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UNIT 9

COMPARING QUANTITIES

(A) Main Concepts and Results

- Discount is a reduction given on marked price.

$$\text{Discount} = \text{Marked Price} - \text{Sale Price (S.P.)}$$

- Discount can be calculated when discount percentage is given.

$$\text{Discount} = \text{Discount \% of Marked Price}$$

- Additional expenses made after buying an article are included in the cost price and are known as overhead expenses.

$$\text{cost price} = \text{buying price} + \text{overhead expenses}$$

- Sales Tax is charged on the sale of an item by the government and is added to the Bill Amount.

$$\text{Sales tax} = \text{Tax\% of sale amount}$$

These days, however, the selling prices (known as MRP) include the tax known as VAT (Value Added Tax).

- The interest compounded annually is the interest calculated on the previous year's amount A, ($A = P + I$).
- The time period after which the interest is added each time to form a new principal is called the **conversion period**.
- When the interest is compounded half yearly, there are two conversion periods in a year of duration 6 months each.
- Amount when interest is compounded annually is

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

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where

P is Principal

R is Rate of interest

n is Time Period

- Amount when interest is compounded half yearly is

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

where $\frac{R}{200}$ is half yearly rate and $2n$ is number of half years.

(B) Solved Examples

In examples 1 to 4, there are four options out of which one is correct. Write the correct answer.

Example 1 : A shirt with marked price Rs 800 was sold at Rs 680. The rate of discount allowed on the shirt is
 (a) 10% (b) 15% (c) 20% (d) 25%

Solution : Correct answer is (b).

Example 2 : If $\frac{7}{3}\%$ of a number is 42, then the number is
 (a) 9800 (b) 8 (c) 1800 (d) 180

Solution : Correct answer is (c).

Example 3 : If the cost price of 10 shirts is equal to the selling price of 8 shirts, then which of the following is true for the transaction?
 (a) Profit of 25% (b) Loss of 25%
 (c) Profit of 20% (d) Loss of 20%

Solution : Correct answer is (a).

Example 4 : Rs 1600 lent at a compound interest of 5% per annum, compounded half yearly for one year will amount to:
 (a) Rs 1640 (b) Rs 1680 (c) Rs 1681 (d) Rs 1764

Solution: Correct answer is (c).

In examples 5 to 7, fill in the blanks to make the statements true.

Example 5 : By selling 50 pens, a shopkeeper lost the amount equal to the selling price of 10 pens. His loss per cent is _____.

Solution : $\frac{50}{3}\%$.

Example 6 : The discount per cent is calculated on the _____ price of an article.

Solution : Marked Price.

Example 7 : Amna purchased a toy for Rs 660 including sales tax. If the rate of sales tax is 10%, then the selling price of the toy is _____.

Solution : Rs 600.

In examples 8 to 11, state whether the statements are true (T) or false (F).

Example 8 : When the interest is compounded half yearly, the number of conversion periods in a year is four.

Solution : False.

Example 9 : Arnav buys a book costing Rs 600. If the rate of sales tax is 7%, then the total amount payable by him is Rs 642.

Solution : True.

Example 10 : After allowing a discount of 15% on the marked price of an article, it is sold for Rs 680. The marked price of the article is Rs 800.

Solution : True.

Example 11 : Overhead charges, if any, are sometimes included in the cost price.

Solution : False.

Example 12 : A number is increased by 20% and then it is decreased by 20%. Find the net increase or decrease per cent.

Solution : Let the number be 100

Increase in the number = 20% of 100 = 20

So Increased number = 100 + 20 = 120

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$$\text{Decrease in the number} = 20\% \text{ of } 120 = \frac{20}{100} \times 120 = 24$$

$$\text{So new number} = 120 - 24 = 96$$

$$\text{Net decrease} = 100 - 96 = 4$$

$$\text{Hence net decrease per cent} = \frac{4}{100} \times 100 = 4\%$$

Example 13 : Vishakha offers a discount of 20% on all the items at her shop and still makes a profit of 12%. What is the cost price of an article marked at Rs 280?

Solution : Marked Price = Rs 280

$$\text{Discount} = 20\% \text{ of Rs } 280$$

$$= \frac{20}{100} \times 280 = \text{Rs } 56$$

$$\text{So selling price} = \text{Rs } (280 - 56)$$

$$= \text{Rs } 224$$

Let the cost price be Rs 100

$$\text{Profit} = 12\% \text{ of Rs } 100$$

$$= \text{Rs } 12$$

$$\text{So selling price} = \text{Rs } (100 + 12) = \text{Rs } 112$$

If the selling price is Rs 112, cost price = Rs 100

$$\text{If the selling price is Rs } 224, \text{ cost price} = \text{Rs } \frac{100}{112} \times 224$$

$$= \text{Rs } 200.$$

Example 14 : Find the compound interest on Rs 48,000 for one year at 8% per annum when compounded half yearly.

Solution : Principal (P) = Rs 48,000

$$\text{Rate (R)} = 8\% \text{ p.a.}$$

$$\text{Time (n)} = 1 \text{ year}$$

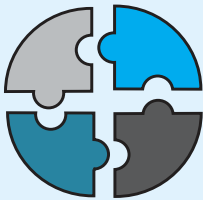
Interest is compounded half yearly

$$A = P \left[1 + \frac{R}{200} \right]^{2n}$$

$$\begin{aligned}
 &= 48,000 \left[1 + \frac{8}{100} \right]^2 \\
 &= 48,000 \times \frac{26}{25} \times \frac{26}{25} \\
 &= 76.8 \times 26 \times 26 \\
 &= \text{Rs } 51,916.80
 \end{aligned}$$

$$\begin{aligned}
 \text{Therefore Compound Interest} &= A - P \\
 &= \text{Rs } (51,916.80 - 48,000) \\
 &= \text{Rs } 3,916.80
 \end{aligned}$$

Application on Problem Solving Strategy



Example 15 :

Lemons were bought at Rs 60 a dozen and sold at the rate of Rs 40 per 10. Find the gain or loss percent.



Understand and Explore the problem

- What do you know?

Cost of lemons per dozen : Rs 60

and S.P. of 10 lemons : Rs 40

Which other information is needed to solve the given problem?

Gain/Loss



Plan a Strategy

- Change: either convert C.P. of 1 dozen into C.P. of 10 lemons or convert S.P. of 10 lemons into S.P. of 1 dozen
- If C.P. > S.P. find Loss = C.P. - S.P.
If S.P. > C.P. find gain = S.P. - C.P.
If S.P. = C.P. No gain, No loss
- If gain, find gain %
If loss, find loss %
Gain/Loss are always calculated on the basis of C.P.

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Solve

- C.P. of 1 dozen lemons = Rs 60
C.P. of 1 lemon = Rs 5
C.P. of 10 lemons = Rs 50
- S.P. of 10 lemons Rs 40
- As S.P. < C.P. = Loss

$$\begin{aligned}\text{Loss} &= \text{C.P.} - \text{S.P.} \\ &= \text{Rs } 50 - \text{Rs } 40 \\ &= \text{Rs } 10\end{aligned}$$

- Loss $= \frac{\text{Loss}}{\text{C.P.}} \times 100\%$
 $= \frac{10}{50} \times 100\%$
 $= 20\%$



Revise

- Verify your answer by adopting Backward method
i.e. Loss % = 20%
Loss = 20% of 60

$$= \frac{20}{100} \times 60 = \text{Rs } 12$$

$$\text{C.P. of 1 dozen} = \text{Rs } 60$$

$$\text{Loss on 1 dozen} = \text{Rs } 12$$

$$\text{S.P.} = \text{C.P.} - \text{Loss} = 60 - 12 = \text{Rs } 48$$

$$\text{S.P. of 1 dozen} = \text{Rs } 48$$

$$\text{S.P. of 1 lemon} = \text{Rs } \frac{48}{12} = \text{Rs } 4$$

$$\text{S.P. of 10 lemons} = \text{Rs } 40$$

Hence verified.

Think and Discuss

- (a) What would happen if C.P. of 1 dozen is Rs 48?
(b) What would happen if S.P. of 10 lemons is Rs 60?

(C) 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.
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
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
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
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

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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
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) $\frac{100}{x \cdot a}$
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
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.
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
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%
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.

- The discount is the amount by which the regular price is reduced.
- The sale price is the regular price minus the discount.

- (b) A earns more profit than B.
 (c) A earns less profit than B.
 (d) Cannot be decided.
- 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
- 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
- 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
- 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
- 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
- 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
- 19.** 40% of [100 – 20% of 300] is equal to
 (a) 20 (b) 16 (c) 140 (d) 64
- 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%

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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.
22. Increase of a number from 150 to 162 is equal to increase of _____ per cent.
23. 15% increase in price of an article, which is Rs 1,620, is the increase of Rs _____.
24. Discount = _____ - _____.
25. Discount = Discount % of _____.
26. _____ is charged on the sale of an item by the government and is added to the bill amount.
27. Amount when interest is compounded annually is given by the formula _____.
28. Sales tax = tax % of _____.
29. The time period after which the interest is added each time to form a new principal is called the _____.
30. _____ expenses are the additional expenses incurred by a buyer for an item over and above its cost of purchase.
31. The discount on an item for sale is calculated on the _____.
32. When principal P is compounded semi-annually at $r\%$ per annum for t years, then
Amount = _____.
33. Percentages are _____ to fractions with _____ equal to 100.
34. The marked price of an article when it is sold for Rs 880 after a discount of 12% is _____.
35. The compound interest on Rs 8,000 for one year at 16% p.a. compounded half yearly is _____, given that $(1.08)^2 = 1.1664$.
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 _____.

- The amount of money that is earning interest or that you are borrowing is called the **principal**.
- The amount due is equal to the principal plus the accrued interest.

Simple interest $I = prt$

37. If amount on the principal of Rs 6,000 is written as $6000 \left(1 + \frac{5}{100}\right)^3$ and compound interest payable half yearly, then rate of interest p.a. is _____ and time in years is _____.
38. By selling an article for Rs 1,12,000 a girl gains 40%. The cost price of the article was _____.
39. The loss per cent on selling 140 geometry boxes at the loss of S.P. of 10 geometry boxes is equal to _____.
40. The cost price of 10 tables is equal to the sale price of 5 tables. The profit per cent in this transaction is _____.
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 _____.
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 _____.
43. 2500 is greater than 500 by _____%.
44. Four times a number is a _____ % increase in the number.
45. 5% sales tax is charged on an article marked Rs 200 after allowing a discount of 5%, then the amount payable is _____.

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.
47. Additional expenses made after buying an article are included in the cost price and are known as Value Added Tax.
48. Discount is a reduction given on cost price of an article.
49. Compound interest is the interest calculated on the previous year's amount.
50. C.P. = M.P. – Discount.
51. A man purchased a bicycle for Rs 1,040 and sold it for Rs 800. His gain per cent is 30%.

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- 52.** Three times a number is 200% increase in the number, then one-third of the same number is 200% decrease in the number.
- 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.
- 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.
- 55.** If the discount of Rs y is available on the marked price of Rs x , then the discount percent is $\frac{x}{y} \cdot 100\%$.
- 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%.
- 57.** Selling price of 9 articles is equal to the cost price of 15 articles. In this transaction there is profit of $66\frac{2}{3}\%$.
- 58.** The compound interest on a sum of Rs P for T years at $R\%$ per annum compounded annually is given by the formula $P \left[1 + \frac{R}{100} \right]^T$.
- 59.** In case of gain, $S.P. = \frac{(100 + \text{gain}\%) \cdot C.P.}{100}$.
- 60.** In case of loss, $C.P. = \frac{100 \times S.P.}{100 + \text{Loss}\%}$
- 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.

Problem Solving Tip

Another way to find the total cost of an item is to add the sales tax per cent to 100%. Then multiply this new per cent by the regular price.

For example, if the regular price is Rs 35.98 and the sales tax is 6%, add 6% to 100%. Then find 106% of Rs 35.98.

$$1.06 \times 35.98 = 38.14.$$

The total cost is Rs 38.14.

- 62.** The cost of a book marked at Rs 190 after paying a sales tax of 2% is Rs 192.
- 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.
- 64.** The original price of a shampoo bottle bought for Rs 324 if 8% VAT is included in the price is Rs 300.
- 65.** Sales tax is always calculated on the cost 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.
- 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?
- 68.** Find the S.P. if
- (a) M.P. = Rs 5450 and discount = 5%
- (b) M.P. = Rs 1300 and discount = 1.5%
- 69.** Find the M.P. if
- (a) S.P. = Rs 495 and discount = 1%
- (b) S.P. = Rs 9,250 and discount = $7\frac{1}{2}\%$
- 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
- 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.
- 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?

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- 73.** A watch worth Rs 5400 is offered for sale at Rs 4,500. What per cent discount is offered during the sale?
- 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.
- 75.** Jyotsana bought a product for Rs 3,155 including 4.5% sales tax. Find the price before tax was added.
- 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?

Problem Solving Tip

Another method to find the sale price of an item is to subtract the per cent of discount from 100. Then multiply this number to the regular price.

- 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).
- 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.
- 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.
- 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.
- 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.
- 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%.

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- 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.

- 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.

- 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.
- 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.
- 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?

- People employed in India must pay an income tax based on their income. The net pay, or take-home pay, is the amount of money that a person is paid.
- Homeowners pay property taxes based on the value of their house and property.

- 88.** Ayesha announced a festival discount of 25% on all the items in her mobile phone shop. Ramandeep bought a mobile phone for himself. He got a discount of Rs 1,960. What was the marked price of the mobile phone?
- 89.** Find the difference between Compound Interest and Simple Interest on Rs 45,000 at 12% per annum for 5 years.
- 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?
- 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?
- 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.
- 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.

- 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

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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

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

Problem Solving Tip

When an item is on sale, you can save money buying it at less than regular price. The discount is the amount that the regular price is reduced. The sale price is the regular price minus the discount.

You can use a proportion or an equation to solve problems involving discount and sale price.

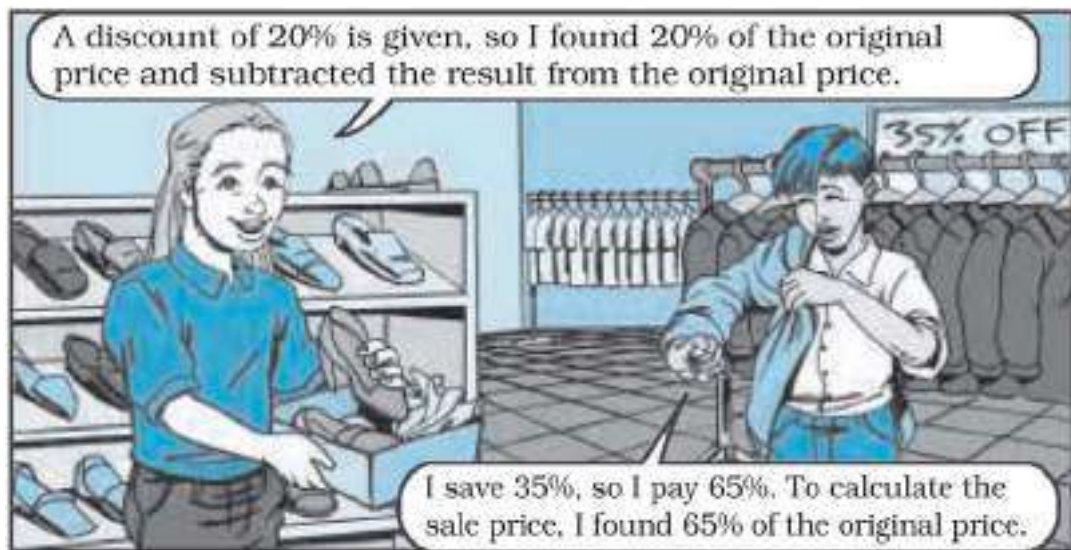
- 103.** Brinda purchased 18 coats at the rate of Rs 1,500 each and sold them at a profit of 6%. If customer is to pay sales tax at the rate of 4%, how much will one coat cost to the customer and what will be the total profit earned by Brinda after selling all coats?
- 104.** Rahim borrowed Rs 10,24,000 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.
- 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%?
- 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 (240ml)		Serving Size 1 cup (240ml)	
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 2g	2%	Total Fat 2g	3%
Saturated Fat-0g	0%	Saturated Fat-1.5g	6%
Cholesterol 0mg	0%	Cholesterol 10mg	3%
Sodium 540mg	22%	Sodium 690mg	29%
Total Carbohydrate 17g	6%	Total Carbohydrate 17g	6%
Dietary Fibre 3 gram	14%	Dietary Fibre 4 gram	18%
Sugar 5g		Sugar 11g	
Protein 3g		Protein 2g	
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 2,000 calorie diet.		*Per cent Daily Values are based on a 2,000 calorie diet.	

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- (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.
- 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.

- 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?

- 109.** At a toy shop price of all the toys is reduced to 66% of the original price.
- What is the sale price of a toy that originally costs Rs 90?
 - How much money would you save on a toy costing Rs 90?
- 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.
- Do you think both the methods will give the same result? If not, predict which method will be beneficial for her.
 - For each method, calculate the amount Sheela would have to pay. Show your work.
 - Which method do you think stores actually use? Why?
- 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?
- 112.** For an amount, explain why, a 20% increase followed by a 20% decrease is less than the original amount.

Problem Solving Tip

There are various taxes that people must pay. Some examples are sales tax, property tax and income tax. A tax is charge, usually a percentage, that is imposed by the government.

You can set up a proportion or equation to solve problems involving taxes.

- 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

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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 block?
 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.
- 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?
- 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?



The per cent of decrease tells what per cent the amount of decrease is of the original number.

To find the per cent of decrease express a ratio of the amount of decrease to the original number as per cent.

$$\text{Per cent of Decrease} = \frac{\text{amount of decrease}}{\text{original number}} \times 100$$

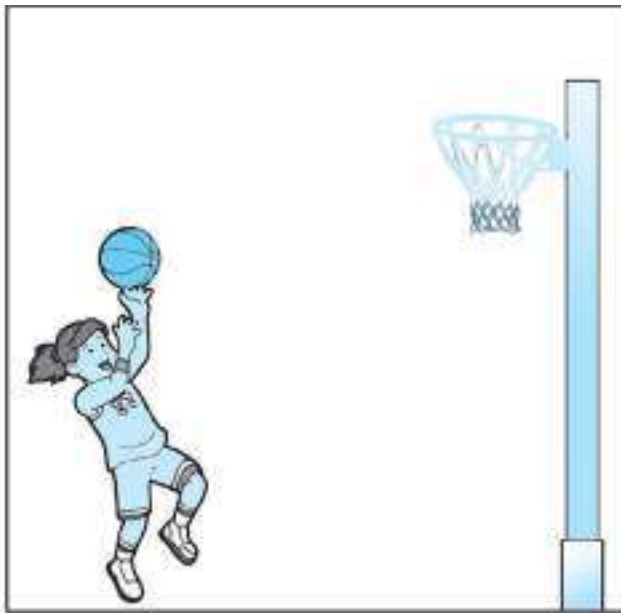
- 116.** Below is the Report Card of Vidit Atrey. Vidit's teacher left the last column blank. Vidit is not able to make out, in which subject he performed better and in which he needs improvement. Complete the table to help Vidit know his comparative performance.

Assessment Report for 2009-2010

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	99/120	
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	

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



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- 118.** During school hours, Neha finished 73% of her homework and Minakshi completed $\frac{5}{8}$ of her homework. Who must finish a greater per cent 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?
- 120.** Madhu's room measures $6\text{m} \times 3\text{m}$. Her carpet covers 8m^2 . What per cent of floor is covered by the carpet?
- 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 weighs 56 kg, how much of her weight is water?
- 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?
- 123.** A student used the proportion $\frac{n}{100} = \frac{5}{32}$ to find 5% of 32. What did the student do wrong?
- 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 Rs)	Cost+Tax (in Rs)
1. X (100 gm)	70	75
2. Y (100 gm)	62	65

(D) Applications, Gamess and Puzzles

1. Complete the grid using the clues given below.

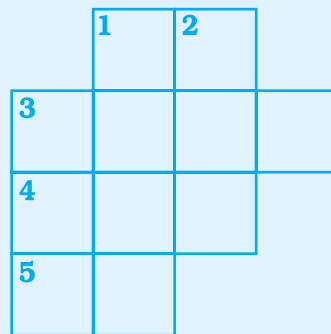
Clues

Down

- (1) The total cost price of a TV set whose cost price is Rs 6,900 and money spent on repairs is Rs 300.
- (2) The price of a cycle is Rs 800. It is now increased by 20%. The new sale price is Rs _____.
- (3) The list price of a bag is Rs 220. A discount of 15% is offered to make the sales price as Rs _____.

Across

- (1) Discount on an item marked at Rs 800 and sold for Rs 721.
- (3) The selling price of a fan costing Rs 1,200 if a profit of Rs 5% is to be made.
- (4) The cost price of an item sold at Rs 1,600 at a 100% profit.
- (5) The profit per cent of an item marked at Rs 800 and sold at Rs. 1,360.



2.

1. Children go to school for their overall personality development. Co-curricular activities (CCA) play a major role in this. Fill the following table to know, how the students of your class did in the I and II term.

S. No.	Names	Number of CCA activities (I term)	Number of CCA activities (II term)	Difference	Increase/ Decrease Per cent

Now, answer the following questions.

- (a) Who is the most active participant in CCA activities in I term? In II term?
- (b) What is the percentage of your participation in I term? In II term?

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- 3.** Discuss with your parents and create a checkbook to keep a record of monthly expenses of your family as shown below (You may change the entries as per your requirements).

Sr. No.	Date	Description of Transaction	Payment Debt. (-)	Payment Credit (+)	Balance
1.		Payment Deposit			
2.		Rent			
3.		School expenses			
4.		Travelling expenses			
5.		Groceries			
6.		Gas and Electricity			
7.		Spending money on outings			
8.		Water			
9.		Phone			
10.		Credit card payment			
11.		Others			

Now, answer the following questions.

- What per cent of the total income is spend on school expenses?
- Are the expenditure on gas and electricity more than the expenditure on travelling expense?
- What is your family's savings for a month?
- What per cent of family income is saved?
- How can you increase your family's savings?

4.

Observe your daily schedule and note down the following:

Activities	Hours per day
Sleeping	
At School	
Socialising	
Watching TV	
Doing Homework	
Phone chatting	
Net chatting	
Eating	
Bathing / Growing	
Other activities	

- Find the ratio of number of hours spent at school to number of hours spent while sleeping.
- Find percentage of hours spent in
 - studying at home
 - watching TV.
- Find the ratio of total time spent on chatting to studying.

5 School has arranged for an excursion. Students are thrilled and plan to decide their menu. You being the class representative have the responsibility to survey different shops to make the least expenditure. The following table may help you.

Item	Name of Item	Shop	Marked Price	Discount (if any)	Cost Price
1.	Juice	A B			
2.	Cookies	A B			
3.					
4.					
5.					

Have a discussion for the above table to make an economical purchase. Enjoy your excursion.

6. Crossword

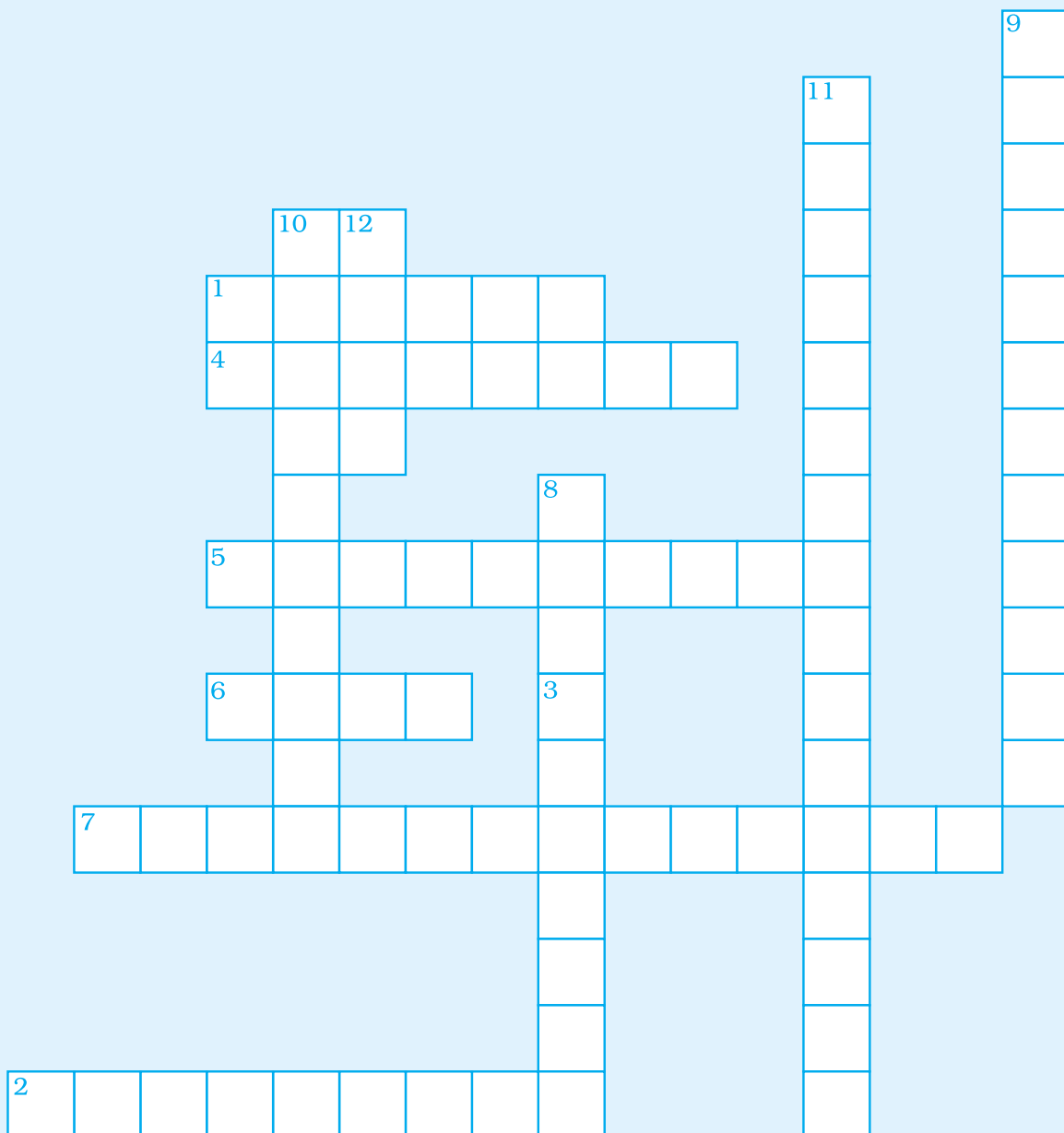
Across

- Shopkeeper earns it if $S.P. > C.P.$
- The price at which the article is purchased.
- List price of an article.
- It is a reduction given on M.P.
- Duration for the sum is borrowed.
- This becomes half if the interest is compounded half yearly.
- Interest computed on the original principal.

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Down

8. This comes from Latin word per centum.
9. The price at which article is sold.
10. The original sum deposited or borrowed.
11. The interest is calculated on the amount of the previous year..
12. Shopkeeper bears it if $S.P. < C.P.$



Source: NCERT