RD SHARMA

Solutions

Class 8 Maths

Chapter 14

Ex 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 $A = P\left(1 + \frac{R}{100}\right)^n$ 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
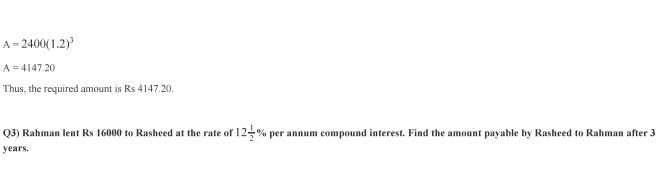
R = 20 % p.a

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

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

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

$A = 2400(1.2)^3$

$A = 4147.20$

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:

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

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

$A = 50000(1.175)^2$

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 = 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 = 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:

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

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

$A = 57600(1.0625)^3$

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:

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

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

$A = 64000(1.025)^3$

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:

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

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

$A = 8192(1.0625)^3$

$A = Rs\ 9826$

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:

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

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

$A = 15625(1.043)^3$

$A = Rs\ 17576$

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:

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

When compounded quarterly, we have:

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

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

$A = 16000(1.054)^4$

$A = Rs\ 19448.10$

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\left(1 + \frac{R_1}{100} \times 1 + \frac{R_2}{100}\right) = 12500\left(1 + \frac{15}{100} \times 1 + \frac{16}{100}\right) = 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 $= P\left(1 + \frac{R}{100}\right)^2 \times \left(1 + \frac{\frac{1}{4} \times R}{100}\right)$

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

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

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

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

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

$A = 125000(1.015)^3$

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

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

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

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.