

Chapter - 9
Comparing Quantities

Exercise

In questions 1 to 20, there are four options out of which one is correct. Write the correct answer.

1. Suppose for the principal P, rate R% and time T, the simple interest is S and compound interest is C. Consider the possibilities.

(i) $C > S$ (ii) $C = S$ (iii) $C < S$

Then

(a) only (i) is correct. (b) either (i) or (ii) is correct.
(c) either (ii) or (iii) is correct. (d) only (iii) is correct.

Solution:

(a) only (i) is correct.

Let,
Principal, P = Rs. 100,
Rate = 10% and
Time = 1 year

$$\begin{aligned}\text{Simple interest (SI)} &= \frac{P \times R \times T}{100} \\ &= (100 \times 10 \times 1) / 100 \\ &= \text{Rs. } 10\end{aligned}$$

As,

$$\begin{aligned}\text{Amount} &= P \left(1 + \frac{R}{100} \right)^t \\ &= 100 \left(1 + \frac{10}{100} \right)^1 \\ &= 100 \left(\frac{11}{10} \right) \\ &= \text{Rs. } 110\end{aligned}$$

$$\begin{aligned}\text{Compound interest (CI)} &= \text{Amount} - \text{Principal} \\ &= 110 - 100 \\ &= 10\end{aligned}$$

So,
 $CI > SI$

2. Suppose a certain sum doubles in 2 years at r % rate of simple interest per annum or at R% rate of interest per annum compounded annually. We have

(a) $r < R$ (b) $R < r$ (c) $R = r$ (d) can't be decided

Solution:

(b) $R < r$

3. The compound interest on Rs 50,000 at 4% per annum for 2 years compounded annually is

(a) Rs 4,000 (b) Rs 4,080 (c) Rs 4,280 (d) Rs 4,050

Solution:

(b) Rs 4,080

$P = \text{Rs.} 50000,$

$R = 4\%,$

$T = 2 \text{ years}$

$$\begin{aligned} A &= P \left(1 + \frac{R}{100} \right)^t \\ &= 50000 \left(1 + \frac{4}{100} \right)^2 \\ &= 50000 \left(1 + \frac{1}{25} \right)^2 \\ A &= 50000 \left(\frac{26}{25} \right)^2 \\ &= 54080 \end{aligned}$$

$$\begin{aligned} \text{Compound interest} &= A - P \\ &= 54080 - 50000 \\ &= \text{Rs. } 4080 \end{aligned}$$

4. If marked price of an article is Rs 1,200 and the discount is 12% then the selling price of the article is

(a) Rs 1,056 (b) Rs 1,344 (c) Rs 1,212 (d) Rs 1,188

Solution:

(a) Rs 1,056

Marked price = Rs.1200

Discount = 12%

Since,

Discount = Discount% on Marked price

$$\begin{aligned} \text{Discount price} &= 12\% \text{ of } 1200 \\ &= \frac{12}{100} \times 1200 \\ &= 12 \times 12 \\ &= 144 \end{aligned}$$

$$\begin{aligned} \text{Selling price} &= \text{Marked price} - \text{discount price} \\ &= 1200 - 144 \\ &= \text{Rs. } 1056 \end{aligned}$$

5. If 90% of x is 315 km, then the value of x is
(a) 325 km (b) 350 km (c) 350 m (d) 325 m

Solution:

(b) 350 km

90% of x is 315 km

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

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

$$= 315 \times \frac{10}{9}$$

$$= 350$$

6. To gain 25% after allowing a discount of 10%, the shopkeeper must mark the price of the article which costs him Rs 360 as
(a) Rs 500 (b) Rs 450 (c) Rs 460 (d) Rs 486

Solution:

(a) Rs 500

Let, marked price = x

Cost price = Rs.360

As per the question;

$$x - \left[x \times \left(\frac{10}{100} \right) \right] - \frac{25 \times 360}{100} = 360$$

$$x - \frac{x}{10} - 90 = 360$$

$$\frac{9x}{10} = 360 + 90$$

$$9x = 4500$$

$$x = 500$$

7. If a % is the discount per cent on a marked price x, then discount is

(a) $\frac{x}{a} \times 100$ (b) $\frac{a}{x} \times 100$ (c) $x \times \frac{a}{100}$ (d) $\frac{100}{x \times a}$

Solution:

$$(c) x \times \left(\frac{a}{100}\right)$$

(Discount = Discount% on Marked Price)

8. Ashima took a loan of Rs 1,00,000 at 12% p.a. compounded half yearly. She paid Rs 1,12,360. If $(1.06)^2$ is equal to 1.1236, then the period for which she took the loan is

- (a) 2 years (b) 1 year (c) 6 months (d) $1\frac{1}{2}$ years

Solution:

(b) 1 year

P = Rs.100000,

R = 12% per annum compounded half-yearly.

Amount = Rs.112360

Since we know,

$$A = P \left(1 + \frac{R}{100}\right)^t$$

$$112360 = 100000 \left(1 + \frac{12}{100}\right)^t$$

$$112360/100000 = \left(1 + \frac{12}{100}\right)^t$$

$$(1.1236)^1 = (1.12)^t$$

If we compare the base terms, 1.1236 is approximately equal to 1.12

Hence,

t = 1 year.

9. For calculation of interest compounded half yearly, keeping the principal same, which one of the following is true.

- (a) Double the given annual rate and half the given number of years.
(b) Double the given annual rate as well as the given number of years.
(c) Half the given annual rate as well as the given number of years.
(d) Half the given annual rate and double the given number of years.

Solution:

(d) Half the given annual rate and double the given number of years.

10. Shyama purchases a scooter costing Rs 36,450 and the rate of sales tax is 9%, then the total amount paid by her is

- (a) Rs 36,490.50 (b) Rs 39,730.50 (c) Rs 36,454.50 (d) Rs 33,169.50

Solution:

(b) Rs 39,730.50

Scooter cost Rs.36450 at the rate of sales tax = 9%.

Total cost of scooter paid by Shyama = 9% of 36450 + 36450

$$\begin{aligned} &= \left(\frac{9}{100} \times 36450\right) + 36450 \\ &= 3280.5 + 36450 \\ &= 39730.5 \end{aligned}$$

11. The marked price of an article is Rs 80 and it is sold at Rs 76, then the discount rate is

- (a) 5% (b) 95% (c) 10% (d) appx. 11%

Solution:

(a) 5%

Marked price = Rs. 80

Sold price = Rs.76

We know that,

Selling price = Marked price – Discount

Discount = Marked price – Selling price

Discount = Rs.80-Rs.76

$$= \text{Rs.}4$$

$$\text{Discount \%} = \frac{4}{80} \times 100$$

$$= 5\%$$

12. A bought a tape recorder for Rs 8,000 and sold it to B. B in turn sold it to C, each earning a profit of 20%. Which of the following is true:

- (a) A and B earn the same profit.
(b) A earns more profit than B.
(c) A earns less profit than B.
(d) Cannot be decided.

Solution:

(c) A earns less profit than B

Cost price of tape recorder bought by A = Rs.8000

$$\begin{aligned}\text{Cost price of tape recorder for B} &= 20\% \text{ profit on cost price for A} \\ &= \frac{20}{100} \times 8000 + 8000 \\ &= 20 \times 80 + 8000 \\ &= 1600 + 8000 \\ &= \text{Rs.9600}\end{aligned}$$

$$\begin{aligned}\text{Cost price of tape recorder sold to C} &= 20\% \text{ profit on cost price for B} \\ &= \frac{20}{100} \times 9600 + 9600 \\ &= 1920 + 9600 \\ &= \text{Rs.11520}\end{aligned}$$

Here,

$$\begin{aligned}\text{Profit for A} &= \text{Rs.1600} \\ \text{Profit for B} &= \text{Rs.1920}\end{aligned}$$

So, A earns less profit than B.

13. Latika bought a teapot for Rs 120 and a set of cups for Rs 400. She sold teapot at a profit of 5% and cups at a loss of 5%. The amount received by her is

- (a) Rs 494 (b) Rs 546 (c) Rs 506 (d) Rs 534

Solution:

(c) Rs 506

Explanation: Price of teapot = Rs. 120
Price of set of cups = Rs. 400
Latika sold teapot at a profit of 5%
Selling price of teapot = $\frac{5}{100} \times 120 + 120$
 $= \frac{120}{20} + 120$
 $= 6 + 120$
 $= \text{Rs.126}$

Also, cups were sold at a loss of 5%.

$$\begin{aligned}\text{Now, Selling price of cups} &= 400 - \frac{5}{100} \times 400 \\ &= 400 - 20 \\ &= \text{Rs. 380}\end{aligned}$$

$$\begin{aligned}\text{Therefore, total amount received} &= \text{Rs. 126} + \text{Rs. 380} \\ &= \text{Rs. 506}\end{aligned}$$

14. A jacket was sold for Rs 1,120 after allowing a discount of 20%. The marked price of the jacket is

- (a) Rs 1440 (b) Rs 1400 (c) Rs 960 (d) Rs 866.66

Solution:

(b) Rs. 1400

Let marked price = x

Discount = 20%

Selling price = 1120

Hence,

$$1120 = x - x \left(\frac{20}{100} \right)$$

$$1120 = x - \frac{x}{5}$$

$$1120 = \frac{4x}{5}$$

$$x = \frac{(1120 \times 5)}{4} \\ = 1400$$

15. A sum is taken for two years at 16% p.a. If interest is compounded after every three months, the number of times for which interest is charged in 2 years is

(a) 8 (b) 4 (c) 6 (d) 9

Solution:

(a) 8

Rate of interest is compounded after every three months.

Thus, the time period for amount in a year will be 4 times.

If amount is taken for 2 year,

Then, $4 \times 2 = 8$ times charged in 2 year.

16. The original price of a washing machine which was bought for Rs 13,500 inclusive of 8% VAT is

(a) Rs 12,420 (b) Rs 14,580 (c) Rs 12,500 (d) Rs 13,492

Solution:

(a) Rs 12,420

The original price of the washing machine = Rs.13500

VAT = 8%.

The original price of the washing machine including of 8% VAT

$$= 13500 - 13500 \times \frac{8}{100}$$

$$= 13500 - 135 \times 8$$

$$= 13500 - 1080$$

$$= \text{Rs.}12420$$

17. Avinash bought an electric iron for Rs 900 and sold it at a gain of 10%. He sold another electric iron at 5% loss which was bought Rs 1200. On the transaction he has a

(a) Profit of Rs 75 (b) Loss of Rs 75 (c) Profit of Rs 30 (d) Loss of Rs 30

Solution:

(c) Profit of Rs 30

Price of electric iron = Rs. 900

Sold at 10% profit

Now,

$$\begin{aligned}\text{Selling price of the electric iron} &= (10/100) \times 900 + 900 \\ &= 90 + 900 \\ &= \text{Rs.}990\end{aligned}$$

Another electric iron sold at 5% loss.

Cost price of another electric iron = Rs.1200

Thus,

$$\begin{aligned}\text{Selling price of the electric iron} &= 1200 \times 1200 \\ &= 1200 - 60 \\ &= \text{Rs.}1140\end{aligned}$$

$$\begin{aligned}\text{Total cost paid by Avinash for purchasing electric irons} &= \text{Rs.}900 + \text{Rs.}1200 \\ &= \text{Rs.}2100\end{aligned}$$

$$\begin{aligned}\text{Total received amount} &= \text{Rs.}990 + \text{Rs.}1140 \\ &= \text{Rs.} 2130\end{aligned}$$

$$\begin{aligned}\text{Therefore, his profit} &= \text{Rs.}2130 - \text{Rs.}2100 \\ &= \text{Rs.}30\end{aligned}$$

18. A TV set was bought for Rs 26,250 including 5% VAT. The original price of the TV set is

(a) Rs 27,562.50 (b) Rs 25,000 (c) Rs 24,937.50 (d) Rs 26,245

Solution:

(c) Rs 24,937.50

Cost price of TV set = Rs. 26250.

VAT including = 5%

$$\begin{aligned}\text{Original price} &= \text{Cost price of article including VAT} = 26250 - (5/100) \times 26250 \\ &= 26250 - 1312.5 \\ &= 24,937.50\end{aligned}$$

Therefore,

Original price of TV set is = Rs. 24,937.50

19. 40% of [100 – 20% of 300] is equal to

(a) 20 (b) 16 (c) 140 (d) 64

Solution:

(b) 16

40% of [100 – 20% of 300]

$40\% \times [100 - (20/100 \times 300)]$

$40\% \times [100 - 60]$

$40/100 \times 40$

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20. Radhika bought a car for Rs 2,50,000. Next year its price decreased by 10% and further next year it decreased by 12%. In the two years overall decrease per cent in the price of the car is

(a) 3.2% (b) 22% (c) 20.8% (d) 8%

Solution:

(c) 20.8%

Radhika bought a car for Rs. 250000.

Cost price = Rs.250000

Its price decreased next year for 10%.

Thus,

New price = $250000 - (10/100) \times 250000$
 $= 250000 - 25000$
 $= 225000$

Again, the price of car decreased by 12% next year.

So the price will be:

$= 225000 - 225000 \times (12/100)$
 $= 225000 - 27000$
 $= 198000$

So, the overall decrease in percentage of car price = $(250000 - 198000) / 250000 \times 100$

$= (52000 / 250000) \times 100$

$= 520 / 25$

$= 20.8\%$

In questions 21 to 45 fill in the blanks to make the statements true.

21. _____ is a reduction on the marked price of the article.

Solution:

Discount

22. Increase of a number from 150 to 162 is equal to increase of _____ per cent.

Solution:

8%

Explanation: Increase of a number from 150 to 162 = $162 - 150$
 $= 12$

$$\begin{aligned} \text{Percentage of increased number} &= \frac{12}{150} \times 100 \\ &= \frac{120}{15} \\ &= 8\% \end{aligned}$$

23. 15% increase in price of an article, which is Rs 1,620, is the increase of Rs _____.

Solution:

Rs.212

Let x is the price of the article.

Thus,

$$1620 = x + x \times (15/100)$$

$$1620 = \frac{115x}{100}$$

$$115x = 1620 \times 100$$

$$x = \frac{1620 \times 100}{115}$$

$$x = 1408$$

Hence,

$$\begin{aligned} \text{Increase in price} &= 1620 - 1408 \\ &= 212. \end{aligned}$$

24. Discount = _____ - _____.

Solution:

Discount = Marked Price – Selling Price.

25. Discount = Discount % of _____.

Solution:

Discount = Marked Price – Selling Price.

26. _____ is charged on the sale of an item by the government and is added to the bill amount.

Solution:

Sales tax

27. Amount when interest is compounded annually is given by the formula _____.

Solution:

$$A = P \left(1 + \frac{R}{100} \right)^t \quad [P = \text{Principal, } R = \text{Rate, } t = \text{time}]$$

28. Sales tax = tax % of _____.

Solution:

Bill amount

29. The time period after which the interest is added each time to form a new principal is called the _____.

Solution:

Conversion period

30. _____ expenses are the additional expenses incurred by a buyer for an item over and above its cost of purchase.

Solution:

Overhead

31. The discount on an item for sale is calculated on the _____.

Solution:

Marked price

32. When principal P is compounded semi-annually at r % per annum for t years, then Amount = _____.

Solution:

$$A = P \left(1 + \frac{R}{100} \right)^{2t}$$

33. Percentages are _____ to fractions with _____ equal to 100.

Solution:

Denominator

34. The marked price of an article when it is sold for Rs 880 after a discount of 12% is _____.

Solution:

Rs. 1000

Selling price = Rs. 880

Discount percentage = 12%

Let x be the marked price.

Since, discount is calculated on marked price,

Thus;

$$x - x \times (12/100) = 880$$

$$\frac{88x}{100} = 880$$

$$x = 10 \times 100 \\ = 1000$$

35. The compound interest on Rs 8,000 for one year at 16% p.a. compounded half yearly is _____, given that $(1.08)^2 = 1.1664$.

Solution:

Rs. 9331.2

Principal = Rs. 8000

Time period = 1 year

Rate = 16%

$$= 0.16$$

$$\text{Amount} = P \left(1 + \frac{r}{n} \right)^{nt}$$

n = 2 (compounded half yearly in a year)

$$A = 8000 \left(1 + \frac{0.16}{2} \right)^{2 \times 1} \\ = 8000 (1 + 0.08)^2$$

$$= 8000 (1.08)^2$$

$$A = 8000 \times 1.1664$$

$$A = 9331.2$$

36. In the first year on an investment of Rs 6, 00,000 the loss is 5% and in the second year the gain is 10%, the net result is _____.

Solution:

627000

Investment amount = 600000

Loss in first year = 5%.

$$\begin{aligned} \text{So, investment in first year} &= 600000 - (5/100) \times 600000 \\ &= 600000 - 30000 \\ &= 570000 \end{aligned}$$

In second year, the gain is 10%.

$$\begin{aligned} \text{Net result} &= 570000 + \frac{10}{100} \times 570000 \\ &= 570000 + 57000 \\ &= 627000 \end{aligned}$$

37. If amount on the principal of Rs 6,000 is written as 6000 3 5 1+ 100 and compound interest payable half yearly, then rate of interest p.a. is _____ and time in years is _____.

Solution:

Rate – 10% and 1.5 years

38. By selling an article for Rs 1, 12,000 a girl gains 40%. The cost price of the article was _____.

Solution:

Rs.80000

Selling price of the article = ₹112000

Gain% = 40%

Let, x is the cost price of the article.

Since,

Cost price = selling price – profit % on cost price

Therefore,

Selling price = cost price + profit % on cost price

Hence,

$$112000 = x + x \times \left(\frac{40}{100} \right)$$

$$112000 = x + \frac{2x}{5}$$

$$112000 = 7x/5$$

$$x = (112000 \times 5)/7$$

$$x = 80000$$

39. The loss per cent on selling 140 geometry boxes at the loss of S.P. of 10 geometry boxes is equal to _____.

Solution:

$$\frac{20}{3} \%$$

Let, the selling price of one geometry box = Rs.1

So, the selling price of 140 geometry boxes = 1×140
= Rs.140

Selling price of 10 geometry boxes = Rs.10

Loss = Rs. 10

$$\begin{aligned} \text{Loss percentage} &= \text{Loss/CP} \times 100 \\ &= 10/(140+10) \times 100 \\ &= 10/150 \times 100 \\ &= \frac{20}{3} \% \end{aligned}$$

40. The cost price of 10 tables is equal to the sale price of 5 tables. The profit per cent in this transaction is _____.

Solution:

100%

Let, the cost price of one table is Rs.1

Cost price of 10 tables = Sale price of 5 tables

(Given)

Sale price of 5 tables profit = cost price of 5 tables = Rs. 5

$$\begin{aligned} \text{Profit percentage} &= \text{Profit/CP} \times 100 \\ &= 5/5 \times 100 \\ &= 100\% \end{aligned}$$

41. Abida bought 100 pens at the rate of Rs 3.50 per pen and pays a sales tax of 4%. The total amount paid by Abida is _____.

Solution:

Rs.364

Number of pens = 100

Rate of per pen = Rs.3.50

$$\begin{aligned}\text{Cost of 100 pens} &= 100 \times 3.50 \\ &= 350\end{aligned}$$

$$\begin{aligned}\text{Sales tax on pen} &= 4\% \\ \text{Total amount paid} &= 350 \times (4/100) + 350 \\ &= 350 \times 1/25 + 350 \\ &= 14 + 350 \\ &= 364\end{aligned}$$

42. The cost of a tape-recorder is Rs 10,800 inclusive of sales tax charged at 8%. The price of the tape-recorder before sales tax was charged is _____.

Solution:

Rs.10000

Cost of tape recorder = Rs.10800

Let, the cost before including the tax = x

Therefore,

$$x + x \times (8/100) = 10800$$

$$\frac{100x + 8x}{100} = 10800$$

$$108x = 1080000$$

$$x = 10000$$

43. 2500 is greater than 500 by _____ %.

Solution:

400%

As,

$$2500 - 500 = 2000$$

$$\begin{aligned}\text{Percentage increase in 500 to 2500} &= (2000/500) \times 100 \\ &= 2000/5 \\ &= 400\end{aligned}$$

44. Four times a number is a _____ % increase in the number.

Solution:

300%

Let the number be x.

Four times of number = 4x

$$\begin{aligned}4x \text{ is greater than } x \text{ by} &= 4x - x \\ &= 3x\end{aligned}$$

$$\begin{aligned}\text{Percentage increase in } x &= 3x/x \times 100 \\ &= 300\%\end{aligned}$$

45. 5% sales tax is charged on an article marked Rs 200 after allowing a discount of 5%, then the amount payable is _____.

Solution:

Rs.199.50.

Marked price = Rs. 200

Discount = 5%

$$\begin{aligned}\text{Selling price} &= 200 - \left(\frac{5}{100}\right) \times 200 \\ &= 200 - 20 \\ &= 190\end{aligned}$$

$$\begin{aligned}\text{Selling price including 5\% tax} &= 190 + \left(\frac{5}{100}\right) \times 190 \\ &= 190 + 9.5 \\ &= \text{Rs. } 199.5\end{aligned}$$

In questions 46 to 65 state whether the statements are true (T) or false (F).

46. To calculate the growth of a bacteria if the rate of growth is known, the formula for calculation of amount in compound interest can be used.

Solution:

True

47. Additional expenses made after buying an article are included in the cost price and are known as Value Added Tax.

Solution:

False

48. Discount is a reduction given on cost price of an article.

Solution:

False

49. Compound interest is the interest calculated on the previous year's amount.

Solution:

True

50. C.P. = M.P. – Discount.

Solution:

False

51. A man purchased a bicycle for Rs 1,040 and sold it for Rs 800. His gain per cent is 30%.

Solution:

The given statement is false.

Given,

A man purchased a bicycle = Rs. 1,040

Selling price of this bicycle = Rs. 800

We know that,

Loss = cost price – selling price

$$= 1040 - 800$$

$$= \text{Rs. } 240$$

$$\text{Loss\%} = \frac{\text{loss}}{\text{cost price}} \times 100$$

$$= \frac{240}{1040} \times 100$$

$$= 23.07\%$$

52. Three times a number is 200% increase in the number, then one-third of the same number is 200% decrease in the number.

Solution.

False

Let x be the number.

So, three times of x = 3x

Difference between 3x and x = 3x - x

$$= 2x$$

Percentage increase in x = $\frac{2x}{x} \times 100$

$$= 200\%$$

If one-third of x = $\frac{x}{3}$,

Difference between x and $\frac{x}{3} = \frac{2x}{3}$

$$\begin{aligned}\text{Percentage decrease} &= \frac{\frac{2x}{3}}{x} \times 100 \\ &= 66.66\%\end{aligned}$$

53. Simple interest on a given amount is always less than or equal to the compound interest on the same amount for the same time period and at the same rate of interest per annum.

Solution.

False

For 1 yr, the simple interest and compound interest for same amount on same rate of interest are equal.

But for 2 yr, the simple interest is less than the compound interest for same amount on same rate of interest.

54. The cost of a sewing machine is Rs 7,000. Its value depreciates at 8% p.a. Then the value of the machine after 2 years is Rs 5,924.80.

Solution:

The given statement is true.

55. If the discount of Rs y is available on the marked price of Rs x, then the discount percent is $\frac{x}{y} \times 100\%$. □

Solution.

False

Marked price =Rs.x

Discount amount =Rs.y

$$\begin{aligned}\text{Discount Percentage} &= \frac{\text{Discount}}{\text{Marked Price}} \times 100\% \\ &= \frac{y}{x} \times 100\%\end{aligned}$$

56. Number of students appearing for class X CBSE examination increases from 91,422 in 1999–2000 to 11,6054 in 2008–09. Increase in the number of students appeared is approximately 27%.

Solution:

The given statement is true.

57. Selling price of 9 articles is equal to the cost price of 15 articles. In this transaction there is profit of $66\frac{2}{3}\%$.

Solution:

The given statement is true.

58. The compound interest on a sum of Rs P for T years at R% per annum compounded annually is given by the formula $P \left(1 + \frac{R}{100}\right)^T$.

Solution:

The given statement is false.

As per condition given in question,
Compound interest = Amount – Principal
Where,

$$A = P \left(1 + \frac{R}{100}\right)^T$$

59. In case of gain, S.P. = $\frac{(100 + \text{gain}\%) \times \text{C.P.}}{100}$.

Solution:

The given statement is true.

60. In case of loss, C.P. = $\frac{100 \times \text{S.P.}}{100 + \text{Loss}\%}$.

Solution:

The given statement is false.

We have,

$$\text{Cost Price} = \frac{100}{100 - \text{loss}\%} \times \text{Selling Price}$$

61. The value of a car, bought for Rs 4, 40,000 depreciates each year by 10% of its value at the beginning of that year. So its value becomes Rs 3, 08,000 after three years.

Solution:

The given statement is false.

As per given data,

The value of the care after depreciation in 3 years is:

$$A = P \left(1 - \frac{R}{100} \right)^t$$

$$A = 440000 \left(1 - \frac{10}{100} \right)^3$$

$$A = 440000 \left(\frac{9}{10} \right)^3$$

$$A = 440 \times 729$$

$$A = \text{Rs.} 320760$$

62. The cost of a book marked at Rs 190 after paying a sales tax of 2% is Rs 192.

Solution:

The given statement is false.

Marked price of a book = Rs.190.

Sales tax = 2%

$$\begin{aligned} \text{Cp of book after 2\% sales tax} &= 190 + \frac{2}{100} \times 190 \\ &= 193.8 \text{ Rs.} \end{aligned}$$

63. The buying price of 5 kg of flour with the rate Rs 20 per kg, when 5% ST is added on the purchase is Rs 21.

Solution:

The given statement is true.

64. The original price of a shampoo bottle bought for Rs 324 if 8% VAT is included in the price is Rs 300.

Solution.

False

The original price of a shampoo bottle = Rs.300

Cost price of shampoo bottle after 8% VAT,

$$\begin{aligned}
&= 300 + \frac{8}{100} \times 300 \\
&= 300 + 24 \\
&= 324 \text{ Rs.}
\end{aligned}$$

65. Sales tax is always calculated on the cost price of an item and is added to the value of the bill.

Solution:

The given statement is false.

Sales tax is always calculated on the selling price of an item and is added to the value of the bill.

Solve the following:

66. In a factory, women are 35% of all the workers, the rest of the workers being men. The number of men exceeds that of women by 252. Find the total number of workers in the factory.

Solution.

Percentage of women in factory = 35%
 Percentage of men in factory = $100 - 35$
 $= 65\%$

Let the number of persons in the factory be x .
 According to the question,

$$\begin{aligned}
x \times \frac{65}{100} - x \times \frac{35}{100} &= 252 \\
\frac{65x - 35x}{100} &= 252 \\
\frac{30x}{100} &= 252 \\
x &= 840
\end{aligned}$$

67. Three bags contain 64.2 kg of sugar. The second bag contains $\frac{4}{5}$ of the contents of the first and the third contains $45\frac{1}{2}\%$ of what there is in the second bag. How much sugar is there in each bag?

Solution.

The total weight of sugar in three bags = 64.2 kg
 Let the first bag contains x kg sugar.

$$\text{Second bag contains} = \frac{4x}{5}$$

Third bag contains,

$$\begin{aligned} &= \frac{4x}{5} \times \frac{91}{2} \% \\ &= \frac{91x}{250} \text{ kg} \end{aligned}$$

According to question,

$$x + \frac{4x}{5} + \frac{91x}{250} = 64.2$$

On solving,

$$x = 29.67 \text{ kg}$$

First bag contains = 29.67kg

$$\begin{aligned} \text{Second bag contains} &= \frac{4x}{5} \\ &= 23.73 \text{ kg} \end{aligned}$$

$$\begin{aligned} \text{Third bag contains} &= \frac{91x}{250} \\ &= 10.8 \text{ kg} \end{aligned}$$

68. Find the S.P. if

(a) M.P. = Rs 5450 and discount = 5%

(b) M.P. = Rs 1300 and discount = 1.5%

Solution:

(a) Marked price = 5450

Discount % = 5%

$$SP = MP - \frac{\text{Discount}\%}{100} \times MP$$

$$= 5450 - \frac{5}{100} \times 5450$$

$$= 5177.5$$

(b) M.P. = Rs 1300

Discount = 1.5%

$$SP = MP - \frac{\text{Discount}\%}{100} \times MP$$

$$= 1300 - \frac{1.5}{100} \times 1300$$

$$= 1280.5$$

69. Find the M.P. if

(a) S.P. = Rs 495 and discount = 1%

(b) S.P. = Rs 9,250 and discount = $7\frac{1}{2}\%$

Solution:

(a) Selling price (SP) = 7495

Discount % = 1%

Let MP be x,

$$SP = MP - \frac{\text{Discount}\%}{100} \times MP$$

$$495 = x - \frac{1}{100} \times x$$

$$495 = \frac{99x}{100}$$

$$x = 500$$

(b) S.P. = Rs 9,250

Discount = $7\frac{1}{2}\%$

Let MP be x,

$$SP = MP - \frac{\text{Discount}\%}{100} \times MP$$

$$9250 = x - \frac{15}{2 \times 100} \times x$$

$$495 = \frac{185x}{200}$$

$$x = 10000$$

70. Find discount in per cent when

(a) M.P. = Rs 625 and S.P. = Rs 562.50

(b) M.P. = Rs 900 and S.P. = Rs 873

Solution:

We know that,

Discount = Market price – Selling price.

Discount = 625 – 562.50

= 62.5

$$\begin{aligned} \text{Discount\%} &= \frac{\text{Discount}}{\text{MP}} \times 100 \\ &= \frac{62.5}{625} \times 100 \\ &= 10\% \end{aligned}$$

(b) M.P. = Rs 900
S.P. = Rs 873

Discount = Market price – Selling price.
Discount = 900 – 873
= 27

$$\begin{aligned} \text{Discount\%} &= \frac{\text{Discount}}{\text{MP}} \times 100 \\ &= \frac{27}{900} \times 100 \\ &= 3\% \end{aligned}$$

71. The marked price of an article is Rs 500. The shopkeeper gives a discount of 5% and still makes a profit of 25%. Find the cost price of the article.

Solution:

Given,
Market price of an article = Rs 500.
The shopkeeper gives a discount = 5%
But it makes profit = 25%
Let, the cost price of an article = Rs. x

As per question,
CP after 5% discount = 500-25
= 475

According to question,
(100+25% of x) = 475

$$\frac{125}{100} \times x = 475$$

$$\begin{aligned} x &= \frac{475 \times 100}{125} \\ &= 3.8 \times 100 \\ &= 380 \end{aligned}$$

72. In 2007 – 08, the number of students appeared for Class X examination was 1,05,332 and in 2008–09, the number was 1,16,054. If 88,151 students

pass the examination in 2007–08 and 103804 students in 2008–09. What is the increase or decrease in pass % in Class X result?

Solution:

Given, In 2007 – 08,

The number of students appeared for Class X examination = 1, 05,332

In 2008–09, the number = 1, 16,054.

Passed % of students in 2007-2008,

$$\begin{aligned} &= \frac{\text{Number of students passed in 2007-08}}{\text{Number of students appeared in 2007-08}} \times 100 \\ &= \frac{88151}{105332} \times 100 \\ &= 83.68\% \end{aligned}$$

Passed % of students in 2008-2009,

$$\begin{aligned} &= \frac{\text{Number of students passed in 2008-09}}{\text{Number of students appeared in 2008-09}} \times 100 \\ &= \frac{103804}{116054} \times 100 \\ &= 89.44\% \end{aligned}$$

$$\begin{aligned} \text{Increase in percentage} &= 89.44 - 83.68 \\ &= 5.76\% \end{aligned}$$

73. A watch worth Rs 5400 is offered for sale at Rs 4,500. What per cent discount is offered during the sale?

Solution:

Given,

Market price of watch = Rs 5400

Selling price = Rs. 4500

We know that,

Discount = Market price – Selling price.

$$\begin{aligned} \text{Discount}\% &= \frac{\text{Discount}}{\text{MP}} \times 100 \\ &= \frac{900}{5400} \times 100 \\ &= \frac{50}{3} \% \end{aligned}$$

74. In the year 2001, the number of malaria patients admitted in the hospitals of a state was 4,375. Every year this number decreases by 8%. Find the number of patients in 2003.

Solution:

As per given question,
Time period = 2 years

Suppose the number of patients in 2003 = A
We know that,

$$A = P \left(1 - \frac{R}{100} \right)^t$$

$$A = 4375 \left(1 - \frac{8}{100} \right)^2$$

$$A = 4375 \left(\frac{23}{25} \right)^2$$

$$A = 3703$$

75. Jyotsana bought a product for Rs 3,155 including 4.5% sales tax. Find the price before tax was added.

Solution:

A product bought by Jyotsana for Rs. 3155 including 4.5% sales tax.
Let the price of the product before sales tax be Rs. x.

According to question,

$$x + x \times \frac{4.5}{100} = 3155$$

$$x + x \times \frac{45}{1000} = 3155$$

$$\frac{1045x}{1000} = 3155$$

$$x = 3019.14 \text{ Rs.}$$

76. An average urban Indian uses about 150 litres of water every day.

Activity	Litres per person per day
Drinking	3
Cooking	4

Bathing	20
Sanitation	40
Washing clothes	40
Washing utensils	20
Gardening	23
Total	150

(a) What per cent of water is used for bathing and sanitation together per day?

(b) How much less per cent of water is used for cooking in comparison to that used for bathing?

(c) What per cent of water is used for drinking, cooking and gardening together?

Solution:

As per question,

a) Percentage of water is used for bathing and sanitation together per day,

$$\begin{aligned}
 &= \frac{20 + 40}{150} \times 100 \\
 &= 40\%
 \end{aligned}$$

b) Difference between water used for cooking and bathing = $20 - 4$
= 16 L

In %,

$$\begin{aligned}
 &= \frac{16}{150} \times 100 \\
 &= 10.67\%
 \end{aligned}$$

c) Total used water = 30 L

In %,

$$\begin{aligned}
 &= \frac{30}{150} \times 100 \\
 &= 20\%
 \end{aligned}$$

77. In 1975, the consumption of water for human use was about 3850 cu.km/year. It increased to about 6000 cu.km/year in the year 2000. Find the per cent increase in the consumption of water from 1975 to 2000. Also,

find the annual per cent increase in consumption (assuming water consumption increases uniformly).

Solution:

As per question,
Increase in consumption of water in 1975 to 2000
= 6000 – 3850
= 2150cu km/yr

In %,
 $= \frac{2150}{3850} \times 100$
= 55.84%

Total increased water consumption in 25 years = $\frac{2150}{25}$
= 86 cu km/yr

So,

In percentage, $\frac{86}{3850} \times 100 = 2.23\%$

78. Harshna gave her car for service at service station on 27-05-2009 and was charged as follows:

- (a) 3.10 litres engine oil @ Rs 178.75 per litre and VAT @ 20%.**
- (b) Rs 1,105.12 for all other services and VAT @ 12.5%.**
- (c) Rs 2,095.80 as labour charges and service tax @10%.**
- (d) 3% cess on service Tax.**

Find the bill amount.

Solution:

As per question,

a) The cost of engine oil including 20% VAT,
 $= 554.125 + 554.125 \times \frac{20}{100}$
= Rs.664.94

b) Amount paid for all services = Rs. 1105.12 Amount paid including 12.5% VAT,
 $= 1105.12 + 1105.12 \times \frac{12.5}{100}$
= Rs.1243.26

c) Net labour charges including 10% service tax

$$= 2095.80 + 2095.80 \times \frac{10}{100}$$

$$= \text{Rs.} 2305.38$$

d) Cess on service tax @ 3%,

$$= 209.58 \times \frac{3}{100}$$

$$= 2.095 \times 3$$

$$= \text{Rs.} 6.29$$

So, net bill amount,

$$= \text{Rs.} 664.95 + \text{Rs.} 1243.26 + \text{Rs.} 2305.38 + \text{Rs.} 6.29$$

$$= \text{Rs.} 4219.88$$

79. Given the principal = Rs 40,000, rate of interest = 8% p.a. compounded annually. Find

- (a) Interest if period is one year.
- (b) Principal for 2nd year.
- (c) Interest for 2nd year.
- (d) Amount if period is 2 years.

Solution:

As per question,

a) Compound interest for 1 year:

$$A = P \left(1 + \frac{R}{100} \right)^1$$

$$A = 40000 \left(1 + \frac{8}{100} \right)^1$$

$$A = \text{Rs.} 43200$$

$$\text{Compound interest} = A - P$$

$$= 43200 - 40000$$

$$= \text{Rs.} 3200$$

b) Amount of 1 year is equal to the principal of second year = Rs. 43200

c) Now, amount for the second year:

$$A = P \left(1 + \frac{R}{100} \right)^1$$

$$A = 43200 \left(1 + \frac{8}{100} \right)^1$$

$$A = \text{Rs. } 46656$$

$$\begin{aligned} \text{Compound interest} &= \text{Amount} - \text{Principal} \\ &= \text{Rs. } 46656 - \text{Rs. } 43200 \\ &= \text{Rs. } 3456 \end{aligned}$$

d) For period of two years, we have already calculated amount = Rs. 46656

80. In Delhi University, in the year 2009 – 10, 49,000 seats were available for admission to various courses at graduation level. Out of these 28,200 seats were for the students of General Category while 7,400 seats were reserved for SC and 3,700 seats for ST. Find the per centage of seats available for

(i) Students of General Category.

(ii) Students of SC Category and ST Category taken together.

Solution:

As per question,

i) Students of general category,

$$\begin{aligned} &= \frac{\text{Seats of general category}}{\text{Total seats available}} \times 100\% \\ &= \frac{28200}{49000} \times 100\% \\ &= 57.55\% \end{aligned}$$

ii) Total students of SC/ST category = 7400 + 3700
= 11100 students

Now,

Students of SC/ST category,

$$\begin{aligned} &= \frac{\text{Seats of SC/ST category}}{\text{Total seats available}} \times 100\% \\ &= \frac{11100}{49000} \times 100\% \\ &= 22.65\% \end{aligned}$$

81. Prachi bought medicines from a medical store as prescribed by her doctor for Rs 36.40 including 4% VAT. Find the price before VAT was added.

Solution:

As per question,

We know that,

Selling price = cost price + VAT

So,

Price before VAT was added,

$$= 36.40 - \frac{4}{100} \times 36.40$$

$$= 36.40 - 4 \times 0.364$$

$$= 36.40 - 1.456$$

$$= \text{Rs. } 35$$

82. Kritika ordered one pizza and one garlic bread from a pizza store and paid Rs 387 inclusive of taxes of Rs 43. Find the tax%.

Solution:

As per question, Inclusive tax = Rs. 43

The cost of products without tax = $387 - 43$

$$= \text{Rs. } 344$$

Now,

Tax percentage,

$$= \frac{43}{344} \times 100$$

$$= 12.5\%$$

83. Arunima bought household items whose marked price and discount % is as follows:

Item	Quantity	Rate	Amount	Discount%
(a) Atta	1 packet	200	200	16%
(b) Detergent	1 packet	371	371	22.10%
(c) Namkeen	1 packet	153	153	18.30%

Find the total amount of the bill she has to pay.

Solution:

a) Rate of 1 packet atta = Rs. 200

Discount % = 16%

So,

The price;

$$= 200 - \frac{16}{100} \times 100$$

$$= \text{Rs.}168$$

b) Rate of 1 packet detergent = Rs. 371

Discount % = 22.10%

So,

The price,

$$= 371 - \frac{22.10}{100} \times 100$$

$$= \text{Rs.}289$$

c) Rate of 1 packet nankeen = Rs. 153 Discount % = 18.305%

$$\text{The price,} = 153 - \frac{18.30}{100} \times 100$$

$$= \text{Rs.}185$$

Net amount of the bill she has to pay = price of Atta + price of Detergent + price of nankeen
 $= 168 + 289 + 185$
 $= \text{Rs.}582$

84. Devangi's phone subscription charges for the period 17-02-09 to 16-03-09 were as follows:

Period	Amount (in Rs)	Service Tax %
17-02-09 to 23-02-09	199.75	12
24-02-09 to 16-03-09	599.25	10

Find the final bill amount if 3% education cess was also charged on service tax.

Solution:

As per question,

Amount for period 17 – 02-09 to 23 – 02-09 = Rs. 199.75

So,

Amount with service tax @12% ,

$$= 199.75 - \frac{12}{100} \times 199.75$$

$$= \text{Rs.}223.72$$

Amount for period 24 – 02-09 to 15 – 03 – 09 = Rs.599.25

Amount with service tax @12%,

$$= 599.25 - \frac{10}{100} \times 599.25$$

$$= \text{Rs.} 659.175$$

So,

$$\begin{aligned} \text{Net bill amount including education cess of 3\%,} \\ &= 882.895 + 3\% \text{ of } 882.895 \\ &= \text{Rs. } 909.39 \end{aligned}$$

85. If principal = Rs 1,00,000. rate of interest = 10% compounded half yearly. Find

(i) Interest for 6 months.

(ii) Amount after 6 months.

(iii) Interest for next 6 months.

(iv) Amount after one year.

Solution:

We know that, $CI = A - P$

And where for six months amount,

$$A = P \left(1 + \frac{R}{200} \right)^t$$

a) Given,

$$n = 6 \text{ months}$$

$$A = P \left(1 + \frac{R}{200} \right)^t$$

$$A = 100000 \left(1 + \frac{10}{200} \right)^1$$

$$A = \text{Rs.} 105000$$

$$\begin{aligned} CI &= 105000 - 100000 \\ &= \text{Rs. } 5000 \end{aligned}$$

b) Amount for six months = Rs. 105000

c) Interest for next six months:

As per question,

$$A = P \left(1 + \frac{R}{200} \right)^t$$

$$A = 105000 \left(1 + \frac{10}{200} \right)^1$$

$$A = \text{Rs.} 110250$$

$$CI = 110250 - 105000$$

$$= \text{Rs. } 5250$$

d) Amount after one year = Rs. 110250

86. Babita bought 160 kg of mangoes at Rs 48 per kg. She sold 70% of the mangoes at Rs 70 per kg and the remaining mangoes at Rs 40 per kg. Find Babita's gain or loss per cent on the whole dealing.

Solution:

As per question,

$$\begin{aligned}\text{So, net amount babita paid} &= 48 \times 160 \\ &= \text{Rs. } 7680\end{aligned}$$

She sold 70% of mangoes at Rs. 70 per kg.

$$\text{So, cost of 70\% of mangoes} = 160 \times \frac{70}{100} \times 70 = \text{Rs. } 7840$$

$$\begin{aligned}\text{Net amount received after selling mangoes} &= 7840 + 1920 \\ &= \text{Rs. } 9760\end{aligned}$$

We know that, $SP > CP$.

So, there is a gain;

$$\begin{aligned}\text{Gain} &= SP - CP \\ &= 9760 - 7680 \\ &= 2080\end{aligned}$$

Now,

$$\begin{aligned}\text{Gain percentage} &= \frac{\text{Gain}}{CP} \times 100 \\ &= \frac{2080}{7680} \times 100 \\ &= 27.08\end{aligned}$$

87. A shopkeeper was selling all his items at 25% discount. During the off season, he offered 30% discount over and above the existing discount. If Pragya bought a skirt which was marked for Rs 1,200, how much did she pay for it?

Solution:

As per question,

Market price of the skirt = Rs. 1200

$$\begin{aligned}\text{During normal season discount @ 25\%} &= \frac{25}{100} \times 1200 \\ &= \text{Rs. } 300\end{aligned}$$

$$\begin{aligned}\text{After the discount, price of the skirt} &= 1200 - 300 \\ &= \text{Rs. } 900\end{aligned}$$

$$\begin{aligned}\text{In off season, the shopkeeper also offer discount @30\%} &= \frac{30}{100} \times 900 \\ &= \text{Rs.270}\end{aligned}$$

Now,

$$\begin{aligned}\text{The price of skirt after 30\% discount} &= 900 - 270 \\ &= \text{Rs. 630}\end{aligned}$$

88. Ayesha announced a festival discount of 25% on all the items in her mobile phone shop. Raman deep bought a mobile phone for himself. He got a discount of Rs 1,960. What was the marked price of the mobile phone?

Solution:

Let, the market price of the phone = x

Festival discount on phone = 25%

Ramadeep got total discount = Rs. 1960

As per question,

$$\begin{aligned}1960 &= x \times \frac{25}{100} \\ x &= 1960 \times 4 \\ &= \text{Rs.7840}\end{aligned}$$

89. Find the difference between Compound Interest and Simple Interest on Rs 45,000 at 12% per annum for 5 years.

Solution:

As per question,

$$\begin{aligned}SI &= \frac{PRT}{100} \\ &= \frac{45000 \times 12 \times 5}{100} \\ &= \text{Rs.27000}\end{aligned}$$

$$CI = A - P$$

Where,

$$A = P \left(1 + \frac{R}{100} \right)^t$$

$$A = 45000 \left(1 + \frac{12}{100} \right)^5$$

$$A = \text{Rs.79200}$$

$$\begin{aligned}CI &= 79200 - 45000 \\ &= 34200\end{aligned}$$

Also,

$$\begin{aligned}\text{Difference between SI and CI} &= 34200 - 27000 \\ &= \text{Rs. } 7200\end{aligned}$$

90. A new computer costs Rs 1,00,000. The depreciation of computers is very high as new models with better technological advantages are coming into the market. The depreciation is as high as 50% every year. How much will the cost of computer be after two years?

Solution:

As per Question,

Let the cost of computer after two years = x

We know that,

$$A = P \left(1 - \frac{R}{100} \right)^t$$

$$A = 100000 \left(1 - \frac{50}{100} \right)^2$$

$$A = \text{Rs. } 25000$$

91. The population of a town was decreasing every year due to migration, poverty and unemployment. The present population of the town is 6,31,680. Last year the migration was 4% and the year before last, it was 6%. What was the population two years ago?

Solution:

As per question,

Let, two years ago the population = P

We know that,

$$A = P \left(1 - \frac{R}{100} \right) \left(1 - \frac{R}{100} \right)$$

$$631680 = P \left(1 - \frac{4}{100} \right) \left(1 - \frac{6}{100} \right)$$

$$631680 = P \times \frac{24}{25} \times \frac{47}{50}$$

$$P = 700000$$

92. Lemons were bought at Rs 48 per dozen and sold at the rate of Rs 40 per 10. Find the gain or loss per cent.

Solution:

As per question,

Cost of one dozen lemons = Rs. 48

We know that,

1 dozen = 12 pieces.

$$\begin{aligned}\text{Cost of 1 lemon} &= \frac{48}{12} \\ &= \text{Rs.4}\end{aligned}$$

Also 10 lemons sold by Rs. 40.

$$\begin{aligned}\text{Selling price of one lemon} &= \frac{40}{10} \\ &= \text{Rs.4}\end{aligned}$$

Now, cost price of one lemon = Selling price of one lemon.

Zero profit and Zero loss.

93. If the price of petrol, diesel and LPG is slashed as follows:

Fuel	Old prices/ litre (in Rs)	New price/ litre (in Rs)	% Decrease
Petrol / L	45.62	40.62	_____
Diesel / L	32.86	30.86	_____
LPG/14.2kg	304.70	279.70	_____

Complete the above table.

Solution:

From the above table,

For per litre petrol, old price = Rs. 45.62 and New price = Rs. 40.62

Decrement in price = Rs. 45.62 - Rs. 40.62

$$= \text{Rs. 5}$$

So,

$$\begin{aligned}\text{Decrease percentage} &= \frac{5}{45.62} \times 100 \\ &= 10.96\%\end{aligned}$$

For per litre diesel,

Old price = Rs. 32.86

New price = Rs. 30.86

Decrement in price = Rs. 32.86 - Rs. 30.86

$$= \text{Rs. 2}$$

$$\begin{aligned}\text{Decrease percentage} &= \frac{2}{32.86} \times 100 \\ &= 6.09\%\end{aligned}$$

For LPG,

Old price = Rs. 304.70 and

New price = Rs. 279.70

Decrement in price = Rs. 304.70 - Rs. 279.70
= Rs. 25

So,

$$\begin{aligned}\text{Decrease Percentage} &= \frac{25}{304.70} \times 100 \\ &= 8.20\%\end{aligned}$$

94. What is the percentage increase or decrease in the number of seats won by A, B, C and D in the general elections of 2009 as compared to the results of 2004?

Political party	Number of seats won in 2004	Number of seats won in 2009
A	206	145
B	116	138
C	4	24
D	11	12

Solution:

For political party A,

Number of seats won in 2004 = 206 Number of seats won in 2009 = 145

Decreased number of seats won by the party A, $206 - 145 = 61$ Seats

$$\begin{aligned}\text{So, decreased percentage} &= \frac{61}{206} \times 100 \\ &= \frac{61}{206} \times 100\end{aligned}$$

For political party B,

Number of seats won in 2004 = 116

Number of seats won in 2009 = 138

Increased number of seats won by the party B,

$138 - 116 = 22$ Seats

$$\begin{aligned}\text{So, increased percentage} &= \frac{22}{116} \times 100 \\ &= 18.96\%\end{aligned}$$

For political party C,

Number of seats won in 2004 = 4 Number of seats won in 2009 = 24

Increased number of seats won by the party C,

$24 - 4 = 20$ Seats

$$\begin{aligned}\text{So, increased percentage} &= \frac{20}{4} \times 100 \\ &= 500\%\end{aligned}$$

For political party D,

Number of seats won in 2004 = 11

Number of seats won in 2009 = 12

Increased number of seats won by the party D,

$$12 - 11 = 1 \text{ Seat}$$

$$\begin{aligned}\text{So, increased percentage} &= \frac{1}{11} \times 100 \\ &= 9.09\%\end{aligned}$$

95. How much more per cent seats were won by X as compared to Y in Assembly Election in the state based on the data given below.

Party	Won (out of 294)
X	158
Y	105
Z	18
W	13

Solution:

As per question,

Net number of seats won by the party X = 158

Net number of seats won by the party Y = 105

So, the total number of seats in election = 294

$$\text{And the \% of seats won by party X} = \frac{158}{294} \times 100 = 53.74\%$$

$$\text{And also, the \% of seats won by party Y} = \frac{105}{294} \times 100 = 35.71\%$$

$$\begin{aligned}\text{Now, the difference of percentage} &= (53.74 - 35.71) \% \\ &= 18.03 \%\end{aligned}$$

Therefore, party X won 18.03 % as compared to party Y.

96. Ashima sold two coolers for Rs 3,990 each. On selling one cooler she gained 5% and on selling the the other she suffered a loss of 5%. Find her overall gain or loss % in whole transaction.

Solution:

SP of each cooler =Rs. 3990

Let, the CP of both coolers for Ashima = x

We know that,

Profit = SP – CP

So,

$$3990 = x + x \times \frac{5}{100}$$

$$3990 = \frac{21x}{20}$$

$$x = \text{Rs.} 3800$$

And also, on another transaction of other cooler she has a loss = 5%

$$3990 = x - x \times \frac{5}{100}$$

$$3990 = \frac{19x}{20}$$

$$x = \text{Rs.} 4200$$

Now,

$$\begin{aligned} \text{The net CP for Ashima} &= \text{Rs. } 3800 + \text{Rs. } 4200 \\ &= \text{Rs. } 8000 \end{aligned}$$

$$\begin{aligned} \text{Ashima sold both coolers} &= \text{Rs. } 3990 \times 2 \\ &= \text{Rs. } 7980 \end{aligned}$$

Here, CP > SP.

So, Ashima has loss her whole transaction.

Now,

$$\begin{aligned} \text{Loss} &= \text{Rs } 8000 - \text{Rs. } 7980 \\ &= \text{Rs. } 20 \end{aligned}$$

$$\begin{aligned} \text{Loss Percentage} &= \frac{20}{8000} \times 100 \\ &= 0.25\% \end{aligned}$$

97. A lady buys some pencils for Rs 3 and an equal number for Rs 6. She sells them for Rs 7. Find her gain or loss%.

Solution:

As per question,

Cost price of some pencils = Rs.3 and

For other equal no. of pencils = Rs.3 and

Net selling price = Rs.7.

Suppose, lady buys 'n' pencils for Rs = 3.

(Type - 1)

CP for one such pencil = Rs. $\frac{3}{x}$

And for 'n' pencils of other kind, she paid Rs.= 6

(Type - 2)

CP for one such pencil = Rs. $\frac{6}{x}$

Total pencils = $x + x$
= $2x$

She sells $2x$ pencils at Rs. 7

SP of one pencil = $\frac{7}{2x}$

Now,

Calculation for type I,

We know that, Gain = selling price - cost price

By using above formula,

$$\begin{aligned}\text{Gain} &= \frac{7}{2x} - \frac{3}{x} \\ &= \frac{1}{2x}\end{aligned}$$

$$\begin{aligned}\text{Gain\%} &= \frac{\text{Gain}}{\text{CP}} \times 100 \\ &= \frac{\frac{1}{2x}}{\frac{3}{x}} \times 100 \\ &= \frac{50}{3}\%\end{aligned}$$

Now,

Calculation for type II

Loss = CP - SP

So,

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$$\begin{aligned}
 \text{Loss} &= \frac{6}{x} - \frac{7}{2x} \\
 &= \frac{5}{2x} \\
 \text{Loss\%} &= \frac{\text{Loss}}{CP} \times 100 \\
 &= \frac{5}{\frac{2x}{6}} \times 100 \\
 &= \frac{125}{3} \% \\
 \text{So,} \\
 \text{Net gain \%} &= \frac{125}{3} - \frac{50}{3} \\
 &= 25\%
 \end{aligned}$$

98. On selling a chair for Rs 736, a shopkeeper suffers a loss of 8%. At what price should he sell it so as to gain 8%?

Solution:

Given,

Selling price of chair = Rs.736, this led to loss of 8%.

Let, the cost price of a chair = Rs. x

As per question,

$$x - x \times \frac{8}{100} = 736$$

$$\frac{92x}{100} = 736$$

$$x = \text{Rs.}800$$

$$\begin{aligned}
 \text{To gain 8\% profit the price should be} &= 800 + 800 \times \frac{8}{100} \\
 &= 864 \text{ Rs.}
 \end{aligned}$$

99. A dining table is purchased for Rs 3,200 and sold at a gain of 6%. If a customer pays sales tax at the rate of 5%. How much does the customer pay in all for the table?

Solution:

Selling price of the dining table,

$$= 3200 + 3200 \times \frac{6}{100}$$

$$= \text{Rs.} 3392$$

Selling price with the sale tax,

$$= 3392 + 3392 \times \frac{5}{100}$$

$$= \text{Rs.} 3561.60$$

100. Achal bought a second-hand car for Rs 2,25,000 and spend Rs 25,000 for repairing. If he sold it for Rs 3,25,000, what is his profit per cent?

Solution:

$$\begin{aligned} \text{Actual cost for the car} &= \text{Rs. } 225000 + \text{Rs. } 25000 \\ &= \text{Rs. } 250000 \end{aligned}$$

$$\text{Achal sold her car} = \text{Rs. } 325000$$

Now,

$$\begin{aligned} \text{Profit} &= \text{Rs. } 325000 - \text{Rs. } 250000 \\ &= 75000 \end{aligned}$$

$$\begin{aligned} \text{Profit\%} &= \frac{\text{Profit}}{\text{CP}} \times 100 \\ &= \frac{75000}{250000} \times 100 \\ &= 30\% \end{aligned}$$

101. A lady bought an air-conditioner for Rs 15,200 and spent Rs 300 and Rs 500 on its transportation and repair respectively. At what price should she sell it to make a gain of 15%?

Solution:

$$\begin{aligned} \text{Actual cost price of air conditioner with transportation charge and repair charges} \\ &= \text{Rs. } 15200 + \text{Rs. } 300 + \text{Rs. } 500 \\ &= \text{Rs. } 15500 + \text{Rs. } 500 \\ &= \text{Rs. } 16000 \end{aligned}$$

$$\begin{aligned} \text{For gain 15\% she should sell it for Rs,} &= 16000 + 16000 \times \frac{15}{100} \\ &= \text{Rs.} 18400 \end{aligned}$$

102. What price should a shopkeeper mark on an article that costs him Rs 600 to gain 20%, after allowing a discount of 10%

Solution:

Given,

Gain percentage = 20% and the

CP of an article = Rs. 600

Now,

$$\begin{aligned} \text{Gain} &= \frac{600 \times 20}{100} \\ &= 120 \end{aligned}$$

By using formula SP = gain + CP

$$\text{SP} = \text{Rs. } 600 + \text{Rs. } 120$$

$$= \text{Rs. } 720$$

Let, the MP = x

Since, he allow a discount = 10 %

As per question,

$$x - 10\% \text{ of } x = \text{Rs. } 720$$

$$x - \frac{10x}{100} = \text{Rs. } 720$$

$$\frac{90x}{100} = \text{Rs. } 720$$

$$x = \text{Rs. } 800$$

103. Brinda purchased 18 coats at the rate of Rs 1,500 each and sold them at a profit of 6%. If customer is to pay sales tax at the rate of 4%, how much will one coat cost to the customer and what will be the total profit earned by Brinda after selling all coats?

Solution:

Net cost of 18 coats = 1500 x 18

$$= \text{Rs. } 27000$$

$$\text{The amount received by bindra} = 27000 + 27000 \times \frac{6}{100}$$

$$= \text{Rs. } 28620$$

If customer pay sale tax = 4%

$$\text{CP with sale tax} = 28620 + 28620 \times \frac{4}{100}$$

$$= \text{Rs. } 29764.80$$

$$\text{CP for 1 coat for customer} = \frac{29764.80}{18}$$

$$= \text{Rs. } 1653.60$$

Now,

$$\text{Pprofit earned by bindra,} = \text{Rs. } 28620 - \text{Rs. } 27000$$

$$= \text{Rs. } 1620$$

104. Rahim borrowed Rs 10,24,000 from a bank for one year. If the bank charges interest of 5% per annum, compounded half-yearly, what amount will he have to pay after the given time period. Also, find the interest paid by him.

Solution:

Let,

Amount = A

In half yearly,

$R = R/2$ and

$T = 2T$

So, for compounded half-yearly,

$$A = P \left(1 + \frac{R}{200} \right)^{2t}$$

$$A = 1024000 \left(1 + \frac{5}{200} \right)^2$$

$$A = \text{Rs. } 1075840$$

Also,

$$CI = A - P$$

$$= \text{Rs. } 1075840 - \text{Rs. } 1024000$$

$$= \text{Rs. } 51840$$

105. The following items are purchased from showroom:

T-Shirt worth Rs 1200.

Jeans worth Rs 1000.

2 Skirts worth Rs 1350 each.

What will these items cost to Shikha if the sales tax is 7%?

Solution:

$$\text{Net cost} = \text{Rs. } 1200 + \text{Rs. } 1000 + \text{Rs. } 1350$$

$$= \text{Rs. } 3550$$

Shikha have to pay sale tax = 7%

$$\text{Now, the net amount to pay} = 3550 + \frac{7}{100} \times 3550$$

$$= \text{Rs. } 3798.5$$

106. The food labels given below give information about 2 types of soup: cream of tomato and sweet corn. Use these labels to answer the given questions. (All the servings are based on a 2000 calorie diet.)

Sweet corn		Cream of tomato	
Nutrition facts		Nutrition facts	
Serving size 1 cup (240 mL)		Serving size 1 cup (240 mL)	
About 2 serving per container		About 2 serving per container	
Amount per serving		Amount per serving	
Calories 90	Calories from fat 9	Calories 100	Calories from fat 20
	% Daily value		% Daily value
Total fat 2 g	2%	Total fat 2 g	3%
Saturated Fat-0 g	0%	Saturated fat-1.5 g	6%
Cholesterol 0 mg	0%	Cholesterol 10 mg	3%
Sodium 540 mg	22%	Sodium 690 mg	29%
Sweet corn		Cream of tomato	
Total carbohydrate 17g	6%	Total carbohydrate 17g	6%
Dietary fibre 3 g	14%	Dietary fibre 4 g	18%
Sugar 5g		Sugar 11g	
Protein 3 g		Protein 2 g	
Vitamin A 30%	Vitamin C 10%	Vitamin A 20%	Vitamin C 20%
Calcium 2%	Iron 6%	Calcium 0%	Iron 8%
Per cent daily values are based on a 2000 calories diet.		Per cent daily values are based on a 2000 calories diet.	

(a) Which can be measured more accurately : the total amount of fat in cream of tomato soup or the total amount of fat in sweet corn soup?

Explain.

(b) One serving of cream of tomato soup contains 29% of the recommended daily value of sodium for a 2000 calorie diet. What is the recommended daily value of sodium in milligrams? Express the answer upto 2 decimal places.

(c) Find the increase per cent of sugar consumed if cream of tomato soup is chosen over sweet corn soup.

(d) Calculate ratio of calories from fat in sweet corn soup to the calories from fat in cream of tomato soup.

Solution:

a) Serving size of one cup of sweet corn = 240mL
Net fat = 2 g on 2 %

$$\begin{aligned} \text{The total amount of fat in sweet corn soup} &= \frac{2}{100} \times 240 \\ &= 4.8g \end{aligned}$$

Now, for one serving = $4.8/2$
= 2.4g

$$\begin{aligned} \text{Given, serving cost of one cup of tomato cream} &= \frac{3}{100} \times 240 \\ &= 7.2g \end{aligned}$$

Now, for one serving = $7.2/2$
= 3.6g

b) According to the question,
29% of 2000 calories = 690 mg

c) The increase percent of sugar consumed,
 $11 \text{ g} - 5 \text{ g} = 6 \text{ g}$

$$\begin{aligned} \text{So, increased percentage} &= \frac{6}{5} \times 100 \\ &= 120\% \end{aligned}$$

d) Ratio = 3:7

107. Music CD originally priced at Rs 120 is on sale for 25% off. What is the S.P.?

Sonia and Rahul have different ways of calculating the sale price for the items they bought.



As you work on the next problem, try both of these methods to see which you prefer.

Solution:

As per question,

Original price of CD = Rs. 120

25% discount on Rs. 120.

$$\begin{aligned}\text{If the sale is applicable} &= 120 \times \frac{25}{100} \\ &= \text{Rs. } 30\end{aligned}$$

Discount = Rs. 30

$$\begin{aligned}\text{So, selling price after discount} &= \text{Rs. } 120 - \text{Rs. } 30 \\ &= \text{Rs. } 90\end{aligned}$$

108. Store A and Store B both charge Rs 750 for a video game. This week the video game is on sale for Rs 600 at Store B and for 25% off at Store A. At which store is the game less expensive?

Solution:

As per question:

$$\begin{aligned}\text{The price of video game at store B} &= 750 - 750 \times \frac{25}{100} \\ &= \text{Rs. } 562.5\end{aligned}$$

109. At a toy shop price of all the toys is reduced to 66% of the original price.

(a) What is the sale price of a toy that originally costs Rs 90?

(b) How much money would you save on a toy costing Rs 90?

Solution:

As per question,

a) When price reduced to 66% of the original price,

$$\begin{aligned}\text{Then the price} &= 90 - 90 \times \frac{66}{100} \\ &= \text{Rs. } 30.6\end{aligned}$$

b) Saved money;

$$\begin{aligned}&= 90 \times \frac{66}{100} \\ &= \text{Rs. } 59.4\end{aligned}$$

110. A store is having a 25% discount sale. Sheela has a Rs 50 gift voucher and wants to use it to buy a board game marked for Rs 320. She is not sure how to calculate the concession she will get. The sales clerk has suggested two ways to calculate the amount payable.

- Method 1: Subtract Rs 50 from the price and take 25% off the resulting price.

- Method 2: Take 25% off the original price and then subtract Rs 50.

a. Do you think both the methods will give the same result? If not, predict which method will be beneficial for her.

b. For each method, calculate the amount Sheela would have to pay. Show your work.

c. Which method do you think stores actually use? Why?

Solution:

a) In method 1,

Rs. 320 – Rs. 50 = Rs. 270

25% discount on Rs. 270;

$$= 270 - 270 \times \frac{25}{100}$$

$$= \text{Rs. } 202.5$$

In method 2,

25% discount on Rs. 320;

$$= 320 - 320 \times \frac{25}{100} - 50$$

$$= \text{Rs. } 190$$

So, method 2 is easy for her.

b) In method 1,

Amount paid = Rs. 202.5

In method 2,

Amount paid = Rs. 190

c) Method 1. This method shows actual discount in loss.

111. Living on your own: Sanjay is looking for one-bedroom apartment on rent. At Neelgiri apartments, rent for the first two months is 20% off. The one bedroom rate at Neelgiri is Rs 6,000 per month. At Savana apartments, the first month is 50% off. The one bedroom rate at Savana

apartments is Rs 7000 per month. Which apartment will be cheaper for the first two months? By how much?

Solution:

Rent for first two months,

$$\begin{aligned} &= 2 \times \left(6000 - 6000 \times \frac{20}{100} \right) \\ &= \text{Rs. } 9600 \end{aligned}$$

By comparison of S. apartment, it offers 50% of for her first month, where the rent for bedroom = Rs. 7000/ month;

$$\left(7000 - 7000 \times \frac{50}{100} \right) = \text{Rs. } 3500$$

So, the rent for two months in Savera apartment,
= Rs. 3500 + Rs. 7000
= Rs. 10500

Therefore, Neelgiri apartment will be cheaper by,
= Rs. 10500 + Rs. 9600
= Rs. 900

112. For an amount, explain why, a 20% increase followed by a 20% decrease is less than the original amount.

Solution:

Let, the original price = x
20% increase in Rs. 100;

$$\begin{aligned} &= \left(100 + 100 \times \frac{20}{100} \right) \\ &= \text{Rs. } 120 \end{aligned}$$

Now,
20% decrease in Rs. 120;

$$\begin{aligned} &= \left(120 - 120 \times \frac{20}{100} \right) \\ &= \text{Rs. } 96 \end{aligned}$$

So, decreased price is lower than the original price.

113. Sunscreens block harmful ultraviolet (UV) rays produced by the sun. Each sunscreen has a Sun Protection Factor (SPF) that tells you how many minutes you can stay in the sun before you receive one minute of burning UV rays. For example, if you apply sunscreen with SPF 15, you get 1 minute of UV rays for every 15 minutes you stay in the sun.

1. A sunscreen with SPF 15 allows only $\frac{1}{15}$ of the sun's UV rays. What per cent of UV rays does the sunscreen abort?
2. Suppose a sunscreen allows 25% of the sun's UV rays.
 - a. What fraction of UV rays does this sunscreen block? Give your answer in lowest terms.
 - b. Use your answer from Part (a) to calculate this sunscreen's SPF. Explain how you found your answer.
3. A label on a sunscreen with SPF 30 claims that the sunscreen blocks about 97% of harmful UV rays. Assuming the SPF factor is accurate, is this claim true? Explain.

Solution:

i) According to the question,
 $\frac{14}{15}$ of the sun's UV rays abort by sunscreen.
 In % = 93.33%

(ii)

(a) Lowest fraction of blocked UV rays ; $100 - 25 = 75\%$
 $= \frac{3}{4}$

(b) Sunscreen allows 25% on $\frac{3}{5}$ of UV rays

Means, it protects UV rays; $1 - \frac{3}{4} = \frac{1}{4}$

Therefore, its SPF = 4

iii) The given statement is false.

114. A real estate agent receives Rs 50,000 as commission, which is 4% of the selling price. At what price does the agent sell the property?

Solution:

As per question,

$$x \times \frac{4}{100} = 50000$$

$$x = \text{Rs.}1250000$$

115. With the decrease in prices of tea by 15% Tonu, the chaiwallah, was able to buy 2 kg more of tea with the same Rs 45 that he spent each month on buying tea leaves for his chai shop. What was the reduced price of tea? What was the original price of tea?



Solution:

As per question,

Suppose, purchased tea = y kg

Price of tea per kg = Rs. x

$$\begin{aligned} \text{Discount 15\% per kg} &= x - \frac{15}{100}x \\ &= 85\% \end{aligned}$$

A chaiwallah can buy 2 kg extra with 15% of discount.

But without discount,

$$xy = 45$$

.....(i)

$$\left(x - \frac{15x}{100}\right)\left(\frac{85x}{100}\right)(x + 2) = 45$$

.... (ii)

Solving above equations,

$$\frac{85}{100}(45) + \frac{85 \times 2x}{100} = 45$$

$$45\left(1 - \frac{15}{100}\right) = \frac{85 \times 2x}{100}$$

$$\frac{45 \times 85}{100} = \frac{85 \times 2x}{100}$$

$$x = \frac{135}{34}$$

$$x = 3.97 \text{ per kg}$$

$$\begin{aligned} \text{Reduced price} &= \frac{85}{100} \times 3.97 \\ &= 3.38 \text{ per kg} \end{aligned}$$

116. Below is the Report Card of Vidit Atrey. Vidit's teacher left the last column blank. Vidit is not able to make out, in which subject he performed better and in which he needs improvement. Complete the table to help Vidit know his comparative performance.

Class 9B		Name : Vidit Atrey		Date : 31 March 2010
Subject	Internal Assessment	Examination	Total	Final %
1. English literature	20/25	82/100	102/125	
2. English language	22/25	91/100	113/125	
3. Hindi literature	18/25	67/75	85/100	
4. Hindi language	16/25	68/75	84/100	
5. Mathematics	42/50	88/100	130/150	
6. Sanskrit	14/20	75/100	89/120	
7. Physics	45/50	90/100	135/150	
8. Chemistry	41/50	82/100	123/150	
9. Biology	43/50	87/100	130/150	
10. History and Civics	19/25	68/75	87/100	
11. Geography	17/20	71.5/80	88.5/100	

Solution:

$$1. \text{ English literature} = \frac{102}{125} \times 100$$

$$= 81.6\%$$

$$2. \text{ English language} = \frac{113}{125} \times 100$$

$$= 90.4\%$$

$$3. \text{ Hindi literature} = \frac{85}{100} \times 100$$

$$= 85\%$$

$$4. \text{ Hindi language} = \frac{84}{100} \times 100$$

$$= 84\%$$

$$5. \text{ Mathematics} = \frac{130}{150} \times 100$$

$$= 86.67\%$$

$$6. \text{ Sanskrit} = \frac{89}{120} \times 100$$

$$= 74.16$$

$$7. \text{ Physics} = \frac{135}{150} \times 100$$

$$= 90\%$$

$$8. \text{ Chemistry} = \frac{123}{150} \times 100$$

$$\begin{aligned}
 &= 82\% \\
 9. \text{ Biology} &= \frac{130}{150} \times 100 \\
 &= 86.67\%
 \end{aligned}$$

$$\begin{aligned}
 10. \text{ History and civics} &= \frac{87}{100} \times 100 \\
 &= 87\%
 \end{aligned}$$

$$\begin{aligned}
 11. \text{ Geography} &= \frac{88.5}{100} \times 100 \\
 &= 88.5\%
 \end{aligned}$$

117. Sita is practicing basket ball. She has managed to score 32 baskets in 35 attempts. What is her success rate in per centage?



Solution:

$$\begin{aligned}
 \text{Success rate of sita} &= \frac{32}{35} \times 100 \\
 &= 91.42\%
 \end{aligned}$$

118. During school hours, Neha finished 73% of her homework and Minakshi completed 5/8 of her homework. Who must finish a greater per cent of homework?

Solution:

$$\begin{aligned}
 \text{Finished homework by neha} &= 73\% \\
 &= \frac{73}{100}
 \end{aligned}$$

Homework left for minakshi;

$$= 1 - \frac{5}{8}$$

$$= \frac{3}{8}$$

Percentage form of $\frac{3}{8} = 37.5\%$

Now, homework left by neha = $(100 - 73)$
 $= 27\%$

Percentage form of $27\% = \frac{27}{100}$

So, minkashi finished a greater % of homework.

119. Rain forests are home to 90,000 of the 2,50,000 identified plant species in the world. What per cent of the world's identified plant species are found in rain forests?

Solution:

% of the world's identified plant species are found in rain forests,

$$= \frac{90000}{250000} \times 100$$
$$= 36\%$$

120. Madhu's room measures 6m × 3m. Her carpet covers 8m². What per cent of floor is covered by the carpet?

Solution:

Area of rectangle = length x breadth

$$\text{So, area covered by the carpet in \%} = \frac{8}{18} \times 100$$
$$= 44.44 \%$$

121. The human body is made up mostly of water. In fact, about 67% of a person's total body weight is water. If Jyoti weights 56 kg, how much of her weight is water?

Solution:

$$\text{Water in jyoti's body} = \frac{67}{100} \times 56$$
$$= 37.52$$

122. The per cent of pure gold in 14 carat gold is about 58.3%. A 14 carat gold ring weighs 7.6 grams. How many grams of pure gold are in the ring?

Solution:

Pure gold in 14 carat gold of 7.6 g,

$$= 7.6 \times \frac{58.3}{100}$$

$$= 4.431 \text{ g}$$

123. A student used the proportion $\frac{n}{100} = \frac{5}{32}$ to find 5% of 32. What did the student do wrong?

Solution:

$$5 \% \text{ of } 32 = \frac{5}{100} \times 32$$

$$= 1.6 \%$$

But, Student finding % is 5 of 32.

124. The table shows the cost of sunscreen of two brands with and without sales tax. Which brand has a greater sales tax rate? Give the sales tax rate of each brand.

	Cost (in ₹)	Cost + Tax (in ₹)
1. X (100 g)	70	75
2. Y (100 g)	62	65

Solution:

According to question,

Brand X sunscreen cost = Rs. 70

And with sales tax = Rs. 75

Sales tax paid = Rs. 75 - Rs. 70

$$= \text{Rs. } 5$$

Again,

Brand Y sunscreen cost = Rs. 62

And with sales tax = Rs. 65

Now,

sales tax paid = Rs. 65 - Rs. 62

$$= \text{Rs. } 3$$

So, greater sales tax rate = Brand X

$$\text{Now, sales tax for brand X} = \frac{5}{70} \times 100$$

$$= 7.14\%$$

$$\begin{aligned}\text{Now, sales tax for brand Y} &= \frac{3}{62} \times 100 \\ &= 4.84\%\end{aligned}$$

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