## EXERCISE 8.1

1. Find the ratio of the following:
(a) Speed of a cycle 15 km per hour to the speed of a scooter 30 km per hour.
(b) 5 m to 10 km
(c) 50 paise to ₹ 5

## Solution:

a) Ratio of the speed of the cycle to the speed of the scooter $=15 / 30=1 / 2=1: 2$
b) Since $1 \mathrm{~km}=1000 \mathrm{~m}$
$5 \mathrm{~m} / 10 \mathrm{~km}=5 \mathrm{~m} /(10 \times 1000) \mathrm{m}=5 / 10000=1 / 2000=1: 2000$

The required ratio is 1:2000
c) Since, ₹ $1=100$ paise

50 paise $/ ₹ 5=50 /(5 \times 100)=50 / 500=1 / 10=1: 10$
The required ratio is $1: 10$
2. Convert the following ratio to percentages:
a) $\mathbf{3 : 4}$
b) $\mathbf{2 : 3}$

## Solution:

a) $3: 4=3 / 4=3 / 4 \times 100 \%=0.75 \times 100 \%=75 \%$
b) $2: 3=2 / 3=2 / 3 \times 100 \%=0.666 \times 100 \%=66.66 \%=66^{2} / 3 \%$
$3.72 \%$ of 25 students are good in mathematics. How many are not good in mathematics?

## Solution:

It's given that $72 \%$ of 25 students are good in mathematics

So, the percentage of students who are not good in mathematics $=(100-72) \%$
$=28 \%$

Here, the number of students who are good in mathematics $=72 / 100 \times 25=18$

Thus, the number of students who are not good in mathematics $=25-18=7$
[Also, $28 \%$ of $25=28 / 100 \times 25=7]$
Therefore, 7 students are not good in mathematics.
4. A football team won 10 matches out of the total number of matches they played. If their win percentage was 40, then how many matches did they play in all?

## Solution:

Let the total number of matches played by the team be x .
Given that the team won 10 matches and the winning percentage of the team was $40 \%$.
$\Rightarrow 40 / 100 \times x=10$
$40 \mathrm{x}=10 \times 100$
$40 \mathrm{x}=1000$
$\mathrm{x}=1000 / 40$
$=100 / 4$
$=25$
Therefore, the team played 25 matches.
5. If Chameli had ₹ 600 left after spending $75 \%$ of her money, how much did she have in the beginning?

## Solution:

Let the amount of money which Chameli had, in the beginning, be $x$
Given that, after spending $75 \%$ of ₹ $x$, she was left with ₹ 600
So, (100-75)\% of $x=$ ₹ 600
Or, $25 \%$ of $\mathrm{x}=$ ₹ 600
$25 / 100 \times x=₹ 600$
$x=₹ 600 \times 4$
$=₹ 2400$
Therefore, Chameli had ₹2400 in the beginning.
6. If $\mathbf{6 0 \%}$ of people in the city like cricket, $30 \%$ like football and the remaining like other games, then what per cent of the people like other games? If the total number of people is 50 lakhs, find the exact number who like each type of game.

## Solution:

Percentage of people who like other games $=(100-60-30) \%$
$=(100-90) \%$
$=10 \%$
Total number of people $=50$ lakhs
So,
Number of people who like cricket $=60 / 100 \times 50=30$ lakhs
Number of people who like football $=30 / 100 \times 50=15$ lakhs
Number of people who like other games $=10 / 100 \times 50=5$ lakhs

## EXERCISE 8.2

1. A man got a $\mathbf{1 0 \%}$ increase in his salary. If his new salary is $₹ \mathbf{1}, \mathbf{5 4 , 0 0 0}$, find his original salary.

## Solution:

Let the original salary be x
Given that, the new salary is $₹ 1,54,000$
Original salary + Increment $=$ New salary
Given that the increment is $10 \%$ of the original salary
So, $(x+10 / 100 \times x)=154000$
$x+x / 10=154000$
$11 x / 10=154000$
$x=154000 \times 10 / 11$
$=140000$

Therefore, the original salary was $₹ 1,40,000$.
2. On Sunday, 845 people went to the zoo. On Monday, only 169 people went. What is the per cent decrease in the number of people visiting the zoo on Monday?

## Solution:

Given that on Sunday, 845 people went to the zoo, and on Monday, 169 people went to the zoo.
Decrease in the number of people $=845-169=676$
Thus,
Percentage decrease $=($ Decrease in the number of people/Number of people who went to the zoo on Sunday $) \times 100 \%$
$=(676 / 845 \times 100) \%$
$=80 \%$
3. A shopkeeper buys 80 articles for $₹ \mathbf{2 , 4 0 0}$ and sells them for a profit of $\mathbf{1 6 \%}$. Find the selling price of one article.

## Solution:

Given that the shopkeeper buys 80 articles for ₹ 2,400
Cost of one article $=2400 / 80=₹ 30$

Profit percentage $=16 \%$
Profit percentage $=$ Profit/C.P. x 100
$16=$ Profit $/ 30 \times 100$

Profit $=(16 \times 30) / 100$
$=₹ 4.8$

Therefore, the selling price of one article $=$ C.P. + Profit
$=₹(30+4.80)$
$=₹ 34.80$
4. The cost of an article was ₹ $\mathbf{1 5 , 5 0 0}$. $\mathbf{4 5 0}$ was spent on its repairs. If it is sold for a profit of $\mathbf{1 5 \%}$, find the selling price of the article.

## Solution:

The total cost of an article $=$ Cost + Overhead expenses
$=₹ 15500+₹ 450$
$=₹ 15950$

Profit percentage $=15 \%$
Profit percentage $=$ Profit/C.P. x 100
$15=$ Profit $/ 15950 \times 100$

Profit $=(15 \times 15950) / 100$
$=2392.50$

Therefore, the selling price of the article $=$ C.P.+ Profit
$=₹(15950+2392.50)$
$=₹ 18342.50$
5. A VCR and TV were bought for ₹ 8,000 each. The shopkeeper made a loss of $4 \%$ on the VCR and a profit of $\mathbf{8 \%}$ on the TV. Find the gain or loss per cent on the whole transaction.

## Solution:

C.P. of a VCR $=₹ 8000$

The shopkeeper made a loss of $4 \%$ on VCR
This means if C.P. is ₹ 100 , then S.P. is ₹ 96 .

When C.P. is ₹ 8000 ,
S.P. $=(96 / 100 \times 8000)=₹ 7680$
C.P. of a TV $=₹ 8000$

The shopkeeper made a profit of $8 \%$ on TV.
This means that if C.P. is ₹ 100 , then S.P. is ₹ 108 .
When C.P. is ₹ 8000 ,
S.P. $=(108 / 100 \times 8000)=₹ 8640$

Total S.P. $=₹ 7680+₹ 8640=₹ 16320$
Total C.P. $=₹ 8000+₹ 8000=₹ 16000$
Since, total S.P.> total C.P. $\Rightarrow$ profit
Profit = ₹ $16320-₹ 16000=₹ 320$
Profit \% on the whole transaction $=$ Profit/Total CP x 100
$=320 / 16000 \times 100$
$=2 \%$
Therefore, the shopkeeper had a gain of $2 \%$ on the whole transaction.
6. During a sale, a shop offered a discount of $10 \%$ on the marked prices of all the items. What would a customer have to pay for a pair of jeans marked at ₹ 1450 and two shirts marked at ₹ 850 each?

## Solution:

Total marked price $=₹(1,450+2 \times 850)$
$=₹(1,450+1,700)$
= ₹ 3,150
Given that, the discount percentage $=10 \%$
Discount $=₹(10 / 100 \times 3150)=₹ 315$
Also, Discount $=$ Marked price - Sale price
₹ $315=₹ 3150-$ Sale price
$\therefore$ Sale price $=₹(3150-315)$
= ₹ 2835

Therefore, the customer will have to pay ₹ 2,835 .
7. A milkman sold two of his buffaloes for ₹ 20,000 each. On one, he made a gain of $5 \%$ and on the other, a loss of $10 \%$. Find his overall gain or loss.
(Hint: Find the C.P. of each)

## Solution:

S.P. of each buffalo $=₹ 20,000$

The milkman made a gain of 5\% while selling one buffalo
This means if C.P. is ₹ 100 , then S.P. is ₹ 105 .
C.P. of one buffalo $=100 / 105 \times 20000$
$=₹ 19,047.62$
Also, the second buffalo was sold at a loss of $10 \%$
This means if C.P. is ₹ 100 , then S.P. is ₹ 90
$\therefore$ C.P. of other buffalo $=100 / 90 \times 20000$
$=₹ 22222.22$
Total C.P. $=₹ 19047.62+₹ 22222.22=₹ 41269.84$
Total S.P. $=₹ 20000+₹ 20000=₹ 40000$
Loss $=₹ 41269.84-₹ 40000=₹ 1269.84$
Therefore, the overall loss of milkman was ₹ $1,269.84$
8. The price of a TV is $₹ \mathbf{1 3 , 0 0 0}$. The sales tax charged on it is at the rate of $\mathbf{1 2 \%}$. Find the amount that Vinod will have to pay if he buys it.

## Solution:

On ₹ 100 , the tax to be paid $=₹ 12$
Here, on ₹ 13000 , the tax to be paid will be $=12 / 100 \times 13000$
$=₹ 1560$

Required amount $=$ Cost + Sales Tax
$=₹ 13000+₹ 1560$
$=₹ 14560$

Therefore, Vinod will have to pay ₹ 14,560 for the TV.
9. Arun bought a pair of skates at a sale where the discount given was $\mathbf{2 0 \%}$. If the amount he pays is ₹ $\mathbf{1 , 6 0 0}$, find the marked price.

## Solution:

Let the marked price be x
Discount percent $=$ Discount/Marked Price x 100
$20=$ Discount $/ \mathrm{x} \times 100$
Discount $=20 / 100 \times x$
$=\mathrm{x} / 5$
Also,
Discount $=$ Marked price - Sale price
$x / 5=x-₹ 1600$
$x-x / 5=1600$
$4 x / 5=1600$
$x=1600 \times 5 / 4$
$=2000$
Therefore, the marked price was ₹ 2000 .
10. I purchased a hair dryer for ₹ 5,400 , including $8 \%$ VAT. Find the price before VAT was added.

## Solution:

The price includes VAT
So, $8 \%$ VAT means that if the price without VAT is ₹ 100 ,
Then, the price including VAT will be ₹ 108
When price including VAT is ₹ 108 , original price $=₹ 100$
When price including VAT is $₹ 5400$, original price $=₹(100 / 108 \times 5400)$
$=₹ 5000$
Therefore, the price of the hair dryer before the addition of VAT was ₹ 5,000 .

## EXERCISE 8.3

1. Calculate the amount and compound interest on
(a) ₹ $\mathbf{1 0 , 8 0 0}$ for $\mathbf{3}$ years at $\mathbf{1 2} 1 / 2 \%$ per annum compounded annually.

## Solution:

Principal $(P)=₹ 10,800$
Rate $(\mathrm{R})=121 / 2 \%=25 / 2 \%$ (annual)

Number of years $(\mathrm{n})=3$
Amount $(\mathrm{A})=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=10800(1+25 / 200)^{3}$
$=10800(225 / 200)^{3}$
$=15377.34375$
$=₹ 15377.34$ (approximately)
C.I. $=\mathrm{A}-\mathrm{P}=₹(15377.34-10800)=₹ 4,577.34$
(b) ₹ $\mathbf{1 8 0 0 0}$ for $21 / 2$ years at $\mathbf{1 0 \%}$ per annum compounded annually.

## Solution:

Principal $(\mathrm{P})=₹ 18,000$

Rate $(\mathrm{R})=10 \%$ annual

Number of years $(\mathrm{n})=2^{1 / 2} 2$
The amount for 2 years and 6 months can be calculated by calculating the amount for 2 years using the compound interest formula, then calculating the simple interest for 6 months on the amount obtained at the end of 2 years.

First, the amount for 2 years has to be calculated
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=18000(1+1 / 10)^{2}$
$=18000(11 / 10)^{2}$
$=₹ 21780$

By taking ₹ 21780 as principal, the S.I. for the next $1 / 2$ year will be calculated
S.I. $=(21780 \times 1 / 2 \times 10) / 100$
$=₹ 1089$
Hence, the interest for the first 2 years $=₹(21780-18000)=₹ 3780$
And, interest for the next $1 / 2$ year $=₹ 1089$
Total C.I. $=₹ 3780+₹ 1089$
$=₹ 4,869$

Therefore,
Amount, $\mathrm{A}=\mathrm{P}+$ C.I.
$=₹ 18000+₹ 4869$
$=₹ 22,869$
(c) ₹ $\mathbf{6 2 5 0 0}$ for $\mathbf{1} 1 / 2$ years at $\mathbf{8 \%}$ per annum compounded half yearly.

## Solution:

Principal $(\mathrm{P})=₹ 62,500$
Rate $=8 \%$ per annum or 4\% per half-year
Number of years $=11 / 2$
There will be 3 half-years in $11 / 2$ years
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=62500(1+4 / 100)^{3}$
$=62500(104 / 100)^{3}$
$=62500(26 / 25)^{3}$
$=₹ 70304$
C.I. $=\mathrm{A}-\mathrm{P}=₹ 70304-₹ 62500=₹ 7,804$
(d) ₹ $\mathbf{8 0 0 0}$ for $\mathbf{1}$ year at $\mathbf{9 \%}$ per annum compound half yearly.
(You can use the year-by-year calculation using S.I. formula to verify)

## Solution:

Principal $(\mathrm{P})=₹ 8000$

Rate of interest $=9 \%$ per annum or $9 / 2 \%$ per half-year
Number of years $=1$ year

There will be 2 half-years in 1 year
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=8000(1+9 / 200)^{2}$
$=8000(209 / 200)^{2}$
$=8736.20$
C.I. $=A-P=₹ 8736.20-₹ 8000=₹ 736.20$
(e) ₹ $\mathbf{1 0 0 0 0}$ for $\mathbf{1}$ year at $\mathbf{8 \%}$ per annum compounded half yearly.

## Solution:

Principal $(\mathrm{P})=₹ 10,000$
Rate $=8 \%$ per annum or $4 \%$ per half-year

Number of years $=1$ year
There are 2 half-years in 1 year
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=10000(1+4 / 100)^{2}$
$=10000(1+1 / 25)^{2}$
$=10000(26 / 25)^{2}$
$=₹ 10816$
C.I. $=\mathrm{A}-\mathrm{P}=₹ 10816-₹ 10000=₹ 816$
2. Kamala borrowed ₹ 26400 from a Bank to buy a scooter at a rate of $15 \%$ p.a. compounded yearly. What amount will she pay at the end of 2 years and 4 months to clear the loan?
(Hint: Find A for 2 years with interest compounded yearly and then find S.I. on the 2nd year amount for 4/12 years.)

## Solution:

Principal $(P)=₹ 26,400$
Rate $(R)=15 \%$ per annum

Number of years $(n)=24 / 12$
The amount for 2 years and 4 months can be calculated by first calculating the amount for 2 years using the compound interest formula, then calculating the simple interest for 4 months on the amount obtained at the end of 2 years.

First, the amount for 2 years has to be calculated
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=26400(1+15 / 100)^{2}$
$=26400(1+3 / 20)^{2}$
$=26400(23 / 20)^{2}$
$=₹ 34914$
By taking ₹ 34,914 as principal, the S.I. for the next $1 / 3$ years will be calculated
S.I. $=(34914 \times 1 / 3 \times 15) / 100=₹ 1745.70$

Interest for the first two years $=₹(34914-26400)=₹ 8,514$
And interest for the next $1 / 3$ year $=₹ 1,745.70$

Total C.I. $=₹(8514+₹ 1745.70)=₹ 10,259.70$
Amount $=P+$ C.I. $=₹ 26400+₹ 10259.70=₹ 36,659.70$
3. Fabina borrows $₹ \mathbf{1 2 , 5 0 0}$ at $\mathbf{1 2 \%}$ per annum for 3 years at simple interest, and Radha borrows the same amount for the same time period at $10 \%$ per annum, compounded annually. Who pays more interest, and by how much?

## Solution:

Interest paid by Fabina $=(\mathrm{P} \times \mathrm{R} \times \mathrm{T}) / 100$
$=(12500 \times 12 \times 3) / 100$
$=4500$

Amount paid by Radha at the end of 3 years $=\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$A=12500(1+10 / 100)^{3}$
$=12500(110 / 100)^{3}$
$=₹ 16637.50$
C.I. $=A-P=₹ 16637.50-₹ 12500=₹ 4,137.50$

The interest paid by Fabina is ₹ 4,500 and by Radha is ₹ $4,137.50$

Thus, Fabina pays more interest
$₹ 4500$ - ₹ $4137.50=₹ 362.50$

Hence, Fabina will have to pay ₹ 362.50 more.
4. I borrowed ₹ 12000 from Jamshed at $\mathbf{6 \%}$ per annum simple interest for $\mathbf{2}$ years. Had I borrowed this sum at $6 \%$ per annum compound interest, what extra amount would I have to pay?

## Solution:

$\mathrm{P}=₹ 12000$
$\mathrm{R}=6 \%$ per annum
$\mathrm{T}=2$ years
S.I. $=(\mathrm{P} \times \mathrm{R} \times \mathrm{T}) / 100$
$=(12000 \times 6 \times 2) / 100$
$=₹ 1440$
To find the compound interest, the amount (A) has to be calculated
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=12000(1+6 / 100)^{2}$
$=12000(106 / 100)^{2}$
$=12000(53 / 50)^{2}$
$=₹ 13483.20$
$\therefore$ C.I. $=\mathrm{A}-\mathrm{P}$
$=₹ 13483.20$ - ₹ 12000
$=₹ 1,483.20$
C.I. - S.I. $=₹ 1,483.20-₹ 1,440$
$=₹ 43.20$

Therefore, the extra amount to be paid is ₹ 43.20 .
5. Vasudevan invested ₹ 60000 at an interest rate of $\mathbf{1 2 \%}$ per annum compounded half yearly. What amount would he get
(i) after 6 months?
(ii) after 1 year?

## Solution:

(i) $\mathrm{P}=₹ 60,000$

Rate $=12 \%$ per annum $=6 \%$ per half-year
$\mathrm{n}=6$ months $=1$ half-year
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=60000(1+6 / 100)^{1}$
$=60000(106 / 100)$
$=60000(53 / 50)$
= ₹ 63600
(ii) There are 2 half-years in 1 year

So, $n=2$
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=60000(1+6 / 100)^{2}$
$=60000(106 / 100)^{2}$
$=60000(53 / 50)^{2}$
$=₹ 67416$
6. Arif took a loan of ₹ 80,000 from a bank. If the rate of interest is $\mathbf{1 0 \%}$ per annum, find the difference in amounts he would be paying after $11 / 2$ years if the interest is
(i) Compounded annually
(ii) Compounded half yearly

## Solution:

(i) $\mathrm{P}=₹ 80,000$
$\mathrm{R}=10 \%$ per annum
$\mathrm{n}=11 / 2$ years
The amount for 1 year and 6 months can be calculated by first calculating the amount for 1 year using the compound interest formula, then calculating the simple interest for 6 months on the amount obtained at the end of 1 year.

First, the amount for 1 year has to be calculated
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=80000(1+10 / 100)^{1}$
$=80000 \times 11 / 100$
$=₹ 88000$

By taking ₹ 88,000 as principal, the S.I. for the next $1 / 2$ year will be calculated as
S.I. $=(\mathrm{P} \times \mathrm{R} \times \mathrm{T}) / 100$
$=(88000 \times 10 \times 1 / 2) / 100$
$=₹ 4400$

Interest for the first year $=₹ 88000-₹ 80000=₹ 8000$
And interest for the next $1 / 2$ year $=₹ 4,400$
Total C.I. $=₹ 8,000+₹ 4,400=₹ 12,400$
$\mathrm{A}=\mathrm{P}+\mathrm{C} . \mathrm{I} .=₹(80000+12400)$
$=₹ 92,400$
(ii) The interest is compounded half yearly

Rate $=10 \%$ per annum $=5 \%$ per half-year
There will be three half-years in 112 years
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=80000(1+5 / 100)^{3}$
$=80000(105 / 100)^{3}$
$=₹ 92610$

Thus, the difference between the amounts $=₹ 92,610-₹ 92,400=₹ 210$
7. Maria invested ₹ 8,000 in a business. She would be paid interest at $5 \%$ per annum compounded annually. Find
(i) The amount credited against her name at the end of the second year
(ii) The interest for the $3^{\text {rd }}$ year

## Solution:

(i) $\mathrm{P}=₹ 8,000$
$\mathrm{R}=5 \%$ per annum
$\mathrm{n}=2$ years
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=8000(1+5 / 100)^{2}$
$=8000(105 / 100)^{2}$
$=₹ 8820$
(ii) The interest for the next year, i.e. the third year, has to be calculated. By taking ₹ 8,820 as principal, the S.I. for the next year will be calculated.
S.I. $=(\mathrm{P} \times \mathrm{R} \times \mathrm{T}) / 100$
$=(8820 \times 5 \times 1) / 100$
$=₹ 441$
8. Find the amount and the compound interest on ₹ 10,000 for $11 / 2$ years at $10 \%$ per annum, compounded half yearly. Would this interest be more than the interest he would get if it was compounded annually?

## Solution:

$\mathrm{P}=$ ₹ 10,000
Rate $=10 \%$ per annum $=5 \%$ per half-year
$\mathrm{n}=11 / 2$ years
There will 3 half-years in $11 / 2$ years
Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=10000(1+5 / 100)^{3}$
$=10000(105 / 100)^{3}$
= ₹ 11576.25
C.I. $=\mathrm{A}-\mathrm{P}$
= ₹ 11576.25 - ₹ 10000
= ₹ $1,576.25$
The amount for 1 year and 6 months can be calculated by first calculating the amount for 1 year using the compound interest formula, then calculating the simple interest for 6 months on the amount obtained at the end of 1 year.

Amount, $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=10000(1+10 / 100)^{1}$
$=10000(110 / 100)$
= ₹ 11000
By taking ₹ 11,000 as the principal, the S.I. for the next $1 / 2$ year will be calculated as
S.I. $=(\mathrm{P} \times \mathrm{R} \times \mathrm{T}) / 100$
$=(11000 \times 10 \times 1 / 2) / 100$
= ₹ 550
So, the interest for the first year = ₹ $11000-₹ 10000=$ ₹ 1,000
Hence, Total compound interest $=$ ₹ $1000+$ ₹ $550=$ ₹ 1,550
So the difference between two interests $=1576.25-1550=26.25$
Therefore, the interest would be 26.25 more when compounded half yearly than the interest when compounded annually.
9. Find the amount which Ram will get on ₹ 4,096 , if he gave it for 18 months at $12^{1 / 2}$ per annum, interest being compounded half-yearly.

## Solution:

$\mathrm{P}=$ ₹ 4,096
$\mathrm{R}=12^{1 / 2}$ per annum $=25 / 2$ per annum $=25 / 4$ per half-year
$\mathrm{n}=18$ months
There will be 3 half-years in 18 months
Therefore, amount $\mathrm{A}=\mathrm{P}(1+\mathrm{R} / 100)^{\mathrm{n}}$
$=4096(1+25 /(4 \times 100))^{3}$
$=4096 \mathrm{x}(1+1 / 16)^{3}$
$=4096 \times(17 / 16)^{3}$
= ₹ 4913
Therefore, the required amount is ₹ 4,913 .
10. The population of a place increased to 54000 in 2003 at a rate of $5 \%$ per annum
(i) find the population in 2001
(ii) what would be its population in 2005?

## Solution:

(i) It's given that population in the year $2003=54,000$
$54,000=($ Population in 2001 $)(1+5 / 100)^{2}$
$54,000=($ Population in 2001 $)(105 / 100)^{2}$

Population in $2001=54000 \times(100 / 105)^{2}$
$=48979.59$
Therefore, the population in the year 2001 was approximately 48,980
(ii) Population in $2005=54000(1+5 / 100)^{2}$
$=54000(105 / 100)^{2}$
$=54000(21 / 20)^{2}$
$=59535$
Therefore, the population in the year 2005 would be 59,535.
11. In a laboratory, the count of bacteria in a certain experiment was increasing at the rate of $2.5 \%$ per hour. Find the bacteria at the end of 2 hours if the count was initially $\mathbf{5 , 0 6 , 0 0 0}$.

## Solution:

The initial count of bacteria is given as 5,06,000
Bacteria at the end of 2 hours $=506000(1+2.5 / 100)^{2}$
$=506000(1+1 / 40)^{2}$
$=506000(41 / 40)^{2}$
$=531616.25$
Therefore, the count of bacteria at the end of 2 hours will be 5,31,616 (approx.).
12. A scooter was bought at $₹ \mathbf{4 2 , 0 0 0}$. Its value depreciated at the rate of $\mathbf{8 \%}$ per annum. Find its value after one year.

## Solution:

Principal $=$ Cost price of the scooter $=₹ 42,000$
Depreciation $=8 \%$ of $₹ 42,000$ per year
$=(\mathrm{P} x \mathrm{R} \times \mathrm{T}) / 100$
$=(42000 \times 8 \times 1) / 100$
$=₹ 3360$

Thus, the value after 1 year $=₹ 42000-₹ 3360=₹ 38,640$.

