Exercise 14.1

Q1) Find the compound interest when principal = Rs 3000, rate = 5% per annum and time = 2 years.

Solution:

Principal for the first year = Rs 3,000

Interest for the first year=Rs3,000 x 5 x $\frac{1}{100}$ = Rs 150

Amount at the end of the first year = Rs 3,000 + Rs 150 = Rs 3,150

Principle Interest for the second year=Rs 3,150 x 5 x $\frac{1}{100}$ = Rs 157.50

Amount at the end of the second year = Rs 3307.50

Compound interest=Rs 3,307.50 – 3,000 = Rs 307.50

Q2) What will be the compound interest on Rs 4000 in two years when the rate of interest is 5% per annum?

Solution:

We know that amount A at the end of n years at the rate of R% per annum is given by A = $P(1+\frac{R}{100})^n$

Giver P = Rs 4,000

R = 5% p.a

n = 2 years

Now,

A = $4000(1+\frac{5}{100})^2$

= $4000(\frac{105}{100})^2$

= Rs 4410

And, CI = A – P = Rs 4,410 – Rs 4,000 = Rs 410

Q3) Rohit deposited Rs 8000 with a finance company for 3 years at an interest of 15% per annum. What is the compound interest that Rohit gets after 3 years?

Solution:

We know that amount A at the end of n years at the rate of R% per annum is given by = A = $P(1 + \frac{R}{100})^n$

Given:

P = Rs 8,000

R = 15% p.a.

n = 3 years.

Now,

A = $8000(1 + \frac{15}{100})^3$

A = $8000(\frac{115}{100})^3$

A = Rs. 12,167

And, CI = A − P = Rs 12,167 − Rs 8,000 = Rs 4,167

Q4) Find the compound interest on Rs 1000 at the rate of 8% per annum for $1\frac{1}{2}$ years when interest is compounded half-yearly.

Solution:

Given:

P = Rs 1,000

R = 8% p.a.

n = 1.5 years

We know that:

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

A = $1000(1 + \frac{8}{200})^3$

$$A = 1000\left(\frac{208}{200}\right)^3$$

A = Rs 1,124.86

Now, CI = A − P = Rs 1,124.86 − Rs 1,000 = Rs 124.86

Q5) Find the compound interest on Rs 160000 for one year at the rate of 20% per annum, if the interest is compounded quarterly.

Solution:

Given:

P = Rs 160,000

R = 20 % p. a.

n = 1 year

We know that:

$$A = P\left(1 + \frac{R}{400}\right)^{4n}$$

$$A = 160000\left(1 + \frac{20}{400}\right)^4$$

$$A = 160000(1.05)^4$$

A = Rs 19,4481

Now, CI = A − P = Rs 19,448.1 − Rs 16,000 = Rs 3,4481

Q6) Swati took a loan of Rs 16000 against her insurance policy at the rate of $12\frac{1}{2}$% per annum. Calculate the total compound interest payable by Swati after 3 year.

Solution:

Given:

P = 16,000

R = 12.5% p.a.

n = 3 years

We know that:

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

$A = 16000(1 + \frac{12.5}{100})^3$

$A = 16000(\frac{112.5}{100})^3$

A = Rs 22,781.25

Now, CI = A − P = Rs 22,781.25 − Rs 16,000 = Rs 6,781.25

Q7) Roma borrowed Rs 64000 from a bank for $1\frac{1}{2}$ years at the rate of 10% per annum. Compute the total compound interest payable by Roma after $1\frac{1}{2}$ years, if the interest is compounded half-yearly.

Solution:

Given:

P = 64,000

R = 10% p.a.

n = 1.5 years

Amount after n years:

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

$A = 64000(1 + \frac{10}{200})^3$

$A = 64000(\frac{210}{200})^3$

A = Rs 74,088

Now, CI = A − P = Rs 74,088 − Rs 64,000 = Rs 10,088

Q8) Mewa Lal borrowed Rs 20000 from his friend Rooplal at 18% per annum simple interest. He lent it to Rampal at the same rate but compounded annually. Find his gain after 2 years.

Solution:

SI for Mewa Lal = $\frac{PRT}{100}$ = $\frac{20000 \times 18 \times 21}{100}$ = Rs 7,200

Thus, he has to pay Rs 7,200 as interest after borrowing CI for Mewa Lal = A − P

= $20000(1 + \frac{18}{100})^2$ − 20,000

= $20000(1.18)^2$ − 20,000

= 27,848 − 20,000

= Rs 7,848

He gained Rs 7,848 as interest after lending. His gain in the whole transaction

= Rs 7,848 − Rs 7,200

= Rs 648

Q9) Find the compound interest on Rs 8000 for 9 months at 20% per annum compounded quarterly.

Solution:

P = Rs 8,000

T = 9 months = 3 quarters

R = 20% per annum = 5% per quarter

A = $8000(1 + \frac{5}{100})^3$

A = $8000(1.05)^3$

A = 9,261

The required amount is Rs 9,261.

Now,

CI = A − P = Rs 9,261 − Rs 8,000 = Rs 1,261

Q10) Find the compound interest at the rate of 10% per annum for two years on that principle which in two years at the rate of 10% per annum gives Rs 200 as simple interest.

Solution:

$SI = \frac{PRT}{100}$

$\therefore P = \frac{SI \times 100}{RT}$

$P = \frac{200 \times 100}{10 \times 2}$

P = Rs 1,000

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

$A = 1000(1 + \frac{10}{100})^2$

$A = 1000(1.1)^2$

A = Rs 1,210

Now,

CI = A − P = Rs 1,210 − Rs 1,000 = Rs 210

Q11) Find the compound interest on Rs 64000 for 1 year at the rate of 10% per compounded quarterly.

Solution:

To calculate the interest compounded quarterly,

We have:

$A = P(1 + \frac{R}{400})^{4n}$

$A = 64000(1 + \frac{10}{400})^{4 \times 1}$

$A = 64000(1.025)^4$

A = 70,644.03

Thus,

The required amount is Rs 70,644.03.

Now, CI = A − P = Rs 70,644.025 − Rs 64,000 = Rs 6,644.03

Q12) Ramesh deposited Rs 7500 in a bank which pays him 12% interest per annum compounded

quarterly. What is the amount which he receives after 9 months?

Solution:

Given:

P = Rs 7,500

R = 12% p.a = 3% quarterly

T = 9 months = 3 quarters

We know that:

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

$A = 7500(1 + \frac{3}{100})^3$

$A = 7500(1.03)^3$

A = 8,195.45

Thus,

The required amount is Rs 8,195.45.

Q13) Anil borrowed a sum of Rs 9600 to install a hand pump in his dairy. If the rate of 1 interest is $5\frac{1}{2}$% per annum compounded annually, determine the compound interest which Anil will have to pay after 3 years.

Solution:

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

$A = 9600(1 + \frac{5.5}{100})^3$

$A = 9600(1.055)^3$

A = Rs 11,272.72

Now,

CI = A − P = Rs 11,272.72 − Rs 9,600 = Rs 1,672.72

Q14) Surabhi borrowed a sum of Rs 12000 from a finance company to purchase a refrigerator. If the rate of interest is 5% per annum compounded annually, calculate the compound interest that Surabhi has to pay to the company after 3 years.

Solution:

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

$A = 12000(1 + \frac{5}{100})^3$

$A = 12000(1.05)^3$

A = Rs 13,891.50

Thus,

The required amount is Rs 13.891.50.

Now,

CI = A − P = Rs 13.891.50 − Rs 12,000 = Rs 1,891.50

Q15) Daljit received a sum of Rs. 40000 as a loan from a finance company. If the rate of interest is 7% per annum corn compounded annually, calculate the compound interest that Daljit pays after 2 years.

Solution:

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

$A = 40000(1 + \frac{7}{100})^2$

$A = 40000(1.07)^2$

A = Rs 45,796

Thus,

The required amount is Rs 45,796.

Now,

CI = A − P = Rs 45.796 − Rs 40,000 = Rs 5,796

Exercise 14.2

Q1) Compute the amount and the compound interest in each of the following by using the formulae when:

(i) Principal = Rs 3000, Rate = 5%, Time = 2 years

(ii) Principal = Rs 3000, Rate =18%, Time = 2 years

(iii) Principal = Rs 5000, Rate = 10 paise per rupee per annum, Time = 2 years

(iv) Principal = Rs 2000, Rate = 4 paise per rupee per annum, Time = 3 years

(v) Principal = Rs 12800, Rate = $7\frac{1}{2}$%, Time = 3 years

(vi) Principal =Rs 10000, Rate 20% per annum compounded half-yearly, Time = 2 years

(vii) Principal = Rs 160000, Rate =10 paise per rupee per annum compounded half-yearly, Time = 2 years.

Solution:

Applying the rule A = $P(1 + \frac{R}{100})^n$ on the given situations, we get:

(i) A = $3000(1 + \frac{5}{100})^2$ = $3000(1.05)^2$ = Rs 3307.5

Now, CI = A − P = Rs 3307.50 − Rs 3000 = Rs. 307.50

(ii) A = $3000(1 + \frac{18}{100})^2$ = $3000(1.18)^2$ = Rs 4177.2

Now, CI = A − P = Rs 4177.20 − Rs 3000 = Rs. 1177.20

(iii) A = $5000(1 + \frac{10}{100})^2$ = $5000(1.10)^2$ = Rs 6050

Now, CI = A − P = Rs 6050 − Rs 5000 = Rs. 1050

(iv) A = $2000(1 + \frac{4}{100})^3$ = $2000(1.04)^3$ = Rs 2249.68

Now, CI = A − P = Rs 2249.68 − Rs 2000 = Rs. 249.68

(v) A = $12800(1 + \frac{7.5}{100})^3$ = $12800(1.075)^3$ = Rs 15901.40

Now, CI = A − P = Rs 15901.40 − Rs 12800 = Rs. 3101.40

(vi) A = $10000(1 + \frac{20}{200})^4$ = $10000(1.1)^4$ = Rs 14641

Now, CI = A − P = Rs 14641 − Rs 10000 = Rs. 4641

(vii) A = $160000(1 + \frac{10}{200})^4$ = $160000(1.05)^4$ = Rs 194481

Now, CI = A − P = Rs 194481 − Rs 160000 = Rs. 34481

Q2) Find the amount of Rs 2400 after 3 years, when the interest is compounded annually at the rate of 20% per annum.

Solution:

Given:

P = Rs 2400

R = 20 % p.a

n = 3 years

We know that amount A at the end of n years at the rate R% per annum when the interest is compounded annually is given by

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

A = $2400(1 + \frac{20}{100})^3$

A = $2400(1.2)^3$

A = 4147.20

Thus, the required amount is Rs 4147.20.

Q3) Rahman lent Rs 16000 to Rasheed at the rate of $12\frac{1}{2}\%$ per annum compound interest. Find the amount payable by Rasheed to Rahman after 3 years.

Solution:

Given:

P = Rs 16000

R = 12.5 % p.a

n = 3 years

We know that amount A at the end of n years at the rate R% per annum when the interest is compounded annually is given by

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

$A = 16000(1 + \frac{12.5}{100})^3$

$A = 16000(1.125)^3$

A = 22781.25

Thus, the required amount is Rs 22781.25.

Q4) Meera borrowed a sum of Rs 1000 from Sita for two years. If the rate of interest is 10% compounded annually, find the amount that Meera has to pay back.

Solution:

Given:

P = Rs 1000

R = 10 % p.a

n = 2 years

We know that amount A at the end of n years at the rate R% per annum when the interest is compounded annually is given by

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

$A = 1000(1 + \frac{10}{100})^2$

$A = 1000(1.1)^2$

A = 1210

Thus, the required amount is Rs 1210.

Q5) Find the difference between the compound interest and simple interest. On a sum of   Rs 50,000 at 10% per annum for 2 years.

Solution:

Given:

P = Rs 50000

R = 10 % p.a

n = 2 years

We know that amount A at the end of n years at the rate R% per annum when the interest is compounded annually is given by

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

$A = 50000(1 + \frac{10}{100})^2$

$A = 50000(1.1)^2$

A = Rs 60500

Also,

CI = A − P = Rs 60500 − Rs 50000 = Rs 10500

We know that SI = $\frac{PRT}{100}$ = $\frac{50000 \times 10 \times 2}{100}$ = Rs 10000

Therefore, Difference between CI and SI = Rs 10500 − Rs 10000 = Rs 500

Q6) Amit borrowed Rs 16000 at $17\frac{1}{2}$% per annum simple interest. On the same day, he lent it to Ashu at the same rate but compounded annually. What does he gain at the end of 2 years?

Solution:

Amount to be paid by Amit:

$SI = \frac{PRT}{100} = \frac{16000 \times 17.5 \times 2}{100}$ = Rs 5600

Amount gained by Amit:

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

$A = 16000(1 + \frac{17.5}{100})^2$

$A = 50000(1.175)^2$

A = Rs 22090

We know that:

CI = A – P = Rs 22090 – Rs 16000 = Rs 6090

Amit's gain in the whole transaction = Rs 6090 – Rs 5600 = Rs 490

Q7) Find the amount of Rs 4096 for 18 months at $12\frac{1}{2}$% per annum, the interest being compounded semi-annually.

Solution:

Given:

P = Rs 4096

R = 12.5 % p.a

n = 1.5 years

We have:

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

When the interest is compounded annually, we have:

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

$$A = 4096\left(1 + \frac{12.5}{200}\right)^3$$

$$A = 4096(1.0625)^3$$

$$A = \text{Rs } 4913$$

Thus, the required amount is Rs 4913.

Q8) Find the amount and the compound interest on Rs 8000 for $1\frac{1}{2}$ years at 10% per annum, compounded half-yearly.

Solution:

Given:

P = Rs 8000

R = 10% p.a

n = 1.5 years

When compounded half-yearly,

We have:

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

$$A = 8000\left(1 + \frac{10}{200}\right)^3$$

$$A = 8000(1.05)^3$$

$$A = \text{Rs } 9261$$

Also, CI = A − P = Rs 9261 − Rs 8000 = Rs 1261

Q9) Kamal borrowed Rs 57600 from LIC against her policy at $12\frac{1}{2}\%$ per annum to build a house. Find the amount that she pays to the LIC after $1\frac{1}{2}$ years if the interest is calculated half-yearly.

Solution:

Given:

P = Rs 57600

R = 12.5% p.a

n = 1.5 years

When the interest is compounded half-yearly,

We have:

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

$A = 57600(1 + \frac{12.5}{200})^3$

$A = 57600(1.0625)^3$

A = Rs 69089.06

Thus, the required amount is Rs 69089.06

Q10) Abha purchased a house from Avas Parishad on credit. If the cost of the house is Rs 64000 and the rate of interest is 5% per annum compounded half-yearly, find the interest paid by Abha after one year and a half.

Solution:

Given:

P = Rs 64000

R = 5% p.a

n = 1.5 years

When the interest is compounded half-yearly,

We have:

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

$$A = 64000(1 + \frac{5}{200})^3$$

$$A = 64000(1.025)^3$$

A = Rs 68921

Also, CI = A − P = Rs 68921 − Rs 64000 = Rs 4921

Thus, the required interest is Rs 4921.

Q11) Rakesh lent out Rs 10000 for 2 years at 20% per annum, compounded annually. How much more he could earn if the interest be compounded half-yearly?

Solution:

Given:

P = Rs 10000

R = 20% p.a

n = 2 years

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

$$A = 10000(1 + \frac{20}{100})^2$$

$$A = 10000(1.2)^2$$

A = 14400

When the interest is compounded half-yearly,

We have:

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

$$A = 10000(1 + \frac{20}{200})^4$$

$$A = 10000(1.1)^4$$

A = Rs 14641

Difference = Rs 14641 − Rs 14400 = Rs 241

Q12) Romesh borrowed a sum of Rs 245760 at 12.5% per annum, compounded annually. On the same day, he lent out his money to Ramu at the same rate of interest, but compounded semi-annually. Find his gain after 2 years.

Solution:

Given:

P = Rs 245760

R = 12.5% p.a

n = 2 years

When compounded annually,

We have: A = $P(1 + \frac{R}{100})^n$

A = $245760(1 + \frac{12.5}{100})^2$

A = $245760(1.125)^2$

A = Rs 311040

When compounded semi-annually,

We have:

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

A = $245760(1 + \frac{12.5}{200})^4$

A = $245760(1.0625)^4$

A = Rs 313203.75

Romesh's gain = Rs 313203.75 − Rs 311040 = Rs 2163.75

Q13) Find the amount that David would receive if he invests Rs 8192 for 18 months at $12\frac{1}{2}\%$ per annum, the interest being compounded half-yearly.

Solution:

Given:

P = Rs 8192

R = 12.5% p.a

n = 1.5 years

When the interest is compounded half-yearly, we have:

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

$A = 8192(1 + \frac{12.5}{200})^3$

$A = 8192(1.0625)^3$

A = Rs 9826

Thus, the required amount is Rs 9826

Q14) Find the compound interest on Rs 15625 for 9 months, at 16% per annum, compounded quarterly.

Solution:

Given:

P = Rs 15625

R = 16 % = $\frac{16}{4}$ = 4 % quarterly

n = 9 months = 3 quarters

We know that:

$A = P(1 + \frac{R}{\ldots})^n$

$$A = 15625(1 + \frac{4}{100})^3$$

$$A = 15625(1.043)^3$$

A = Rs 17576

Also, CI = A − P = Rs 17576 − Rs 15625 = Rs 1951

Thus, the required compound interest is Rs 1951.

Q15) Rekha deposited Rs 16000 in a foreign bank which pays interest at the rate of 20% per annum compounded quarterly, find the interest received by Rekha after one year.

Solution:

Given:

P = Rs 16000

R = 20 % p.a

n = 1 year

We know that:

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

When compounded quarterly, we have:

$$A = P(1 + \frac{R}{400})^{4n}$$

$$A = 16000(1 + \frac{20}{400})^4$$

$$A = 16000(1.054)^4$$

A = Rs 19448.10

Also, CI = A − P = Rs 194448.10 − Rs 16000 = Rs 3448.10

Thus, the interest received by Rekha after one year is Rs 3448.10.

Q16) Find the amount of Rs 12500 for 2 years compounded annually, the rate of interest being 15% for the first year and 16% for the second year.

Solution:

Given:

P = Rs 12500

R_1 = 15 % p.a

R_2 = 16 % p.a

Therefore, the amount after two years = $P(1 + \frac{R_1}{100} \times 1 + \frac{R_2}{100}) = 12500(1 + \frac{15}{100} \times 1 + \frac{16}{100}) = 12500(1.15 \times 1.16) = $ Rs 16675

Thus, the required amount is Rs 16675.

Q17) Ramu borrowed Rs 15625 from a finance company to buy a scooter. If the rate of interest be 16% per annum compounded annually, what payment will he have to make after $2\frac{1}{4}$ years?

Solution:

Given:

P = Rs 15625

R = 16 % p.a

n = $2\frac{1}{4}$

Therefore, Amount after $2\frac{1}{4}$ years = $P(1 + \frac{R}{100})^2 \times (1 + \frac{\frac{1}{4} \times R}{100})$

= $15625(1 + \frac{16}{100})^2 \times (1 + \frac{\frac{16}{4}}{100})$

= $15625(1 + \frac{16}{100})^2 \times (1 + \frac{4}{100})$

= $15625 (1.16)^2 (1.04)$

= Rs 21866

Thus, the required amount is Rs 21866.

Q18) What will Rs 125000 amount to at the rate of 6%, if the interest is calculated after every four months?

Solution:

Because interest is calculated after every 3 months, it is compounded quarterly.

Given:

P = Rs 125000

R = 6 % p.a = $\frac{6}{4}$ % quarterly = 1.5 % quarterly

n = 3

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

A = $125000(1 + \frac{1.5}{100})^3$

A = $125000(1.015)^3$

A = Rs 132670 approx

Thus, the required amount is Rs 132670.

Q19) Find the compound interest at the rate of 5% for three years on that principle which in three years at the rate of 5% per annum gives Rs 12000 as simple interest.

Solution:

$P = \frac{SI \times 100}{RT}$

According to the given values, we have:

P = $\frac{12000 \times 100}{5 \times 3}$ = 80000

The principal is to be compounded annually.

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

$A = 80000(1 + \frac{5}{100})^3$

$A = 80000(1.05)^3 \Rightarrow A = Rs\ 92610$

Now, CI = A − P = 92610 − 80000 = Rs 12610

Thus, the required compound interest is Rs 12610.

Q20) A sum of money was lent for 2 years at 20% compounded annually. If the interest is payable half-yearly instead of yearly, then the interest is Rs 482 more. Find the sum.

Solution:

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

Also, P = A − CI

Let the sum of money be Rs x.

If the compound annually, then: $A_1 = x(1 + \frac{20}{100})^2 = 1.44x$

Therefore, CI = 1.44x − x = 0.44x .....(1)

If the interest is compounded half-yearly, then : $A_2 = x(1 + \frac{10}{100})^4 = 1.4641x$

Therefore, CI = 1.4641x − x = 0.4641x .....(2)

It is given that if interest is compounded half-yearly, then it will be Rs 482 more.

∴ 0.4641x = 0.44x + 482   [From (1) and (2)]

0.4641x − 0.44x = 482

0.0241x = 482

$X = \frac{482}{0.0241} = 20000$

Thus, the required sum is Rs 20000.

Q21) Simple interest on a sum of money for 2 years at $6\frac{1}{2}$% per annum is Rs 5200. What will be the compound interest on the sum at the same rate for the same period?

Solution:

$P = \frac{SI \times 100}{RT}$

According to the given values, we have:

$P = \frac{5200 \times 100}{6.5 \times 2} = 40000$

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

A = $40000(1 + \frac{6.5}{100})^2$

A = $40000(1.065)^2$

A = Rs 45369

Also, CI = A − P = Rs 45369 − Rs 40000 = Rs 5369

Thus, the required compound interest is Rs 5369.

Q22) Find the compound interest at the rate of 5% per annum for 3 years on that principle which in 3 years at the rate of 5% per annum gives Rs 1200 as simple interest.

Solution:

$P = \frac{SI \times 100}{RT}$

According to the given values, we have:

$P = \frac{1200 \times 100}{5 \times 3} = 8000$

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

A = $8000(1 + \frac{5}{100})^3$

A = $8000(1.05)^3$

A = Rs 9261

Also, CI = A − P = Rs 9261 − Rs 8000 = Rs 1261

Thus, the required compound interest is Rs 1261.

Q1) On what sum will the compound interest at 5% per annum for 2 years compounded annually be Rs 164?

Solution:

Let the sum be Rs x.

We know that:

CI = A − P

$$= P(1 + \tfrac{R}{100})^n - P$$

$$= P[(1 + \tfrac{R}{100})^n - 1]$$

$$164 = x[(1 + \tfrac{5}{100})^2 - 1]$$

$$164 = x[(1.05)^2 - 1]$$

$$x = \frac{164}{0.1025}$$

x = 1600

Thus, the required sum is Rs 1600.

Q2) Find the principal if the interest compounded annually at the rate of 10% for two years is Rs 210.

Solution:

Let the sum be Rs x.

We know that:

CI = A − P

$$210 = P(1 + \tfrac{R}{100})^n - P$$

$$210 = P[(1 + \tfrac{R}{100})^n - 1]$$

$210 = x[(1 + \frac{10}{100})^2 - 1]$

$210 = x[(1.10)^2 - 1]$

$x = \frac{210}{0.21}$

$x = 1000$

Thus, the required sum is Rs 1000.

Q3) A sum amounts to Rs 756.25 at 10% per annum in 2 years, compounded annually. Find the sum.

Solution:

Let the sum be Rs x.

Then,

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

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

$756.25 = x[(1 + \frac{10}{100})^2]$

$756.25 = x[(1.10)^2]$

$x = \frac{756.25}{1.21}$

$x = 625$

Thus, the required sum is Rs 625.

Q4) What sum will amount to Rs 4913 in 18 months, if the rate of interest is $12\frac{1}{2}$% per annum, compounded half-yearly?

Solution:

Let the sum be Rs x.

Given:

A = Rs 4913

R = 12.5 %

n = 18 months = 1.5 years

We know that:

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

$4913 = P(1 + \frac{R}{200})^{2n}$

$4913 = x(1 + \frac{12.5}{200})^3$

$4913 = P[(1.0625)^3]$

$X = \frac{4913}{1.1995}$

x = 4096

Thus, the required sum is Rs 4096.

Q5) The difference between the compound interest and simple interest on a certain sum at 15% per annum for 3 years is Rs 283.50. Find the sum.

Solution:

Given:

CI − SI = Rs 283.50

R = 15 %

n = 3 years

Let the sum be Rs x.

We know that:

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

$= x(1 + \frac{5}{100})^3$

$= x(1.15)^3$ .....(1)

Also,

$$SI = \frac{PRT}{100} = \frac{x(15)(3)}{100} = 0.45x$$

A = SI + P = 1.45x   .....(2)

Thus, we have:

$x(1.15)^3 - 1.45x = 283.50$ [From (1) and (2)]

1.523x − 1.45x = 283.50

0.070875x = 283.50

$X = \frac{283.50}{0.070875}$

= 4000

Thus, the sum is Rs 4000.

Q6) Rachana borrowed a certain sum at the rate of 15% per annum. If she paid at the end of two years Rs 1290 as interest compounded annually, find the sum she borrowed.

Solution:

Let the money borrowed by Rachana be Rs x.

Then, we have:

$CI = P(1 + \frac{R}{100})^n - P$

$1290 = x[(1 + \frac{15}{100})^2 - 1]$

1290 = x[0.3225]

$X = \frac{1290}{0.3225}$

= 4000

Thus, Rachana borrowed Rs 4000.

Q7) The interest on a sum of Rs 2000 is being compounded annually at the rate of 4% per annum. Find the period for which the compound interest is Rs 163.20.

Solution:

Let the time period be n years.

Then, we have:

CI $= P(1 + \frac{R}{100})^n - P$

$163.20 = 2000(1 + \frac{4}{100})^n - 2000$

$2163.20 = 2000(1.04)^n$

$(1.04)^n = \frac{2163.20}{2000}$ $(1.04)^n = 1.0816$ $(1.04)^n = (1.04)^2$

On comparing both the sides, we get:

n = 2

Thus, the required time is two years.

Q8) In how much time would Rs 5000 amount to Rs 6655 at 10% per annum compound interest?

Solution:

Let the time period be n years.

Then, we have:

CI $= P(1 + \frac{R}{100})^n - P$

$6655 = 5000(1 + \frac{10}{100})^n - 5000$

$11655 = 5000(1.10)^n$

$(1.1)^n = \frac{11655}{5000}$ $(1.1)^n = 2.331$ $(1.1)^n = (1.1)^3$

On comparing both the sides, we get:

n = 3

Thus, the required time is three years.

Q9) In what time will Rs 4400 become Rs 4576 at 8% per annum interest compounded half-yearly?

Solution:

Let the time period be n years.

R = 8 % = 4 % (Half-yearly)

Thus, we have:

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

$4576 = 4400(1 + \frac{4}{100})^n$

$4576 = 4400(1.04)^n$

$(1.04)^n = \frac{4576}{4400} \; (1.04)^n = 1.04 \; (1.04)^n = (1.04)^1$

On comparing both the sides, we get:

n = 1

Thus, the required time is half year.

Q10) The difference between the S.I. and C.I. on a certain sum of money for 2 years at 4% per annum is Rs 20. Find the sum.

Solution:

Given:

CI − SI = Rs 20

$[P(1 + \frac{4}{100})^2 - P] - \frac{P \times 4 \times 2}{100} = 20 \; P[(1.04)^2 - P] - 0.08P = 20$

0.0816P − 0.08P = 20

0.0016P = 20

$P = \frac{20}{0.0016}$

P = 12500

Thus, the required sum is Rs 12500.

Q11) In what time will Rs 1000 amount to Rs 1331 at 10% per annum, compound interest?

Solution:

Let the time be n years.

Then,

$A = P(1 + \frac{10}{100})^n$

$1331 = 1000(1 + \frac{10}{100})^n$

$(1.1)^n = \frac{1331}{1000}$ $(1.1)^n = 1.331$ $(1.1)^n = (1.1)^3$

On comparing both the sides, we get:

n = 3

Thus, the required time is three years.

Q12) At what rate percent compound interest per annum will Rs 640 amount to Rs 774.40 in 2 years?

Solution:

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

$774.40 = 640(1 + \frac{R}{100})^2$

$(1 + \frac{R}{100})^2 = \frac{774.40}{640}$ $(1 + \frac{R}{100})^2 = 1.21$ $(1 + \frac{R}{100})^2 = (1.1)^2$ $(1 + \frac{R}{100}) = 1.1$ $\frac{R}{100} = 0.1$

R = 10

Thus, the required rate of interest is 10 % per annum.

Q13) Find the rate percent per annum if Rs 2000 amount to Rs 2662 in $1\frac{1}{2}$ years, interest being compounded half-yearly?

Solution:

Let the rate of interest be R %.

Then,

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

$2662 = 2000(1 + \frac{R}{100})^3$

$(1 + \frac{R}{100})^3 = \frac{2662}{2000}$ $(1 + \frac{R}{100})^3 = 1.331$ $(1 + \frac{R}{100})^3 = (1.1)^3$ $(1 + \frac{R}{100}) = 1.1$ $\frac{R}{100} = 0.1$

R = 10

Because the interest rate is being compounded half-yearly, it is 20 % per annum.

Q14) Kamala borrowed from Ratan a certain sum at a certain rate for two years simple interest. She lent this sum at the same rate to Hari for two years compound interest. At the end of two years, she received Rs 210 as compound interest but paid Rs 200 only as simple interest. Find the sum and the rate of interest.

Solution:

Let the sum be Rs P and the rate of interest be R%.

We know that Kamla paid Rs 200 as simple interest.

$\therefore 200 = \frac{PR(2)}{100}$

PR = 10000 .....(1)

Also, Kamla received Rs 210 as compound interest.

$\therefore 210 = P(1 + \frac{R}{100})^2 - 1$ $210(10000) = P(R^2 + 200R)$

$210R = R^2 + 200R$ [From (1)]

R = 10% p.a.

Putting the equation in (1), we get:

P = 1000

Thus, the required sum is Rs 1000 and the rate of interest is 10%.

Q15) Find the rate percent per annum, if Rs 2000 amount to Rs 2315.25 in a year and a half, interest being compounded six monthly.

Solution:

Let the rate percent per annum be R.

Because interest is compounded every six months, n will be 3 for 1.5 years.

Now,

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

$2315.25 = 2000(1 + \frac{R}{200})^3$

$(1 + \frac{R}{200})^3 = \frac{2315.25}{2000}$ $(1 + \frac{R}{200})^3 = 1.157625$ $(1 + \frac{R}{200})^3 = (1.05)^3$ $(1 + \frac{R}{200}) = 1.05$

$\frac{R}{200} = 0.05$

R = 10

Thus, the required rate is 10 % per annum.

Q16) Find the rate at which a sum of money will double Itself in 3 years if the interest is compounded annually.

Solution:

Let the rate percent per annum be R.

Then,

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

$2P = P(1 + \frac{R}{100})^3$

$(1 + \frac{R}{100})^3 = 2$

$(1 + \frac{R}{100}) = 1.2599$

$\frac{R}{100} = 0.2599$

R = 25.99

Thus, the required rate is 25.99 % per annum.

Q17) Find the rate at which a sum of money will become four times the original amount in 2 years if the interest is compounded half-yearly.

Solution:

Let the rate percent per annum be R.

Then,

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

$4P = P(1 + \frac{R}{200})^4$

$(1 + \frac{R}{200})^4 = 4$

$(1 + \frac{R}{200}) = 1.4142$

$\frac{R}{200} = 0.4142$

$R = 82.84$

Thus, the required rate is 82.84 %.

Q18) A certain sum amounts to Rs 6832 in 2 years at 8% compounded interest. Find the sum.

Solution:

Let the sum be P.

Thus, we have:

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

$5832 = P(1 + \frac{8}{100})^2$

$5832 = 1.1664P$

$P = \frac{5832}{1.1664}$

$= 5000$

Thus, the required sum is Rs 5000.

Q19) The difference between the compound interest and simple interest on a certain sum for 2 years at 7.5% per annum is Rs 360. Find the sum.

Solution:

Let the sum be P.

Thus, we have:

CI – SI = 360

$[P(1 + \frac{R}{100})^n - P] - \frac{P \times 7.5 \times 2}{100} = 360$

$P[(1 + \frac{7.5}{100})^2 - 1] - \frac{P \times 7.5 \times 2}{100} = 360$

P [1.155625 – 1] – 0.15P = 360

0.155625P – 0.15P = 360

$P = \frac{360}{0.005625}$

P = 64000

Thus, the required sum is Rs 64000.

Q20) The difference in simple interest and compound interest on a certain sum of money at $6\frac{2}{3}$% per annum for 3 years is Rs 46. Determine the sum.

Solution:

Given:

CI – SI = 46

$P[(1 + \frac{R}{100})^n - 1] - \frac{PRT}{100} = 46 \quad P[(1 + \frac{20}{100})^3 - 1] - \frac{P \times 20 \times 3}{100} = 46 \quad \frac{4096}{3375}P - \frac{P}{5} - P = 46$

$\frac{(4096 - 3375 - 675)P}{3375} = 46$

$P = 46 \times \frac{3375}{46}$

= 3375

Thus, the required sum is Rs 3375.

Q21) Ishita invested a sum of Rs 12000 at 5% per annum compound interest. She received an amount of Rs 13230 after years. Find the value of n.

Solution:

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

$13230 = 12000(1 + \frac{5}{100})^n$

$(1.05)^n = \frac{13230}{12000}$ $(1.05)^n = 1.1025$ $(1.05)^n = (1.05)^2$

On comparing both the sides, we get:

n = 2

Thus, the value of n is two years.

Q22) At what rate percent per annum will a sum of Rs 4000 yield compound interest of Rs 410 in 2 years?

Solution:

Let the rate percent be R.

We know that:

$CI = P(1 + \frac{R}{100})^n - P$

$410 = 4000(1 + \frac{R}{100})^2 - 4000$

$4410 = 4000(1 + \frac{R}{100})^2$

$(1 + \frac{R}{100})^2 = \frac{4410}{4000}$

$$(1 + \tfrac{R}{100})^2 = 1.1025$$

$$(1 + \tfrac{R}{100})^2 = (1.05)^2$$

$$1 + \tfrac{R}{100} = 1.05$$

$$\tfrac{R}{100} = 0.05$$

R = 5

Thus, the required rate percent is 5.

Q23) A sum of money deposited at 2% per annum compounded annually becomes Rs 10404 at the end of 2 years. Find the sum deposited.

Solution:

$$A = P(1 + \tfrac{R}{100})^n$$

$$10404 = P(1 + \tfrac{2}{100})^2$$

$$10404 = P(1.02)^2$$

$$P = \tfrac{10404}{1.0404}$$

P = 10000

Thus, the required sum is Rs 10000.

Q24) In how much time will a sum of Rs 1600 amount to Rs 1852.20 at 5% per annum compound interest?

Solution:

$$A = P(1 + \tfrac{R}{100})^n$$

$$1852.20 = 1600(1 + \tfrac{5}{100})^n$$

$$(1.05)^n = \tfrac{1852.20}{1600} \quad (1.05)^n = 1.157625 \quad (1.05)^n = (1.05)^3$$

On comparing both the sides, we get:

n = 3

Thus, the required time is three years.

Q25) At what rate percent will a sum of Rs 1000 amount to Rs 1102.50 in 2 years at compound interest?

Solution:

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

$1102.50 = 1000(1 + \frac{R}{100})^2$

$(1 + 0.01R)^2 = \frac{1102.50}{1000}$ $(1 + 0.01R)^2 = 1.1025$ $(1 + 0.01R)^2 = (1.05)^2$

On comparing both the sides, we get:

$1 + 0.01R = 1.05$

$0.01R = 0.05$

$R = 5$

Thus, the required rate percent is 5.

Q26) The compound interest on Rs 1800 at 10% per annum for a certain period of time is Rs 378. Find the time in years.

Solution:

$CI = P(1 + \frac{R}{100})^n - P$

$378 = 1800(1 + \frac{10}{100})^n - 1800$

$2178 = 1800(1 + \frac{10}{100})^n$

$(1 + \frac{10}{100})^n = \frac{2178}{1800}$

$(1.1)^n = 1.21$

$(1.1)^n = (1.1)^2$

On comparing both the sides, we get:

$n = 2$

Thus, the required time is two years.

Q27) What sum of money will amount to Rs 45582.25 at $6\frac{3}{4}$% per annum in two years, interest being compounded annually?

Solution:

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

$45582.25 = P(1 + \frac{27}{400})^2$

$P(1.0675)^2 = 45582.25$

P = $\frac{45582.25}{1.13955625}$

P = 40000

Thus, the required sum is Rs 40000.

Q28) Sum of money amounts to. Rs 453690 in 2 years at 6.5% per annum compounded annually. Find the sum.

Solution:

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

$453690 = P(1 + \frac{6.5}{100})^2$

$P(1.065)^2 = 453690$

P = $\frac{453690}{1.134225}$

P = 400000

Thus, the required sum is Rs 400000.

Q1) The present population of a town is 28000. If it increases at the rate of 5% per annum, what will be its population after 2 years?

Solution:

Here,

P = Initial population = 28000

R = Rate of growth of population = 5% per annum

n = Number of years = 2

Therefore, Population after two years = $P(1 + \frac{R}{100})^n$

$= 28000(1 + \frac{5}{100})^2$

$= 28000(1.05)^2$

= 30870

Hence, the population after two years will be 30870.

Q2) The population of a city is 126000. If the annual birth rate and death rate are 5.5% and 9.5% respectively, calculate the population of city after 3 years.

Solution:

Here,

P = Initial population = 125000

Annual birth rate = R_1 = 5.5%

Annual death rate = R_2 = 3.5%

Net growth rate, R = (R_1 − R_2) = 2%

n = Number of years = 3

Therefore, Population after two years = $P(1 + \frac{R}{100})^n$

= $125000(1 + \frac{2}{100})^3$

= $125000(1.02)^3$

= 132651

Hence, the population after three years will be 132651.

Q3) The present population of a town is 25000. It grows at 4%, 5% and 8% during first year, second year and third year respectively. Find its population after 3 years.

Solution:

Here,

P = Initial population = 25000

R_1 = 4%

R_2 = 5%

R_3 = 8%

n = Number of years = 3

Therefore, Population after three years = $P(1 + \frac{R_1}{100})(1 + \frac{R_2}{100})(1 + \frac{R_3}{100})$

= $25000(1 + \frac{4}{100})(1 + \frac{5}{100})(1 + \frac{8}{100})$

= 25000 (1.04) (1.05) (1.08)

= 29484

Hence, the population after three years will be 29484.

Q4) Three years ago, the population of a town was 50000. If the annual increase during three successive years be at the rate of 4%, 5% and 3% respectively, find the present population.

Solution:

Here,

P = Initial population = 50000

R_1 = 4%

R_2 = 5%

R_3 = 3%

n = Number of years = 3

Therefore, Population after three years = $P(1 + \frac{R_1}{100})(1 + \frac{R_2}{100})(1 + \frac{R_3}{100})$

$= 50000(1 + \frac{4}{100})(1 + \frac{5}{100})(1 + \frac{3}{100})$

$= 50000\ (1.04)\ (1.05)\ (1.03)$

$= 56238$

Hence, the population after three years will be 56238.

Q5) There is a continuous growth in the population of a village at the rate of 5% per annum. If its present population is 9261, what it was 3 years ago?

Solution:

Population after three years = $P(1 + \frac{R}{100})^n$

$9261 = P(1 + \frac{5}{100})^3$

$P(1.05)^3 = 9261$

$P = \frac{9261}{1.157625}$

P = 8000

Thus, the population three years ago was 8000.

Q6) In a factory the production of scooters rose to 46305 from 40000 in 3 years. Find the annual rate of growth of the production of scooters.

Solution:

Let the annual rate of growth be R.

Therefore, Production of scooters after three years = $P(1 + \frac{R}{100})^n$

$46305 = 4000(1 + \frac{R}{100})^3$

$(1 + 0.01R)^3 = \frac{46305}{40000}$ $(1 + 0.01R)^3 = 1.157625$ $(1 + 0.01R)^3 = (1.05)^3$

1 + 0.01R = 1.05

0.01R = 0.05

R = 5

Thus, the annual rate of growth is 5%.

Q7) The annual rate of growth in the population of a certain city is 8%. If its present population is

196830, what it was 3 years ago?

Solution:

Population after three years = $P(1 + \frac{R}{100})^n$

$196830 = P(1 + \frac{8}{100})^3$

$196830 = (1.08)^3$

$P = \frac{196830}{1.259712}$

= 156250

Thus, the population three years ago was 156250.

Q8) The population of a town increases at the rate of 50 per thousand. Its population after 2 years will be 22050. Find its present population.

Solution:

Population after three years = $P(1 + \frac{R}{100})^n$

$22050 = P(1 + \frac{50}{1000})^3$

$22050 = (1.05)^2$

$P = \frac{22050}{1.1025}$

= 20000

Thus, the population three years ago was 20000.

Q9) The count of bacteria in a culture grows by 10% in the first hour, decreases by 8% in the second hour and again increases by 12% in the third hour. If the count of bacteria in the sample is 13125000, what will be the count of bacteria after 3 hours?

Solution:

Given:

R_1 = 10%

R_2 = -8%

R_3 = 12%

P = Original count of bacteria = 13125000

We know that:

$$P(1 + \frac{R_1}{100})(1 - \frac{R_2}{100})(1 + \frac{R_3}{100})$$

Therefore, Bacteria count after three hours = $13125000(1 + \frac{10}{100})(1 - \frac{8}{100})(1 + \frac{12}{100})$

= 13125000 (1.10) (0.92) (1.12)

= 14,876,400

Thus, the bacteria count after three hours will be 14,876,400.

Q10) The population of a certain city was 72000 on the last day of the year 1998. During next year it increased by 7% but due to an epidemic, it decreased by 10% in the following year. What was its population at the end of the year 2000?

Solution:

Population at the end of the year 2000 = $P(1 + \frac{R_1}{100})(1 - \frac{R_2}{100})$

$$= 72000\left(1 + \frac{7}{100}\right)\left(1 - \frac{10}{100}\right)$$

= 72000 (1.07) (0.9)

= 69,336

Thus, the population at the end of the year 2000 was 69,336.

Q11) 6400 workers were employed to construct a river bridge in four years. At the end of the first-year, 25% workers were retrenched. At the end of the second year, 25% of those working at that time were retrenched. However, to complete the project in time, the number of workers was increased by 25% at the end of the third year. How many workers were working during the fourth year?

Solution:

Number of workers = 6,400

At the end of the first year, 25% of the workers were retrenched.

Therefore, 25% of 6,400 = 1,600

Number of workers at the end of the first year = 6,400 − 1600 = 4,800

At the end of the second year, 25% of those working were retrenched.

Therefore, 25% of 4,800 = 1,200

Number of workers at the end of the second year = 4,800 − 1200 = 3,600

At the end of the third year, 25% of those working increased.

Therefore, 25% of 3,600 = 900

Number of workers at the end of the third year = 3,600 + 900 = 4,500

Thus, the number of workers during the fourth year was 4,500.

Q12) Aman started a factory with an initial investment of its 100000. In the first year, he incurred a loss of 5%. However, during the second year, he earned a profit of 10% which is the third year rose to 12%. Calculate his net profit for the entire period of three years.

Solution:

Aman's profit for three years = $P(1 - \frac{R_1}{100})(1 + \frac{R_2}{100})(1 + \frac{R_3}{100})$

= $100000(1 - \frac{5}{100})(1 + \frac{10}{100})(1 + \frac{12}{100})$

= 100000 (0.95) (1.10) (1.12)

= 117040

Therefore, Net profit = Rs 117,040 – Rs 100,000

= Rs 17,040

Q13) The population of a town increases at the rate of 40 per thousand annually. If the present population be 175760, what was the population three years ago?

Solution:

Population after 3 years = $P(1 + \frac{R}{100})^3$

175760 = $P(1 + \frac{40}{100})^3$

175760 = $P(1.04)^3$

P = $\frac{175760}{1.124864}$

= 156,250

Thus, the population three years ago was 156,250.

Q14) The production of a mixed company in 1996 was 8000 mixies. Due to increase in demand, it increases its production by 15% in the next two years and after two years its demand decreases by 5%. What will be its production after 3 years?

Solution:

Production after three years $= P(1 + \frac{R_1}{100})^2(1 - \frac{R_2}{100})$

$= 8000(1 + \frac{15}{1000})^2(1 - \frac{5}{100})$

$= 8000\ (1.15)^2\ (0.95)$

$= 10{,}051$

Thus, the production after three years will be 10,051.

Q15) The population of a city increases each year by 4% of what it had been at the beginning of each year. If the population in 1999 had been 6760000, find the population of the city in

(i) 2001   (ii) 1997

Solution:

(i)

Population of the city in 2001 $= P(1 + \frac{R}{100})^2$

$= 6760000(1 + \frac{4}{100})^2$

$= 6760000\ (1.04)^2$

$= 7311616$

Thus, Population of the city in 2001 is 7311616.

(ii)

Population of the city in 1997 = $P(1 + \frac{R}{100})^{-2}$

= $6760000(1 + \frac{4}{100})^{-2}$

= $6760000 \, (1.04)^{-2}$

= 6250000

Thus, Population of the city in 1997 is 6250000.

Q16) Jitendra set up a factory by investing Rs 2500000. During the first two successive years, his profits were 5% and 10% respectively. If each year the profit was on previous year's capital, compute his total profit.

Solution:

Profit at the end of the first year = $P(1 + \frac{R}{100})$

= $2500000(1 + \frac{5}{100})$

= 2,500,000 (1.05)

= 2,625,000

Profit at the end of the second year = $P(1 + \frac{R}{100})$

= $2625000(1 + \frac{10}{100})$

= 2,625,000 (1.1)

= 2,887,500

Total profit = Rs 2,887,500 − Rs 2,500,000 = Rs 387,500

Exercise 14.5

Q1) Ms. Cherian purchased a boat for Rs 16000. If the total cost of the boat is depreciating at the rate of 5% per year, calculate its value after 2 years.

Solution:

Value of the boat after two years = $P(1 - \frac{R}{100})^n$

=> $16000(1 - \frac{5}{100})^2$

= $16000\ (0.95)^2$

= 14,440

Thus, the value of the boat after two years will be Rs 14,440.

Q2) The value of a machine depreciates at the rate of 10% per annum. What will be its value 2 years hence, if the present value is Rs 100000? Also, find the total depreciation during this period.

Solution:

Value of the machine after two years = $P(1 - \frac{R}{100})^n$

=> $100000(1 - \frac{10}{100})^2$

= $100000\ (0.90)^2$

= 81,000

Thus, the value of the machine after two years will be Rs 81,000.

Depreciation = Rs 100,000 − Rs 81,000

= Rs 19,000

Q3) Pritam bought a plot of land for Rs 640000. Its value is increasing by 5% of its previous value after every six months. What will be the value of the plot after 2 years?

Solution:

Given:

P = Rs 64,000

R = 5% for every six months

Value of the plot after two years = $P(1 + \frac{R}{100})^n$

=> $64000(1 + \frac{5}{100})^4$

= $64000(1.025)^4$

= 706,440.25

Thus, the value of the plot after two years will be Rs 706,440.25.

Q4) Mohan purchased a house for Rs 30000 and its value is depreciating at the rate of 25% per year. Find the value of the house after 3 years.

Solution:

Value of the house after three years = $P(1 - \frac{R}{100})^n$

=> $30000(1 - \frac{25}{100})^3$

= $30000(0.75)^3$

= 12,656.25

Thus, the value of the house after three years will be Rs 12,656.25.

Q5) The value of a machine depreciates at the rate of 10% per annum. It was purchased 3 years ago. If its present value is Rs 43740, find its purchase price.

Solution:

Purchase price = $P\left(1 - \frac{R}{100}\right)^{-n}$

$\Rightarrow 43740\left(1 - \frac{10}{100}\right)^{-3}$

$= 43740(0.90)^{-3}$

$= 60,000$

Thus, the purchase price of the machine was Rs 60,000.

Q6) The value of a refrigerator which was purchased 2 years ago, depreciates at 12% per annum. If its present value is Rs 9680, for how much was it purchased?

Solution:

Purchase price = $P\left(1 - \frac{R}{100}\right)^{-n}$

$\Rightarrow 9680\left(1 - \frac{12}{100}\right)^{-2}$

$= 9680(0.88)^{-2}$

$= 12,500$

Thus, the purchase price of the refrigerator was Rs 12,500.

Q7) The cost of a T.V. set was quoted Rs 17000 at the beginning of 1999. In the beginning of 2000 the price was hiked by 5%. Because of decrease in demand the cost was reduced by 4% in the beginning of 2001. What was the cost of the T.V. set in 2001?

Solution:

Cost of the TV = $P(1 + \frac{R}{100})(1 - \frac{R}{100})$

=> $17000(1 + \frac{5}{100})(1 - \frac{4}{100})$

= 17,000 (1.05) (0.96)

= 17,136

Thus, the cost of the TV in 2001 was Rs 17,136.

Q8) Ashish started the business with an initial investment of Rs 500000. In the first year he incurred a loss of 4%. However during the second year he earned a profit of 5% which in third year rose to 10%. Calculate the net profit for the entire period of 3 years.

Solution:

Profit for three years = $P(1 - \frac{R_1}{100})(1 + \frac{R_2}{100})(1 + \frac{R_3}{100})$

=> $500000(1 - \frac{4}{100})(1 + \frac{5}{100})(1 + \frac{10}{100})$

= 500,000 (0.96) (1.05) (1.10) = 554,400

Thus, the net profit is Rs 554,400.