sell the house for rupees _____.

Solution:

Given: Purchasing amount of house = Rs. 5059700

Amount spent on repairing the house = Rs. 40300

So, C.P. of house = 5059700 + 40300 = Rs. 5100000

Profit % = 5%

$$\text{Now, S.P.} = \left(\frac{100 + \text{Profit\%}}{100} \right) \times \text{C.P.}$$

$$= \left(\frac{100 + 5}{100} \right) \times 5100000$$

$$= 105 \times 51000$$

$$= \text{Rs. } 5355000$$

Hence, Aahuti should sell the house for ₹ 5355000 to make a profit of 5%.

44. If 20 lemons are bought for rupees 10 and sold at 5 for three rupees, then _____ in the transaction is _____%.

Solution:

Given: Cost price of 20 lemons = Rs. 10

So, Cost price of 1 lemon = $\frac{10}{20} = \text{Rs. } \frac{1}{2}$

Selling price of 5 lemons = Rs. 3

So, Selling price of 1 lemon = $\text{Rs. } \frac{3}{5}$

Now, S.P. > C.P.

Thus, profit in the transaction = $\frac{3}{5} - \frac{1}{2}$
= $\text{Rs. } \frac{1}{10}$

$$\begin{aligned}\text{Profit\%} &= \frac{\frac{1}{10}}{\frac{1}{2}} \times 100 \\ &= \frac{1}{10} \times \frac{2}{1} \times 100 \\ &= \underline{20\%}\end{aligned}$$

45. Narain bought 120 oranges at rupees 4 each. He sold 60 % of the oranges at rupees 5 each and the remaining at rupees 3.50 each. His _____ is _____ %.

Solution:

Given: Total oranges = 120

60% of oranges = $\frac{60}{100} \times 120$

= 72

Remaining oranges = $120 - 72 = 48$

Now, C.P. of 120 oranges = $120 \times 4 = \text{Rs. } 480$

S.P. of 72 oranges = $72 \times 5 = \text{Rs. } 360$

S.P. of 48 oranges = $48 \times 3.50 = \text{Rs. } 168$

So, S.P. of 120 oranges = $360 + 168 = \text{Rs. } 528$

Now, S.P. > C.P.

Therefore, Narain gets the profit of $\text{Rs. } (528 - 480) = \text{Rs. } 48$

Hence, Profit% = $\frac{48}{480} \times 100 = 10\%$

46. A fruit seller purchased 20 kg of apples at rupees 50 per kg. Out of these, 5% of the apples were found to be rotten. If he sells the remaining apples at rupees 60 per kg, then his _____ is _____ %.

Solution:

Given: Total apples = 20 kg

$$\text{Rotten apples} = \frac{5}{100} \times 20 = 1 \text{ kg}$$

$$\text{Remaining apples} = 20 - 1 = 19 \text{ kg}$$

$$\text{Now, C.P. of 20 kg apples} = 20 \times 50 = \text{Rs. } 1000$$

$$\text{S.P. of 19 kg apples} = 19 \times 60 = \text{Rs. } 1140$$

S.P. > C.P.

So, Fruit seller gets profit of Rs. $(1140 - 1000) = \text{Rs. } 140$

$$\text{Hence, Profit\%} = \frac{140}{1000} \times 100 = \underline{14\%}$$

47. Interest on rupees 3000 at 10% per annum for a period of 3 years is _____.

Solution:

Principal = Rs. 3000, Rate = 10% p.a., Time = 3 years

$$\begin{aligned} \text{As we know that, interest} &= \frac{P \times R \times T}{100} \\ &= \frac{3000 \times 10 \times 3}{100} \\ &= \underline{\text{Rs. } 900} \end{aligned}$$

48. Amount obtained by depositing rupees 20,000 at 8 % per annum for six months is _____.

Solution:

Principal = Rs. 20000, Rate = 8% p.a.

$$\text{Time} = 6 \text{ months} = \frac{6}{12} \text{ year} = \frac{1}{2} \text{ year}$$

$$\begin{aligned} \text{As we know that, interest} &= \frac{P \times R \times T}{100} \\ &= \frac{20000 \times 8 \times 1}{100 \times 2} \\ &= \text{Rs. } 800 \end{aligned}$$

$$\text{Amount} = \text{Principal} + \text{Interest} = 20000 + 800 = \underline{\text{Rs. } 20800}$$

49. Interest on rupees 12500 at 18% per annum for a period of 2 years and 4 months is _____.

Solution:

Principal = ₹ 12500, Rate = 18% p.a.

Time = 2 years + 4 months = 2 years + $\frac{4}{12}$ years

$$= \left(2 + \frac{1}{3}\right) \text{ years}$$

$$= \frac{7}{3} \text{ years}$$

$$\begin{aligned} \text{As we know that, interest} &= \frac{P \times R \times T}{100} \\ &= \frac{12500 \times 18 \times 7}{100 \times 3} \\ &= \text{Rs. } 5250 \end{aligned}$$

50. 25 ml is _____ per cent of 5 litres.

Solution:

Let 25 ml is x% of 5 litres.

So,

$$\frac{x}{100} \times 5 = 25 \times \frac{1}{1000} \text{ litres}$$

$$x = \frac{25}{1000} \times \frac{100}{5}$$

$$x = \frac{5}{10}$$

$$x = 0.5$$

51. If A is increased by 20%, it equals B. If B is decreased by 50%, it equals C. Then _____ % of A is equal to C.

Solution:

According to question,

$$A + \frac{20}{100} \times A = B \text{ and } B - \frac{50}{100} \times B = C$$

$$A \left(1 + \frac{1}{5}\right) = B \text{ and } B \left(1 - \frac{1}{2}\right) = C$$

$$\frac{6}{5} A = B \text{ and } \frac{1}{2} B = C$$

$$\frac{6}{5} A = B \text{ and } B = 2C$$

So,

$$\frac{6}{5}A = 2C$$

$$C = \frac{6}{10}A$$

$$C = \left(\frac{6 \times 10}{10 \times 10} \right) A$$

$$C = \frac{60}{100}A$$

$$C = 60\% \text{ of } A$$

52. Interest = $(P \times R \times T)/100$, where T is _____ R% is _____ and P is _____.

Solution:

Time period, Rate of interest, Principal:

$$\text{As we know that, interest} = \frac{P \times R \times T}{100}$$

where T = Time period

R% = Rate of interest

and P = Principal

53. The difference of interest for 2 years and 3 years on a sum of rupees 2100 at 8% per annum is _____.

Solution:

Principal = ₹ 2100, Rate = 8% p.a.

$$\text{As we know that, interest} = \frac{P \times R \times T}{100}$$

$$\begin{aligned} \text{Interest for 2 years} &= \frac{2100 \times 8 \times 2}{100} \\ &= \text{Rs. } 336 \end{aligned}$$

$$\begin{aligned} \text{Interest for 3 years} &= \frac{2100 \times 8 \times 3}{100} \\ &= \text{Rs. } 504 \end{aligned}$$

$$\text{So, Difference} = 504 - 336 = \underline{\text{Rs. } 168}.$$

54. To convert a fraction into a per cent, we _____ it by 100.

Solution:

To convert a fraction into a percent, we multiply it by 100.

55. To convert a decimal into a per cent, we shift the decimal point two places to the _____.

Solution:

To convert a decimal into a percent, we shift the decimal point two places to the right.

56. The _____ of interest on a sum of rupees 2000 at the rate of 6% per annum for $1\frac{1}{2}$ years and 2 years is rupees 420.

Solution:

Principal = Rs. 2000, Rate = 6% p.a.

$$\text{Interest for } 1\frac{1}{2} \text{ years that is } \frac{3}{2} \text{ years} = \frac{2000 \times 6 \times 3}{100 \times 2} \\ = \text{Rs. 180}$$

$$\text{Interest for 2 years} = \frac{2000 \times 6 \times 2}{100} \\ = \text{Rs. 240}$$

$$\text{Sum of both interest} = \text{Rs. (180 + 240)} \\ = \underline{\text{Rs. 420}}$$

57. When converted into percentage, the value of 6.5 is _____ than 100%.

Solution:

Given: Number = 6.5

Now,

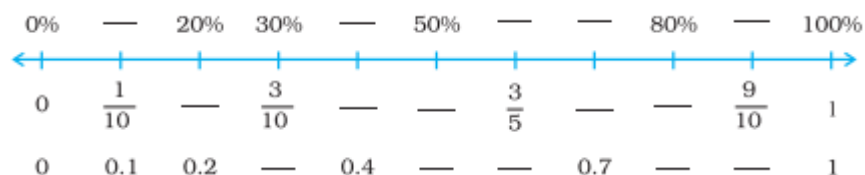
$$\frac{6.5}{100} \times 100 = \frac{650}{100} \\ = 650\%$$

And $650\% > 100\%$

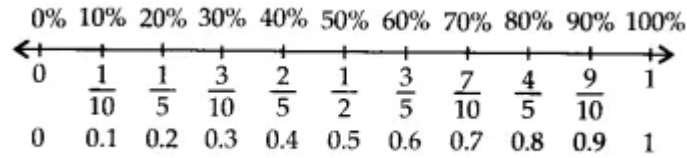
Hence, after converting 6.5 into percentage, the value of 6.5 is more than 100%.

In questions 58 and 59, copy each number line. Fill in the blanks so that each mark on the number line is labelled with a per cent, a fraction and a decimal. Write all fractions in lowest terms.

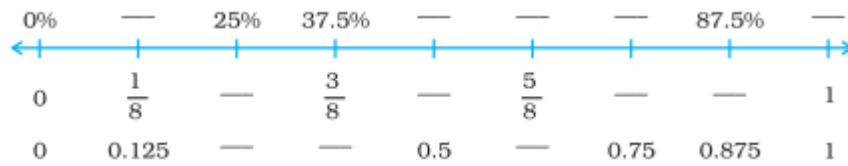
58.



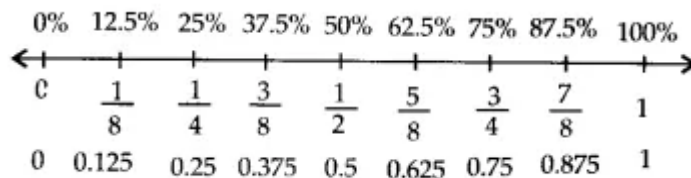
Solution:



59.



Solution:



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

Solution:

$$\begin{aligned}\frac{2}{3} &= \frac{2 \times 100}{3 \times 100} \\ &= \frac{200}{3} \% \\ &= 66\frac{2}{3} \%\end{aligned}$$

Hence, the given statement is true.

61. When an improper fraction is converted into percentage then the answer can also be less than 100.

Solution:

When an improper fraction is converted into percentage then the answer always greater than 100

Hence, the given statement is false.

62. 8 hours is 50% of 4 days.

Solution:

1 day = 24 hours

So, 4 days = $24 \times 4 = 96$ hours

Now, 50% of 96 hours = $\frac{50}{100} \times 96$
 $= 48$ hours

Hence, the given statement is false.

63. The interest on rupees 350 at 5% per annum for 73 days is rupees 35.

Solution:

Principal = Rs. 350, Rate = 5% p.a.

Time = 73 days = $\frac{73}{365}$ years

$$\begin{aligned} \text{Interest} &= \frac{350 \times 5 \times 73}{100 \times 365} \\ &= \frac{2555}{2 \times 365} \\ &= \frac{7}{2} \\ &= \text{Rs. } 3.5 \end{aligned}$$

Hence, the given statement is false.

64. The simple interest on a sum of rupees P for T years at R% per annum is given by the formula: Simple Interest = $(T \times P \times R)/100$.

Solution:

$$\text{Simple interest} = \frac{P \times R \times T}{100} = \frac{T \times P \times R}{100}$$

where P is the principal, R is the rate of interest and T is the time.

Hence, the given statement is true.

65. $75\% = 4/3$.

Solution:

$$75\% = \frac{75}{100}$$

$$= \frac{3}{4}$$

Hence, the given statement is false.

66. 12% of 120 is 100.

Solution:

$$12\% \text{ of } 120 = \frac{12}{100} \times 120$$

$$= 14.40$$

Hence, the given statement is false.

67. If Ankita obtains 336 marks out of 600, then percentage of marks obtained by her is 33.6.

Solution:

Total marks = 600

Marks obtained by Ankita = 336

$$\text{So, percentage of her marks} = \frac{336}{600} \times 100$$

$$= 56\%$$

Hence, the given statement is false.

68. 0.018 is equivalent to 8%.

Solution:

$$0.018 = \frac{0.018}{100} \times 100$$

$$= 1.8\%$$

Hence, the given statement is false.

69. 50% of rupees 50 is rupees 25.

Solution:

$$50\% \text{ of Rs. } 50 = \frac{50}{100} \times 50$$

$$= \text{Rs. } 25$$

Hence, the given statement is true.

70. 250 cm is 4% of 1 km.

Solution:

$$1 \text{ km} = 1000 \text{ m} = 1000 \times 100 \text{ cm} = 100000 \text{ cm}$$

$$4\% \text{ of } 1 \text{ km} = \left(\frac{4}{100} \times 100000 \right) \text{ cm} \\ = 4000 \text{ cm}$$

Hence, the given statement is false.

71. Out of 600 students of a school, 126 go for a picnic. The percentage of students that did not go for the picnic is 75.

Solution:

Total number of students = 600

Number of students went on a picnic = 126

So, Number of students who did not go for the picnic = $600 - 126 = 474$

$$\text{Percentage of students who did not go for the picnic} = \frac{474}{600} \times 100 \\ = 79.16\%$$

Hence, the given statement is false.

72. By selling a book for rupees 50, a shopkeeper suffers a loss of 10%. The cost price of the book is rupees 60.

Solution:

Selling price of a book = Rs. 50

Loss % = Rs. 10

We know that

$$\text{C.P.} = \frac{S.P. \times 100}{(100 - \text{Loss}\%)} \\ = \frac{50 \times 100}{(100 - 10)} \\ = \frac{5000}{90} \\ = \text{Rs. } 55.55$$

Therefore, the cost price of the book is Rs. 55.5.

Hence, the given statement is false.

73. If a chair is bought for rupees 2000 and is sold at a gain of 10%, then selling price of the chair is rupees 2010.

Solution:

Given: C.P. of a chair = Rs. 2000

Gain % = 10

We know that,

$$\begin{aligned} \text{S.P.} &= \left(\frac{100 + \text{gain}\%}{100} \right) \times \text{C.P.} \\ &= \left(\frac{100 + 10}{100} \right) \times 2000 \\ &= \frac{110 \times 2000}{100} \\ &= \text{Rs. } 2200 \end{aligned}$$

Hence, the given statement is false.

74. If a bicycle was bought for rupees 650 and sold for rupees 585, then the percentage of profit is 10.

Solution:

C.P. of a bicycle = Rs. 650

S.P. of the bicycle = Rs. 585

Therefore, there is a loss of Rs. $(650 - 585) = \text{Rs. } 65$

$$\begin{aligned} \text{Loss}\% &= \frac{65}{650} \times 100 \\ &= 10\% \end{aligned}$$

Hence, the given statement is false.

75. Sushma sold her watch for rupees 3320 at a gain of rupees 320. For earning a gain of 10% she should have sold the watch for rupees 3300.

Solution:

S.P. of a watch = Rs. 3320

Gain = Rs. 320

So, C.P. of the watch = Rs. $(3320 - 320) = \text{Rs. } 3000$

Required gain % = 10

$$\text{S.P.} = \left(\frac{100 + \text{Gain}\%}{100} \right) \times \text{C.P.}$$

$$\begin{aligned}
&= \left(\frac{100+10}{100} \right) \times 3000 \\
&= \frac{110}{100} \times 3000 \\
&= \text{Rs. } 3300
\end{aligned}$$

So, for earning again of 10% Sushma should have sold the watch for Rs. 3300.

Hence, the given statement is true.

76. Interest on rupees 1200 for 1(1/2) years at the rate of 15% per annum is rupees 180.

Solution:

Principal = ₹ 1200,

Time = $1\frac{1}{2}$ years = $\frac{3}{2}$ years

Rate = 15% p.a.

$$\begin{aligned}
\text{Interest} &= \frac{P \times R \times T}{100} \\
&= \frac{1200 \times 15 \times 3}{100 \times 2} \\
&= \text{Rs. } 270
\end{aligned}$$

Hence, the given statement is false.

77. Amount received after depositing rupees 800 for a period of 3 years at the rate of 12% per annum is rupees 896.

Solution:

Principal = Rs. 800, Time = 3 years

Rate = 12% p.a.

As we know,

$$\begin{aligned}
\text{Interest} &= \frac{P \times R \times T}{100} \\
&= \frac{800 \times 12 \times 3}{100} \\
&= 288
\end{aligned}$$

Now, amount = Principal + Interest
= Rs. (800 + 288) = Rs. 1088

Hence, the given statement is false.

78. Rupees 6400 were lent to Feroz and Rashmi at 15% per annum for $3\frac{1}{2}$ and 5 years respectively. The difference in the interest paid by them is rupees 150.

Solution:

For Feroz: Principal = ₹ 6400,

Rate = 15% p.a.

$$\text{Time} = 3\frac{1}{2} \text{ years} = \frac{7}{2} \text{ years}$$

As we know,

$$\begin{aligned}\text{Interest} &= \frac{P \times R \times T}{100} \\ &= \frac{6400 \times 15 \times 7}{100 \times 2} \\ &= 3360\end{aligned}$$

For Rashmi : Principal = 6400,

Rate = 15% p.a.

Time = 5 years

$$\begin{aligned}\text{Interest} &= \frac{6400 \times 15 \times 5}{100} \\ &= 4800\end{aligned}$$

Required difference in interests = Rs. $(4800 - 3360) = \text{Rs. } 1440$

Hence, the given statement is false.

79. A vendor purchased 720 lemons at rupees 120 per hundred. 10% of the lemons were found rotten which he sold at rupees 50 per hundred. If he sells the remaining lemons at rupees 125 per hundred, then his profit will be 16%.

Solution:

Total number of lemons = 720

C.P. of 100 lemons = Rs. 120

$$\begin{aligned}\text{So, C.P. of 720 lemons} &= \frac{120}{100} \times 720 \\ &= \text{Rs. } 864\end{aligned}$$

Rotten lemons = 10%

$$\begin{aligned}\text{Number of rotten lemons} &= \frac{10}{100} \times 720 \\ &= 72\end{aligned}$$

Number of remaining lemons which are not rotten = $720 - 72 = 648$

$$\begin{aligned}\text{S.P. of 72 rotten lemons} &= \frac{50}{100} \times 72 \\ &= \text{Rs. } 36\end{aligned}$$

$$\begin{aligned}\text{S.P. of remaining 648 lemons} &= \frac{125}{100} \times 648 \\ &= \text{Rs. } 810\end{aligned}$$

S.P. of 720 lemons = Rs. $(36 + 810) = \text{Rs. } 846$

Here, C.P. > S.P.

Therefore, there is a loss of Rs. $(864 - 846) = \text{Rs. } 18$

Hence, the given statement is false.

80. Find the value of x if

(i) 8% of rupees x is rupees 100

(ii) 32% of x kg is 400 kg

(iii) 35% of rupees x is rupees 280

(v) 45% of marks x is 405.

Solution:

(i) 8% of Rs. x = Rs. 100

$$\begin{aligned}\frac{8}{100} \times x &= 100 \\ \frac{100 \times 100}{8} &= 1250\end{aligned}$$

(ii) 32% of x kg is 400 kg

$$\begin{aligned}\frac{32}{100} \times x &= 400 \\ x &= \frac{400 \times 100}{32}\end{aligned}$$

$$x = 1250$$

(iii) 35% of Rs x is Rs. 280

$$\begin{aligned}\frac{35}{100} \times x &= 280 \\ x &= \frac{280 \times 100}{35}\end{aligned}$$

$$x = 800$$

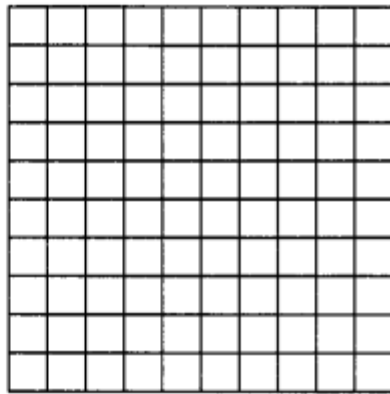
(iv) 45% of marks x is 405

$$\begin{aligned}\frac{45}{100} \times x &= 405 \\ x &= \frac{405 \times 100}{45}\end{aligned}$$

$$x = 900$$

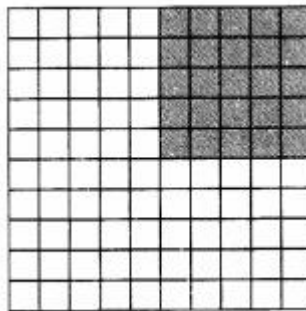
81. Imagine that a 10×10 grid has value 300 and that this value is divided evenly among the small squares. In other words, each small square is worth 3. Use a new grid for each part of this problem, and label each grid “Value : 300.”

- (a) Shade 25% of the grid. What is 25% of 300? Compare the two answers.**
- (b) What is the value of 25 squares?**
- (c) Shade 17% of the grid. What is 17% of 300? Compare the two answers.**
- (d) What is the value of 1 10 of the grid?**



Solution:

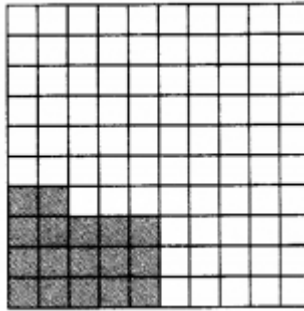
$$\begin{aligned} \text{(a) } 25\% \text{ of } 300 &= \frac{25}{100} \times 300 \\ &= 75 \end{aligned}$$



Now, each small square is worth 3.
 So, 25 small square worth's $25 \times 3 = 75$
 Both the values are same.

(b) From part (a), value of 25 small squares is 75.

$$\begin{aligned} \text{(c) } 17\% \text{ of } 300 &= \frac{17}{100} \times 300 \\ &= 51 \end{aligned}$$



Now, each small square is worth 3
 So, 17 small square worth's $17 \times 3 = 51$
 Both the values are same.

(d) Total numbers in grid = $10 \times 10 = 100$

$$\text{So, } \frac{1}{10} \text{ of } 100 = \frac{1}{10} \times 100 \\ = 10$$

Each small square is worth 3
 So, 10 small square worth's $10 \times 3 = 30$

82. Express $\frac{1}{6}$ as a per cent.

Solution:

$$\frac{1}{6} = \frac{1 \times 100}{6 \times 100} \\ = \frac{100}{6} \% \\ = \frac{50}{3} \% \\ = 16.66\%$$

83. Express $\frac{9}{40}$ as a per cent.

Solution:

$$\frac{9}{40} = \frac{9}{40} \times \frac{100}{100} \\ = \frac{900}{40} \% \\ = \frac{45}{2} \% \\ = 22\frac{1}{2} \%$$

84. Express $\frac{1}{100}$ as a per cent.

Solution:

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

85. Express 80% as fraction in its lowest term.

Solution:

$$\begin{aligned} 80\% &= \frac{80}{100} \\ &= \frac{4}{5} \end{aligned}$$

86. Express $33\frac{1}{3}\%$ as a ratio in the lowest term.

Solution:

$$\begin{aligned} 33\frac{1}{3}\% &= \frac{100}{3}\% \\ &= \frac{100}{3} \times \frac{1}{100} \\ &= \frac{1}{3} \\ &= 1:3 \end{aligned}$$

87. Express $16\frac{2}{3}\%$ as a ratio in the lowest form.

Solution:

$$\begin{aligned} 16\frac{2}{3}\% &= \frac{50}{3}\% \\ &= \frac{50}{3} \times \frac{1}{100} \\ &= \frac{1}{6} \\ &= 1:6 \end{aligned}$$

88. Express 150% as a ratio in the lowest form.

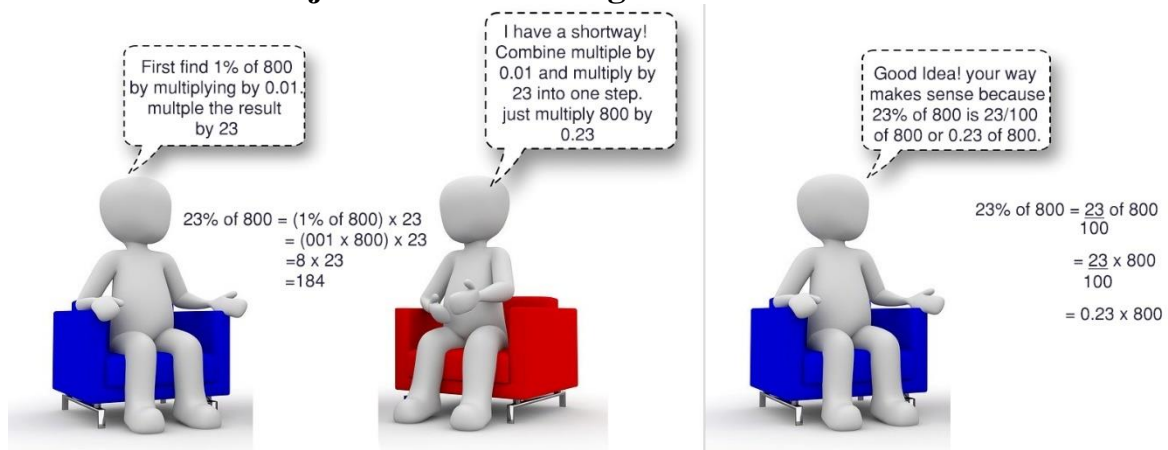
Solution:

$$150\% = \frac{150}{100}$$

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

$$= 3:2$$

89. Sachin and Sanjana are calculating 23% of 800.



Now calculate 52% of 700 using both the ways described above. Which way do you find easier?

Solution:

$$\text{I : } 52\% \text{ of } 700 = (1\% \text{ of } 700) \times 52$$

$$= (0.01 \times 700) \times 52$$

$$= 7 \times 52 = 364$$

$$\text{II. } 52\% \text{ of } 700 = \frac{52}{100} \text{ of } 700$$

$$= \frac{52}{100} \times 700$$

$$= 0.52 \times 700$$

$$= 364$$

We find that the way II is easier.

90. Write 0.089 as a per cent.

Solution:

$$0.089 = 0.089 \times \frac{100}{100}$$

$$= \frac{8.9}{100}$$

$$= 8.9\%$$

91. Write 1.56 as a per cent.

Solution:

$$\begin{aligned}1.56 &= 1.56 \times \frac{100}{100} \\&= \frac{156}{100} \\&= 156\%\end{aligned}$$

92. What is 15% of 20?

Solution:

$$\begin{aligned}15\% \text{ of } 20 &= \frac{15}{100} \times 20 \\&= 3\end{aligned}$$

93. What is 800% of 800?

Solution:

$$\begin{aligned}800\% \text{ of } 800 &= \frac{800}{100} \times 800 \\&= 6400\end{aligned}$$

94. What is 100% of 500?

Solution:

$$\begin{aligned}100\% \text{ of } 500 &= \frac{100}{100} \times 500 \\&= 500\end{aligned}$$

95. What per cent of 1 hour is 30 minutes?

Solution:

Let x% of 1 hour is 30 minutes.

Now, 1 hour = 60 minutes

So,

$$\frac{x}{100} \times 60 = 30$$

$$x = \frac{30 \times 100}{60}$$

$$x = 50$$

96. What per cent of 1 day is 1 minute?

Solution:

Let x% of 1 day is 1 minute,

Now, 1 day – 24 hours = (24×60) minutes

So,

$$\frac{x}{100} \times 1440 = 1$$

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

$$x = 0.069$$

97. What per cent of 1 km is 1000 metres?**Solution:**

Let % of 1 km is 1000 metres.

Now, 1 km = 1000 metres

So,

$$\frac{x}{100} \times 1000 = 1000$$

$$x = \frac{1000 \times 100}{1000}$$

$$x = 100$$

98. Find out 8% of 25 kg.**Solution:**

$$8\% \text{ of } 25 \text{ kg} = \left(\frac{8}{100} \times 25 \right) \text{ kg}$$

$$= 2 \text{ kg}$$

99. What percent of rupees 80 is rupees 100 ?**Solution:**

Let x% of Rs. 80 is Rs. 100

So,

$$\frac{x}{100} \times 80 = 100$$

$$x = \frac{100 \times 100}{80}$$

$$x = 125$$

100. 45% of the population of a town are men and 40% are women. What is the percentage of children?

Solution:

Total percentage = 100

Percentage of men = 45

Percentage of women = 40

So, Percentage of children = $100 - (45 + 40) = 100 - 85 = 15$

101. The strength of a school is 2000. If 40 % of the students are girls then how many boys are there in the school?

Solution:

Total number of students = 2000

Number of girls = 40% of 2000 = $\frac{40}{100} \times 2000$

= 800

So, Number of boys = $2000 - 800 = 1200$

102. Chalk contains 10% calcium, 3% carbon and 12% oxygen. Find the amount of carbon and calcium (in grams) in $2\frac{1}{2}$ kg of chalk.

Solution:

Total amount of chalk = $2\frac{1}{2} \text{ kg} = \frac{5}{2} \text{ kg}$

Amount of calcium = 10% of $\frac{5}{2} \text{ kg}$

$$= \left(\frac{10}{100} \times \frac{5}{2} \right) \text{ kg}$$

$$= 0.25 \text{ kg}$$

$$= (0.25 \times 1000) \text{ g}$$

$$= 250 \text{ g}$$

Amount of carbon = 3% of $\frac{5}{2} \text{ kg}$

$$= \left(\frac{3}{100} \times \frac{5}{2} \right) \text{ kg}$$

$$= 0.075 \text{ kg}$$

$$= (0.075 \times 1000) \text{ g}$$

$$= 75 \text{ g}$$

103. 800 kg of mortar consists of 55% sand, 33% cement and rest lime. What is the mass of lime in mortar?

Solution:

Total mass of mortar = 800 kg

Mass of sand in mortar = 55% of 800 kg

$$= \left(\frac{55}{100} \times 800 \right) \text{kg}$$
$$= 440 \text{kg}$$

Mass of cement in mortar = 33% of 800 kg

$$= \left(\frac{33}{100} \times 800 \right) \text{kg}$$
$$= 264 \text{kg}$$

Hence, Mass of lime in mortar = $[800 - (440 + 264)] \text{ kg}$
 $= 96 \text{ kg}$

104. In a furniture shop, 24 tables were bought at the rate of rupees 450 per table. The shopkeeper sold 16 of them at the rate of rupees 600 per table and the remaining at the rate of 400 per table. Find her gain or loss percent.

Solution:

C.P. of 1 table = Rs. 450

So, C.P. of 24 tables = Rs. $(24 \times 450) = \text{Rs. } 10800$

S.P. of 16 tables = Rs. $\{(16 \times 600) = \text{Rs. } 9600$

S.P. of remaining tables that is 8 tables = Rs. $(8 \times 400) = 3200$

S.P. of 24 tables = Rs. $(9600 + 3200) = \text{Rs. } 12800$

Here, S.P. > C.P.

Therefore, there is a gain of Rs. $(12800 - 10800) = \text{Rs. } 2000$

$$\text{Gain\%} = \frac{2000}{10800} \times 100$$
$$= 18.5\%$$

105. Medha deposited 20% of her money in a bank. After spending 20% of the remainder, she has rupees 4800 left with her. How much did she originally have?

Solution:

Let the amount of money Medha had ₹ x.

Amount of money deposited in bank = 20% of x

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

$$= \frac{x}{5}$$

$$\text{Remaining amount} = x - \frac{x}{5}$$

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

$$\text{Amount of money spent by her} = 20\% \text{ of } \frac{4}{5}x$$

$$= \frac{20}{100} \times \frac{4}{5}x$$

$$= \frac{4}{25}x$$

$$\text{Amount of money left with her} = \frac{4}{5}x - \frac{4}{25}x$$

$$= \frac{16}{25}x$$

Now, according to the question,

$$\frac{16}{25}x = 4800$$

$$x = \frac{4800 \times 25}{16}$$

$$x = 7500$$

106. The cost of a flower vase got increased by 12%. If the current cost is rupees 896, what was its original cost?

Solution:

Let the original cost of a flower vase = Rs. x

Cost of the flower vase after increased by 12% = $x + 12\%$ of x

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

$$= x + \frac{3}{25}x$$

$$= \frac{28}{25}x$$

Now, according to the question,

$$\frac{28}{25}x = 896$$

$$x = \frac{896 \times 25}{28}$$

$$x = 800$$

107. Radhika borrowed rupees 12000 from her friends. Out of which rupees 4000 were borrowed at 18% and the remaining at 15% rate of interest per annum. What is the total interest after 3 years?

Solution:

Given: Total amount borrowed by Radhika = Rs.12000

I:- Principal = Rs. 4000, Rate = 18% p.a.,

Time = 3 years

$$\begin{aligned}\text{As we know, Interest} &= \frac{P \times R \times T}{100} \\ &= \frac{4000 \times 18 \times 3}{100} \\ &= 2160\end{aligned}$$

II:- Principal = ₹ (12000 – 4000) = ₹ 8000,

Rate = 15%, Time = 3 years

$$\begin{aligned}\text{Interest} &= \frac{8000 \times 15 \times 3}{100} \\ &= 3600\end{aligned}$$

$$\begin{aligned}\text{Total interest} &= \text{Rs. } (2160 + 3600) \\ &= \text{Rs. } 5760\end{aligned}$$

108. A man travelled 60 km by car and 240 km by train. Find what per cent of total journey did he travel by car and what per cent by train?

Solution:

Distance travelled by car = 60 km

Distance travelled by train = 240 km

Total distance travelled = (60+240) km = 300 km

$$\begin{aligned}\text{Percentage of journey travelled by car} &= \frac{60}{300} \times 100 \\ &= 20\%\end{aligned}$$

$$\begin{aligned}\text{Percentage of journey travelled by train} &= \frac{240}{300} \times 100 \\ &= 80\%\end{aligned}$$

109. By selling a chair for rupees 1440, a shopkeeper loses 10%. At what price did he buy it?

Solution:

S.P. of a chair = ₹ 1440

Loss% = 10

$$\begin{aligned} \text{C.P.} &= \frac{S.P. \times 100}{100 - \text{Loss}\%} \\ &= \frac{1440 \times 100}{100 - 10} \\ &= \frac{144000}{90} \\ &= 1600 \end{aligned}$$

So, the shopkeeper bought the chair at Rs. 1600.

110. Dhruvika invested money for a period from May 2006 to April 2008 at rate of 12% per annum. If interest received by her is rupees 1620, find the money invested.

Solution:

Let the principal be Rs. P.

Rate = 12% p.a., Interest = Rs. 1620

Time = 2 years

$$\text{Interest} = \frac{P \times R \times T}{100}$$

$$\text{So, } 1620 = \frac{P \times 12 \times 2}{100}$$

$$P = \frac{1620 \times 100}{24}$$

$$P = 6750$$

Hence, amount of money invested by Dhruvika is 6 Rs.750.

111. A person wanted to sell a scooter at a loss of 25%. But at the last moment he changed his mind and sold the scooter at a loss of 20%. If the difference in the two SP's is rupees 4000, then find the CP of the scooter.

Solution:

Let the C.P. of a scooter = Rs. x

$$\text{S.P. of the scooter for a loss of 25\%} = \left(\frac{100 - 25}{100} \right) \times x$$

$$= \frac{3}{4}x$$

$$\text{S.P. of the scooter for a loss of 20\%} = \left(\frac{100-20}{100} \right) \times x$$

$$= \frac{80}{100}x$$

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

$$\text{Difference in both S.P.'s of the scooter} = \frac{4}{5}x - \frac{3}{4}x$$

$$= \frac{1}{20}x$$

Now, according to question,

$$\frac{1}{20}x = 4000$$

$$x = 4000 \times 20$$

$$= 80000$$

112. The population of a village is 8000. Out of these, 80% are literate and of these literate people, 40% are women. Find the ratio of the number of literate women to the total population.

Solution:

Given: Total population of a village = 8000

Number of literate people = 80% of 8000

$$= \frac{80}{100} \times 8000$$

$$= 6400$$

Number of literate women = 40% of 6400

$$= \frac{40}{100} \times 6400$$

$$= 2560$$

$$\text{Required ratio} = \frac{2560}{8000}$$

$$= \frac{8}{25}$$

$$= 8 : 25$$

113. In an entertainment programme, 250 tickets of rupees 400 and 500 tickets of rupees 100 were sold. If the entertainment tax is 40% on ticket of

rupees 400 and 20% on ticket of rupees 100, find how much entertainment tax was collected from the programme.

Solution:

$$\begin{aligned}\text{Cost of 250 tickets of Rs. 400 per ticket} &= \text{Rs. } (250 \times 400) \\ &= \text{Rs. } 100000\end{aligned}$$

$$\begin{aligned}\text{Cost of 500 tickets of Rs. 100 per ticket} &= \text{Rs. } (500 \times 100) \\ &= \text{Rs. } 50000\end{aligned}$$

$$\begin{aligned}\text{Tax on tickets of Rs. 400} &= \frac{40}{100} \times 100000 \\ &= \text{Rs. } 40000\end{aligned}$$

$$\begin{aligned}\text{Tax on tickets of 100} &= \frac{20}{100} \times 50000 \\ &= \text{Rs. } 10000\end{aligned}$$

$$\begin{aligned}\text{Hence, total tax collected from the programme} &= \text{Rs. } (40000 + 10000) \\ &= \text{Rs. } 50000\end{aligned}$$

114. Bhavya earns rupees 50,000 per month and spends 80% of it. Due to pay revision, her monthly income increases by 20% but due to price rise, she has to spend 20% more. Find her new savings.

Solution:

$$\text{Monthly income of Bhavya} = \text{Rs. } 50000$$

$$\text{Spending amount} = 80\% \text{ of Rs. } 50000$$

$$\begin{aligned}&= \frac{80}{100} \times 50000 \\ &= \text{Rs. } 40000\end{aligned}$$

$$\text{New income} = 20\% \text{ of } 50000 + 50000$$

$$\begin{aligned}&= \frac{20}{100} \times 50000 + 50000 \\ &= 10000 + 50000 \\ &= \text{Rs. } 60000\end{aligned}$$

$$\text{New spending amount} = 40000 + 20\% \text{ of } 40000$$

$$\begin{aligned}&= 40000 + \frac{20}{100} \times 40000 \\ &= 40000 + 8000 \\ &= \text{Rs. } 48000\end{aligned}$$

$$\begin{aligned}\text{Hence, New savings of Bhavya} &= \text{Rs. } (60000 - 48000) \\ &= \text{Rs. } 12000\end{aligned}$$

115. In an examination, there are three papers each of 100 marks. A candidate obtained 53 marks in the first and 75 marks in the second paper. How many marks must the candidate obtain in the third paper to get an overall of 70 per cent marks?

Solution:

Total marks = $100 + 100 + 100 = 300$

Marks obtained by the candidate in first paper = 53

Marks obtained by the candidate in second paper = 75

Let the marks obtained by the candidate in third paper = x

Total marks obtained by the candidate = $53 + 75 + x = 128 + x$

Now, according to question:

$$\frac{(128 + x)}{300} \times 100 = 70$$

$$128 + x = 3 \times 70$$

$$x = 210 - 128$$

$$= 82$$

Hence, the candidate must obtain 82 marks in the third paper.

116. Health Application A doctor reports blood pressure in millimetres of mercury (mm Hg) as a ratio of systolic blood pressure to diastolic blood pressure (such as 140 over 80). Systolic pressure is measured when the heart beats, and diastolic pressure is measured when it rests. Refer to the table of blood pressure ranges for adults.

	Blood Pressure Ranges		
	Normal	Prehypertension	Hypertension (Very High)
Systolic	Under 120 mm Hg	120-139 mm Hg	140 mm Hg and above
Diastolic	Under 80 mm Hg	80-89 mm Hg	90 mm Hg and above

Manohar is a healthy 37 years old man whose blood pressure is in the normal category.

(a) Calculate an approximate ratio of systolic to diastolic blood pressures in the normal range.

(b) If Manohar's systolic blood pressure is 102 mm Hg, use the ratio from part (a) to predict his diastolic blood pressure.

(c) Calculate ratio of average systolic to average diastolic blood pressure in the prehypertension category.

Solution:

(a) Systolic blood pressure in the normal range = 120 mm Hg

Diastolic blood pressure in the normal range = 80 mm Hg

$$\begin{aligned}
 \text{So, required ratio} &= \frac{120}{80} \\
 &= \frac{3}{2} \\
 &= 3:2
 \end{aligned}$$

(b) Systolic blood pressure of Manohar = 102 mm Hg

$$\text{So, } \frac{102}{\text{Diastolic blood pressure}} = \frac{3}{2}$$

$$\begin{aligned}
 \text{Diastolic blood pressure} &= 102 \times \frac{2}{3} \\
 &= 68 \text{ mm Hg}
 \end{aligned}$$

$$\text{(c) Average systolic blood pressure in the prehypertension category} = \frac{120+139}{2}$$

$$= \frac{259}{2}$$

$$\begin{aligned}
 \text{Average diastolic blood pressure in the prehypertension category} &= \left(\frac{80+89}{2} \right) \\
 &= \frac{169}{2}
 \end{aligned}$$

$$\begin{aligned}
 \text{So, required ratio} &= \frac{\left(\frac{259}{2} \right)}{\left(\frac{169}{2} \right)} \\
 &= \frac{259}{169} \\
 &= 259:169
 \end{aligned}$$

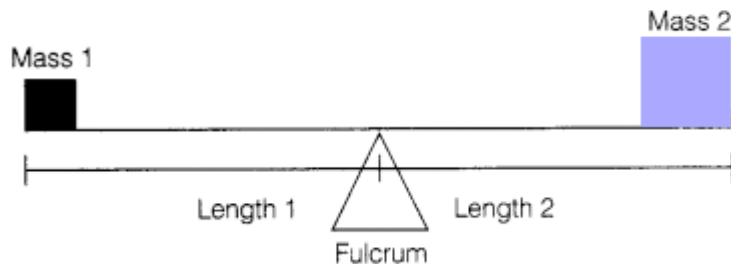
117. (a) Science Application: The king cobra can reach a length of 558 cm. This is only about 60 per cent of the length of the largest reticulated python. Find the length of the largest reticulated python.



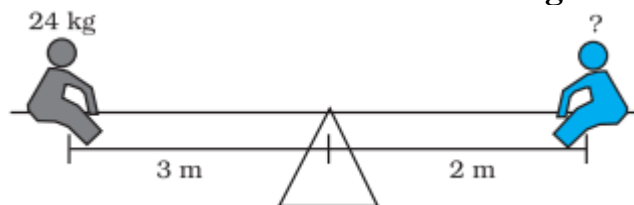
(b) Physical Science Application: Unequal masses will not balance on a fulcrum if they are at equal distance from it; one side will go up and the other side will go down.

Unequal masses will balance when the following proportion is true:

$$\frac{\text{Mass 1}}{\text{Length 2}} = \frac{\text{Mass 2}}{\text{Length 1}}$$



Two children can be balanced on a seesaw when $\text{mass1}/\text{length2} = \text{mass2}/\text{length1}$. The child on the left and child on the right are balanced. What is the mass of the child on the right?



(c) Life Science Application

A DNA model was built using the scale 2 cm: 0.0000001 mm. If the model of the DNA chain is 17 cm long, what is the length of the actual chain?



Solution:

- (a) Let the length of the largest reticulated python – x cm
According to question,
60% of x = 558

$$\frac{60}{100} \times x = 558$$

$$x = \frac{558 \times 100}{60}$$

$$x = 930$$

(b) As we know that,

$$\frac{\text{Mass1}}{\text{Length2}} = \frac{\text{Mass2}}{\text{Length1}}$$

$$\frac{24}{2} = \frac{\text{Mass2}}{3}$$

$$\text{Mass2} = \frac{24 \times 3}{2}$$

$$\text{Mass2} = 36\text{kg}$$

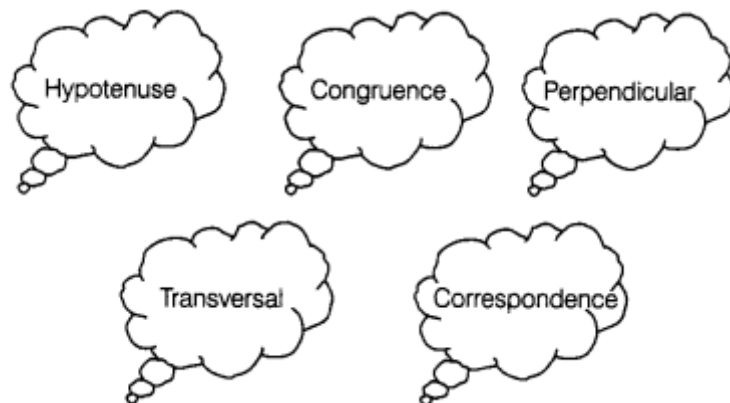
(c) Length of actual chain 0.0000001 mm is measured as 2 cm in the model.

$$\therefore \text{Length of actual chain when length of chain is 17 cm in the model} = \frac{0.0000001}{2} \times 17$$

$$= 0.00000085\text{mm}$$

118. Language Application

Given below are few Mathematical terms.



Find

(a) The ratio of consonants to vowels in each of the terms.

(b) The percentage of consonants in each of the terms.

Solution:

(a)

(i) Number of consonants in 'Hypotenuse' = 6

Number of vowels in 'Hypotenuse' = 4

So, required ratio = $\frac{6}{4}$

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

$$= 3:2$$

(ii) Number of consonants in 'Congruence' = 6

Number of vowels in 'Congruence' = 4

$$\text{So, required ratio} = \frac{6}{4}$$

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

$$= 3:2$$

(iii) Number of consonants in 'Perpendicular' = 8

Number of vowels in 'Perpendicular' = 5

$$\text{So, required ratio} = \frac{8}{5}$$

$$= 8:5$$

(iv) Number of consonants in 'Transversal' = 8

Number of vowels in 'Transversal' = 3

$$\text{So, required ratio} = \frac{8}{3}$$

$$= 8:3$$

(v) Number of consonants in 'Correspondence' = 9

Number of vowels in 'Correspondence' = 5

$$\text{So, required ratio} = \frac{9}{5}$$

$$= 9:5$$

$$\text{(b)(i) Percentage of consonants in 'Hypotenuse'} = \frac{6}{10} \times 100$$

$$= 60\%$$

$$\text{(ii) Percentage of 'consonants in Congruence'} = \frac{6}{10} \times 100$$

$$= 60\%$$

$$\text{(iii) Percentage of consonants in 'Perpendicular'} = \frac{8}{13} \times 100$$

$$= 61.53\%$$

$$\text{(iv) Percentage of consonants in 'Transversal'} = \frac{8}{11} \times 100$$

$$= 72.72\%$$

$$\text{(v) Percentage of consonants in 'Correspondence'} = \frac{9}{14} \times 100$$

$$= 64.28\%$$

119. What's the Error? An analysis showed that 0.06 per cent of the T-shirts made by one company were defective. A student says this is 6 out of every 100. What is the student's error?

Solution:

$$0.06\% = \frac{0.06}{100} \\ = \frac{6}{10000}$$

Hence, 6 out of every 10000 are defective T-shirts.

120. What's the Error? A student said that the ratios $\frac{3}{4}$ and $\frac{9}{16}$ were proportional. What error did the student make?

Solution:

$$\frac{3}{4} = \frac{3}{4} \times \frac{4}{4} \\ = \frac{12}{16} \neq \frac{9}{16}$$

Therefore, $\frac{3}{4}$ and $\frac{9}{16}$ are not proportional.

121. What's the Error? A clothing store charges rupees 1024 for 4 T-shirts. A student says that the unit price is rupees 25.6 per T-shirt. What is the error? What is the correct unit price?

Solution:

Cost price for 4 T-shirts = Rs. 1024.

$$\text{So, cost price for 1 T-shirts} = \text{Rs. } \frac{1024}{4} \\ = \text{Rs. 256}$$

Hence, the correct unit price is Rs. 256.

122. A tea merchant blends two varieties of tea in the ratio of 5 : 4. The cost of first variety is rupees 200 per kg and that of second variety is rupees 300 per kg. If he sells the blended tea at the rate of rupees 275 per kg, find out the percentage of her profit or loss.

Solution:

Suppose quantity of first variety and second variety of tea be 5x kg and 4x kg respectively.

Cost of first variety of tea = Rs. $(200 \times 5x) = \text{Rs. } 1000x$

Cost of second variety of tea = Rs. $(300 \times 4x) = \text{Rs. } 1200x$

Total cost price of tea = Rs. $(1000x + 1200x) = \text{Rs. } 2200x$

Selling price of tea = Rs. $(9x \times 275) = \text{Rs. } 2475x$

Here, S.P. > C.P.

Therefore, there is a profit of = Rs. $(2475x - 2200x) = \text{Rs. } 275x$

$$\begin{aligned}\text{Profit\%} &= \frac{\text{Profit}}{\text{C.P.}} \times 100 \\ &= \frac{275x}{2200x} \times 100 \\ &= 12.5\%\end{aligned}$$

123. A piece of cloth 5 m long shrinks 10 per cent on washing. How long will the cloth be after washing?

Solution:

Length of cloth = 5m

Shrinking percentage after washing = 10%

So, Length of cloth, after washing = 5 – 10% of 5

$$\begin{aligned}&= 5 - \frac{10}{100} \times 5 \\ &= 5 - 0.5 \\ &= 4.5\end{aligned}$$

124. Nancy obtained 426 marks out of 600 and the marks obtained by Rohit are 560 out of 800. Whose performance is better?

Solution:

$$\begin{aligned}\text{Percentage of marks obtained by Nancy} &= \frac{426}{600} \times 100 \\ &= 71\%\end{aligned}$$

$$\begin{aligned}\text{Percentage of marks obtained by Rohit} &= \frac{560}{800} \times 100 \\ &= 70\%\end{aligned}$$

Hence, Nancy's performance is better.

125. A memorial trust donates rupees 5,00,000 to a school, the interest on which is to be used for awarding 3 scholarships to students obtaining first three positions in the school examination every year. If the donation earns an interest of 12 per cent per annum and the values of the second and third scholarships are rupees 20,000 and rupees 15,000 respectively, find out the value of the first scholarship.

Solution:

Total donation amount = Rs. 500000

$$\begin{aligned}\text{Interest on donation amount} &= 500000 \times \frac{12}{100} \times 1 \\ &= \text{Rs. } 60000\end{aligned}$$

$$\begin{aligned}\text{Value of the second and third scholarships} &= \text{Rs. } (20000 + 15000) \\ &= \text{Rs. } 35000\end{aligned}$$

$$\begin{aligned}\text{Now, value of the first scholarship} &= \text{Rs. } (60000 - 35000) \\ &= \text{Rs. } 25000\end{aligned}$$

126. Ambika got 99 per cent marks in Mathematics, 76 per cent marks in Hindi, 61 per cent in English, 84 per cent in Science, and 95% in Social Science. If each subject carries 100 marks, then find the percentage of marks obtained by Ambika in the aggregate of all the subjects.

Solution:

$$\text{Total maximum marks} = 5 \times 100 = 500$$

$$\begin{aligned}\text{Total marks obtained by Ambika in all subjects} &= 99 + 76 + 61 + 84 + 95 \\ &= 415\end{aligned}$$

$$\begin{aligned}\text{Percentage of marks obtained by Ambika} &= \frac{415}{500} \times 100 \\ &= 83\%\end{aligned}$$

127. What sum of money lent out at 16 per cent per annum simple interest would produce rupees 9600 as interest in 2 years?

Solution:

S.I. = ₹ 9600, Time = 2 years,

Rate = 16% p.a.

We know that,

$$\text{Simple interest} = \frac{P \times R \times T}{100}$$

$$\text{So, } 9600 = \frac{P \times 16 \times 2}{100}$$

$$\begin{aligned}P &= \frac{9600 \times 100}{16 \times 2} \\ &= \text{Rs. } 30000\end{aligned}$$

128. Harish bought a gas-chullah for rupees 900 and later sold it to Archana at a profit of 5 per cent. Archana used it for a period of two years

and later sold it to Babita at a loss of 20 per cent. For how much did Babita get it?

Solution:

For Harish: C.P. = Rs. 900, Profit % = 5

$$\begin{aligned} \text{S.P.} &= \left(\frac{100+5}{100} \right) \times 900 \\ &= 105 \times 9 \\ &= \text{Rs. } 945 \end{aligned}$$

Now, S.P. for Harish would be the C.P. for Archana.

For Archana: C.P. = Rs. 945, Loss % = 20

$$\begin{aligned} \text{S.P.} &= \left(\frac{100-20}{100} \right) \times 945 \\ &= \frac{80}{100} \times 945 \\ &= \text{Rs. } 756 \end{aligned}$$

Again, S.P. for Archana would be the C.P. for Babita.

So, Babita got the gas-chullah for Rs. 756.

129. Match each of the entries in Column I with the appropriate entries in Column II:

Column I	Column II
(i) 3.5	(A) Rupees 54
(ii) 2.5	(B) Rupees 47
(iii) 100%	(C) Rupees 53
(iv) 2/3	(D) Rupees 160
(v) 6(1/4)%	(E) 60%
(vi) 12.5%	(F) 25%
(vii) SP when CP = rupees 50 and loss = 6%	(G) 1/16
(viii) SP when CP = rupees 50 and profit = rupees 4	(H) 250%
	(I) Rupees 159

(ix) Profit% when CP = rupees 40 and SP = rupees 50	(J) 66(2/3)%
(x) Profit% when CP = rupees 50 and SP = rupees 60	(K) 20%
(xi) Interest when principal = rupees 800. Rate of interest = 10% per annum and period = 2 years	(L) 0.125
(xii) Amount when principal = rupees 150, Rate of interest = 6% per annum and period = 1 year	(M) 3 : 2
	(N) Rupees 164
	(O) 3 : 3

Solution:

- (i) → (E)
(ii) → (H)
(iii) → (O)
(iv) → (J)
(v) → (G)
(vi) → (L)
(vii) → (B)
(viii) → (A)
(ix) → (F)
(x) → (K)
(xi) → (D)
(xii) → (I)

(i) 3:5

$$\frac{3}{5} = \frac{3}{5} \times \frac{100}{100}$$

$$= \frac{300}{5} \%$$

$$= 60\%$$

(ii) 2.5

$$2.5 = \frac{25}{10} \times \frac{100}{100}$$

$$= \frac{2500}{10} \%$$

$$= 250\%$$

$$(iii) \quad 100\%$$

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

$$= 1$$

$$= 1 \times \frac{3}{3}$$

$$= \frac{3}{3}$$

$$= 3:3$$

$$(iv)$$

$$\frac{2}{3} = \frac{2}{3} \times \frac{100}{100}$$

$$= \frac{200}{3} \%$$

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

$$(v)$$

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

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

$$= \frac{1}{16}$$

$$(vi)$$

$$12.5\% = \frac{12.5}{100}$$

$$= 0.125$$

$$(vii)$$

$$C.P. = Rs. 50, \text{ Loss} = 6\%$$

$$\text{So, S.P.} = \left(\frac{100 - 6}{100} \right) \times 50$$

$$= \frac{94 \times 50}{100}$$

$$= Rs. 47$$

$$(viii) \quad C.P. = Rs. 50, \text{ Profit} = Rs. 4$$

$$\text{So, S.P.} = 50 + 4$$

$$= Rs. 54$$

(ix) C.P.=Rs. 40, S.P. = Rs. 50

$$\begin{aligned}\text{So, profit \%} &= \left(\frac{50-40}{40} \right) \times 100 \\ &= \frac{10}{40} \times 100 \\ &= 25\%\end{aligned}$$

(x) C.P. = Rs. 50, S.P. = Rs. 60

$$\begin{aligned}\text{So, profit} &= \left(\frac{60-50}{50} \right) \times 100 \\ &= \frac{10}{50} \times 100 \\ &= 20\%\end{aligned}$$

(xi) Principal = Rs. 800, Rate = 10% p.a.

Time = 2 years

$$\begin{aligned}\text{So, interest} &= \frac{150 \times 6 \times 1}{100} \\ &= \text{Rs. } 160\end{aligned}$$

(xii) Principal = Rs. 150, Rate = 6% p.a.

Time = 1 year

$$\begin{aligned}\text{Interest} &= \frac{150 \times 6 \times 1}{100} \\ &= \text{Rs. } 9\end{aligned}$$

$$\begin{aligned}\text{So, amount} &= \text{Rs. } (150 + 9) \\ &= \text{Rs. } 159\end{aligned}$$

130. In a debate competition, the judges decide that 20 per cent of the total marks would be given for accent and presentation. 60 per cent of the rest are reserved for the subject matter and the rest are for rebuttal. If this means 8 marks for rebuttal, then find the total marks.

Solution:

Let the total marks be x,

Marks for accent and presentation = 20% of x

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

$$= \frac{x}{5}$$

$$\begin{aligned}\text{Remaining marks} &= x - \frac{x}{5} \\ &= \frac{4x}{5}\end{aligned}$$

$$\begin{aligned}\text{Marks reserved for subject matter} &= 60\% \text{ of } \frac{4x}{5} \\ &= \frac{60}{100} \times \frac{4x}{5} \\ &= \frac{12}{25}x\end{aligned}$$

$$\begin{aligned}\text{Marks for rebuttal} &= \frac{4x}{5} - \frac{12}{25}x \\ &= \frac{8}{25}x\end{aligned}$$

Now, marks for rebuttal = 8

So,

$$\begin{aligned}\frac{8}{25}x &= 8 \\ x &= \frac{25 \times 8}{8} \\ x &= 25\end{aligned}$$

131. Divide rupees 10000 in two parts so that the simple interest on the first part for 4 years at 12 per cent per annum may be equal to the simple interest on the second part for 4.5 years at 16 per cent per annum.

Solution:

Total amount which has to be divide = Rs. 10000

Let first part be = Rs. x

Then, second part = Rs (10000 – x)

$$\begin{aligned}\text{Interest for first part} &= \frac{x \times 12 \times 4}{100} \\ &= \text{Rs. } \frac{12}{25}x\end{aligned}$$

$$\begin{aligned}\text{Interest for second part} &= (10000 - x) \times \frac{16}{100} \times 4.5 \\ &= \text{Rs. } \left(7200 - \frac{18}{25}x \right)\end{aligned}$$

Now, according to the question:

$$\frac{12}{25}x = 7200 - \frac{18}{25}x$$

$$\frac{12}{25}x + \frac{18}{25}x = 7200$$

$$\frac{30}{25}x = 7200$$

$$x = \frac{7200 \times 25}{30}$$

$$x = 6000$$

So, the first part = Rs. 6000

And second apart = Rs. (10000 – 6000)
= Rs. 4000

132. Rupees 9000 becomes rupees 18000 at simple interest in 8 years. Find the rate per cent per annum.

Solution:

Principal = Rs. 9000, Amount = Rs. 18000,

Time = 8 years

So, Interest = Rs. (18000 – 9000) = Rs. 9000

$$\text{Interest} = \frac{P \times R \times T}{100}$$

$$\text{So, } 9000 = \frac{9000 \times R \times 8}{100}$$

$$R = \frac{9000 \times 100}{9000 \times 8}$$

$$R = 12.5\%$$

133. In how many years will the simple interest on a certain sum be 4.05 times the principal at 13.5 per cent per annum?

Solution:

Let the principal be Rs. P.

Then, simple interest = Rs. 4.05 P

Rate = 13.5%

Now,

$$\text{Interest} = \frac{P \times R \times T}{100}$$

$$4.05P = \frac{P \times 13.5 \times T}{100}$$

$$\text{Time} = \frac{4.05 \times 100}{13.5}$$

Time= 30 years

134. The simple interest on a certain sum for 8 years at 12 per cent per annum is rupees 3120 more than the simple interest on the same sum for 5 years at 14 per cent per annum. Find the sum.

Solution:

Let the sum be Rs. P.

$$\begin{aligned}\text{Interest for 8 years at 12\% per annum} &= \frac{P \times 12 \times 8}{100} \\ &= \frac{24}{25}P\end{aligned}$$

$$\begin{aligned}\text{Interest for 5 years at 14\% per annum} &= \frac{P \times 14 \times 5}{100} \\ &= \frac{7}{10}P\end{aligned}$$

Now. According to the question,

$$\frac{24}{25}P = 3120 + \frac{7}{10}P$$

$$\left(\frac{24}{25} - \frac{7}{10}\right)P = 3120$$

$$\left(\frac{96 - 70}{100}\right)P = 3120$$

$$\frac{26}{100}P = 3120$$

$$P = \frac{3120 \times 100}{26}$$

$$P = 12000$$

135. The simple interest on a certain sum for 2.5 years at 12 per cent per annum is rupees 300 less than the simple interest on the same sum for 4.5 years at 8 per cent per annum. Find the sum.

Solution:

Let the sum be Rs. P.

$$\begin{aligned}\text{Interest for 2.5 years at 12\% per annum} &= \frac{P \times 12 \times 2.5}{100} \\ &= \frac{3}{10}P\end{aligned}$$

$$\text{Interest for 4.5 years at 8\% per annum} = \frac{P \times 8 \times 4.5}{100}$$

$$= \frac{9}{25}P$$

Now, according to the question,

$$\frac{3}{10}P = \frac{9}{25}P - 300$$

$$\left(\frac{9}{25} - \frac{3}{10}\right)P = 300$$

$$\frac{36-30}{100}P = 300$$

$$\frac{6}{100}P = 300$$

$$P = \frac{300 \times 100}{6}$$

$$P = 5000$$

136. Designing a Healthy Diet When you design your healthy diet, you want to make sure that you meet the dietary requirements to help you grow into a healthy adult. As you plan your menu, follow the following guidelines

1. Calculate your ideal weight as per your height from the table given at the end of this question.
2. An active child should eat around 55.11 calories for each kilogram desired weight.
3. 55 per cent of calories should come from carbohydrates. There are 4 calories in each gram of carbohydrates.
4. 15 per cent of your calories should come from proteins. There are 4 calories in each gram of proteins.
5. 30 per cent of your calories may come from fats. There are 9 calories in each gram of fat.

Following is an example to design your own healthy diet.

Example

1. Ideal weight = 40 kg.
2. The number of calories needed = $40 \times 55.11 = 2204.4$
3. Calories that should come from carbohydrates = $2204.4 \times 0.55 = 1212.42$ calories.
Therefore, required quantity of carbohydrates = $1212.42/4 = 303.105\text{g} = 300\text{ g. (approx.)}$
4. Calories that should come from proteins = $2204.4 \times 0.15 = 330.66$ calories.

Therefore, required quantity of protein = $330.66/4\text{ g} = 82.66\text{ g.}$

5. Calories that may come from fat = $2204.4 \times 0.3 = 661.3$ calories.
Therefore, required quantity of fat = $661.3/9 \text{ g} = 73.47 \text{ g}$.

Answer the Given Questions

1. Your ideal desired weight is _____ kg.
2. The quantity of calories you need to eat is _____.
3. The quantity of protein needed is _____ g.
4. The quantity of fat required is _____ g.
5. The quantity of carbohydrates required is _____ g.

Ideal Height and Weight Proportion					
Men			Women		
Height		Weight	Height		Weight
Feet	Centimetres	Kilograms	Feet	Centimetres	Kilograms
5'	152	48	4' 7"	140	34
5' 1"	155	51	4' 8"	142	36
5' 2"	157	54	4' 9"	145	39
5' 3"	160	56	4' 10"	147	41
5' 4"	163	59	4' 11"	150	43
5' 5"	165	62	5'	152	45
5' 6"	168	65	5' 1"	155	48
5' 7"	170	67	5' 2"	157	50
5' 8"	173	70	5' 3"	160	52
5' 9"	175	73	5' 4"	163	55
5' 10"	178	75	5' 5"	165	57
5' 11"	180	78	5' 6"	168	59
6'	183	81	5' 7"	170	61
6' 1"	185	84	5' 8"	173	64
6' 2"	188	86	5' 9"	175	66
6' 3"	191	89	5' 10"	178	68
6' 4"	193	92	5' 11"	180	70

Solution:

Let the height of a girl student of 7th class be 5 feet.

(1) Ideal weight – 45 kg

(2) Quantity of calories needed = $45 \times 55.11 = 2479.95$ calories

(3) Calories that should come from carbohydrates = $\frac{2479.95 \times 55}{100}$

$$= 2479.95 \times 0.55$$

$$= 1363.97 \text{ calories}$$

$$\begin{aligned} \text{So, required quantity of carbohydrates} &= \frac{1363.97}{4} \text{ g} \\ &= 340.99 \text{ g} \end{aligned}$$

$$\begin{aligned} (4) \text{ Calories that should come from proteins} &= \frac{2479.95 \times 15}{100} \\ &= 2479.95 \times 0.15 \\ &= 371.99 \text{ calories} \end{aligned}$$

$$\begin{aligned} \text{So, required quantity of protein} &= \frac{371.99}{4} \\ &= 92.99 \text{ g} \end{aligned}$$

$$\begin{aligned} (5) \text{ Calories that may come from fat.} &= \frac{2479.95 \times 30}{100} \\ &= 2479.95 \times 0.3 \\ &= 743.985 \text{ calories} \end{aligned}$$

$$\begin{aligned} \text{So, required quantity of fat} &= \frac{773.985}{9} \text{ g} \\ &= 85.99 \text{ g} \end{aligned}$$

137. 150 students are studying English, Maths or both. 62 per cent of students study English and 68 per cent are studying Maths. How many students are studying both?

Solution:

Total number of students = 150

Number of students studying English = 62% of 150

$$\begin{aligned} &= \frac{62}{100} \times 150 \\ &= 93 \end{aligned}$$

Number of students studying Maths = 68% of 150

$$\begin{aligned} &= \frac{68}{100} \times 150 \\ &= 102 \end{aligned}$$

So, number of students studying both subjects = $(93 + 102) - 150 = 45$

138. Earth Science: The table lists the world's 10 largest deserts.

Largest Deserts in the world	
Desert	Area (in km ²)
Sahara (Africa)	8800000
Gobi (Asia)	1300000
Australian Desert (Australia)	1250000
Arabian Desert (Asia)	850000
Kalahari Desert (Africa)	580000
Chihuahuan Desert (North America)	370000
Takla Makan Desert (Asia)	320000
Kara Kum (Asia)	310000
Namib Desert (Africa)	310000
Thar Desert (Asia)	260000

- (a) What are the mean, median and mode of the areas listed?
 (b) How many times the size of the Gobi Desert is the Namib Desert?
 (c) What percentage of the deserts listed are in Asia?
 (d) What percentage of the total area of the deserts listed is in Asia?

Solution:

(a)

Total area of 10 Deserts = 8800000 + 1300000 + 1250000 + 850000 + 580000 + 370000 + 320000 + 310000 + 310000 + 260000 = 14350000 km²

$$\text{So, mean} = \frac{14350000}{10} \text{ km}^2$$

$$= 1435000 \text{ km}^2$$

Since, n = 10 which is even

$$\text{So, median} = \frac{\text{5th observation} + \text{6th observation}}{2}$$

$$= \frac{580000 + 370000}{2}$$

$$= \frac{950000}{2}$$

$$= 475000 \text{ km}^2$$

Since, area = 310000 km² occurs two times.
 So, Mode = 310000 km²

(b) Area of Gobi Desert = 1300000 km²
 Area of Namib Desert = 310000 km²
 Now, 1300000 = x × 310000

$$x = \frac{310000}{1300000}$$

$$x = 4.19$$

So, size of the Gobi Desert is 4.19 times the Namib Desert

(c) Total number of Deserts = 10

Deserts listed in Asia = 5

$$\begin{aligned}\text{So, required percentage} &= \frac{5}{10} \times 100 \\ &= 50\%\end{aligned}$$

(d) Total area of Deserts listed in Asia = $1300000 + 850000 + 320000 + 310000 + 260000$
 $= 3040000 \text{ km}^2$

Total area of all Deserts = 14350000 km^2

139. Geography Application: Earth's total land area is about 148428950 km². The land area of Asia is about 30 per cent of this total. What is the approximate land area of Asia to the nearest square km?



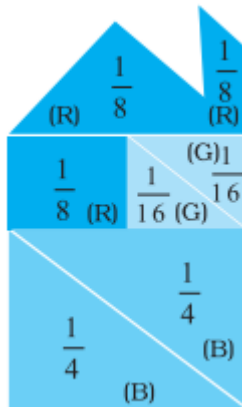
Solution:

Earth's total land area = 148128950 km^2

Land area of Asia = 30% of 148428950 km^2

$$\begin{aligned}&= \frac{30}{100} \times 148428950 \\ &= 44528685 \text{ km}^2\end{aligned}$$

140. The pieces of Tangrams have been rearranged to make the given shape.



By observing the given shape, answer the following questions:

• **What percentage of total has been coloured?**

(i) **Red (R)** = _____

(ii) **Blue (B)** = _____

(iii) **Green (G)** = _____

• **Check that the sum of all the percentages calculated above should be 100.**

• **If we rearrange the same pieces to form some other shape, will the percentage of colours change?**

Solution:

$$(i) \quad \text{Total fraction for Red (R)} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} \\ = \frac{3}{8}$$

Now,

$$\frac{3}{8} = \frac{3}{8} \times \frac{100}{100} \\ = \frac{300}{8} \% \\ = 37.5\%$$

So, percentage of red colour = 37.5%

$$(ii) \quad \text{Total fraction for Blue (B)} = \frac{1}{4} + \frac{1}{4} \\ = \frac{2}{4} \\ = \frac{1}{2}$$

Now,

$$\begin{aligned}\frac{1}{2} &= \frac{1}{2} \times \frac{100}{100} \\ &= \frac{100}{2} \% \\ &= 50\%\end{aligned}$$

So, percentage of blue colour = 50%.

$$\begin{aligned}\text{(iii) Total fraction for Green (G)} &= \frac{1}{16} + \frac{1}{16} \\ &= \frac{2}{16} \\ &= \frac{1}{8}\end{aligned}$$

Now,

$$\begin{aligned}\frac{1}{8} &= \frac{1}{8} \times \frac{100}{100} \\ &= \frac{100}{8} \% \\ &= 12.5\%\end{aligned}$$

So, percentage of green colour = 12.5%

Now, sum of all percentage = 37.5% + 50% + 12.5% = 100%

If we rearrange the same pieces to form some other shape, then percentage of colours will not change.