

Compound Interest Ex 14.1

14. COMPOUND INTEREST

Exercise 14.1

1. Find the compound interest when principle = Rs. 3000, rate = 5% per annum and time = 2 years

Sol:- Principle for the first year = Rs. 3000.

$$\text{Interest for the first year} = \text{Rs.} \left[\frac{3000 \times 5 \times 1}{100} \right]$$

$$= \text{Rs. } 150.$$

$$\text{Amount at the end of first year} = \text{Rs. } 3000 + 150$$

$$= \text{Rs. } 3150/-$$

$$\text{Interest for the second year} = \text{Rs.} \left[\frac{3150 \times 5 \times 1}{100} \right]$$

$$= \text{Rs. } 157.50$$

$$\text{Principle for the second year} = \text{Rs. } 3150$$

$$\text{Amount at the end of the second year} = 3150 + 157.50$$

$$= \text{Rs. } 3307.50$$

$$\text{Compound Interest} = \text{Rs. } 3307.50 - 3000$$

$$= \text{Rs. } 307.50$$

- 2.) What will be the compound interest on Rs. 4000 for two years when rate of interest is 5% per annum

Sol:- Principle for the first year = Rs. 4000

$$\text{Interest for the first year} = \text{Rs.} \left[\frac{4000 \times 5 \times 1}{100} \right]$$

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

$$\begin{aligned}\text{Amount at the end of first year} &= \text{Rs. } 4000 + \text{Rs. } 200 \\ &= \text{Rs. } 4200.\end{aligned}$$

$$\begin{aligned}\text{Interest for the second year} &= \text{Rs. } \left[\frac{4200 \times 5 \times 1}{100} \right] \\ &= \text{Rs. } 210.\end{aligned}$$

$$\text{Principal for the second year} = 4200.$$

$$\begin{aligned}\text{Amount at the end of the second year} &= 4200 + 210 \\ &= \text{Rs. } 4410.\end{aligned}$$

$$\begin{aligned}\text{Compound interest} &= 4410 - 4000 \\ &= \text{Rs. } 410\end{aligned}$$

3) 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?

$$\text{sol: Principal for the first year} = \text{Rs. } 8000.$$

$$\begin{aligned}\text{Interest for the first year} &= \text{Rs. } \left[\frac{8000 \times 15 \times 1}{100} \right] \\ &= \text{Rs. } 1200.\end{aligned}$$

$$\begin{aligned}\text{Amount at the end of the first year} &= 8000 + 1200 \\ &= \text{Rs. } 9200.\end{aligned}$$

$$\begin{aligned}\text{Interest for the second year} &= \text{Rs. } \left[\frac{9200 \times 15 \times 1}{100} \right] \\ &= \text{Rs. } 1380.\end{aligned}$$

$$\begin{aligned}\text{Principal for the second year} &= 9200 + 1380 \\ &= \text{Rs. } 10580.\end{aligned}$$

$$\begin{aligned}\text{Amount at the end of Second year} &= 10580 + 1380 \\ &= 10580,\end{aligned}$$

$$\begin{aligned}\text{Interest for the third year} &= \text{Rs. } \left[\frac{10580 \times 15 \times 1}{100} \right] \\ &= \text{Rs. } 1587.\end{aligned}$$

$$\begin{aligned}\text{Amount at the end of the third year} &= 10580 + 1587 \\ &= \text{Rs. } 12167\end{aligned}$$

$$\begin{aligned}\text{Compound interest} &= 12167 - 8000 \\ &= \text{Rs. } 4167.00.\end{aligned}$$

vi). 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.

Sol:- We have,

$$\text{Rate of interest} = 8\% \text{ per annum} = 4\% \text{ per half year}$$

$$\text{Time} = 1\frac{1}{2} \text{ years} = 3 \text{ half years.}$$

$$\text{Original principal} = \text{Rs. } 1000$$

$$\begin{aligned}\text{Interest for the first half year} &= \text{Rs. } \left[\frac{1000 \times 4 \times 1}{100} \right] \\ &= \text{Rs. } 40\end{aligned}$$

$$\begin{aligned}\text{Amount at the end of first half year} &= 1000 + 40 \\ &= 1040\end{aligned}$$

$$\text{Principal for the second half year} = \text{Rs. } 1040$$

$$\begin{aligned}\text{Interest for the second half year} &= \text{Rs. } \left[\frac{1040 \times 4 \times 1}{100} \right] \\ &= 41.6\end{aligned}$$



Int Amount at the end of the second half year

$$= 1000 + 41.6$$

$$= \text{Rs. } 1081.6$$

Principal for the third half year = Rs. 1081.6

$$\text{Interest for third half year} = \text{Rs. } \left[\frac{1081.6 \times 4 \times 1}{100} \right]$$

$$= 43.264$$

Amount at the end of the third year = 1081.6 + 43.264

$$= 1124.864$$

Compound Interest = Amount - principal

$$= 1124.864 - 1000$$

$$= \text{Rs. } 124.864$$

5.) Find the compound interest on Rs. 16000 for one year at the rate of 20% per annum, if the interest is compounded quarterly.

Sol: Rate of interest = $\frac{20}{4} = 5\%$ per quarter.

Time = 1 year = 4 quarters.

Principal for the first ^{quarter} year = 16000

$$\text{Interest for the first } \text{quarter} \text{ year} = \text{Rs. } \left[\frac{16000 \times 5 \times 1}{100} \right]$$
$$= 8000.$$

Amount at the end of the first quarter

$$= 8000 + 16000$$



6.)

Swati took loan = Rs. 16000.

$$\text{rate} = 12\frac{1}{2}\% = \frac{25}{2}\%$$

$$\begin{aligned}\text{Interest for the first year} &= \text{Rs.} \left[\frac{16000 \times \frac{25}{2} \times 1}{100} \right] \\ &= \text{Rs. } 2000\end{aligned}$$

$$\begin{aligned}\text{Amount at the end of the first year} &= 16000 + 2000 \\ &= \text{Rs. } 18000.\end{aligned}$$

$$\text{Interest for the second year} = \text{Rs.} \left[\frac{18000 \times \frac{25}{2} \times 1}{100} \right]$$

$$\begin{aligned}\text{Amount at the end of the second year} &= \text{Rs. } 2250/- \\ &= 2250 + 18000 \\ &= \text{Rs. } 20250.\end{aligned}$$

$$\text{Principal for the third year} = \text{Rs. } 20250$$

$$\begin{aligned}\text{Interest for the third year} &= \text{Rs.} \left[\frac{20250 \times \frac{25}{2} \times 1}{100} \right] \\ &= \text{Rs. } 2531.25\end{aligned}$$

$$\begin{aligned}\text{Amount at the end of the third year} &= 2531.25 + 20250 \\ &= \text{Rs. } 22781.25\end{aligned}$$

$$\begin{aligned}\text{Compound Interest} &= \text{Amount} - \text{principal} \\ &= 22781.25 - 16000 \\ &= \text{Rs. } 6781.25\end{aligned}$$



$$= 168000$$

Principal for the second quarter = Rs. 168000.

$$\begin{aligned}\text{Interest for the second quarter} &= \text{Rs.} \left[\frac{168000 \times 5 \times 1}{100} \right] \\ &= \text{Rs.} 8400.\end{aligned}$$

$$\begin{aligned}\text{Amount at the end of the second quarter} \\ &= 8400 + 168000 \\ &= \text{Rs.} 176400\end{aligned}$$

Principal for the third quarter = Rs. 176400.

$$\begin{aligned}\text{Interest for the third quarter} &= \text{Rs.} \left[\frac{176400 \times 5 \times 1}{100} \right] \\ &= \text{Rs.} 8820\end{aligned}$$

$$\begin{aligned}\text{Amount at the end of the third quarter} \\ &= 176400 + 8820 \\ &= \text{Rs.} 185220.\end{aligned}$$

Principal for the ~~third~~ ^{fourth} quarter = Rs. 185220.

$$\begin{aligned}\text{Interest for the fourth quarter} &= \text{Rs.} \left[\frac{185220 \times 5 \times 1}{100} \right] \\ &= \text{Rs.} 9261\end{aligned}$$

$$\begin{aligned}\text{Amount at the end of fourth quarter} \\ &= 185220 + 9261 \\ &= \text{Rs.} 194481\end{aligned}$$

$$\begin{aligned}\text{Compound Interest} &= \text{Amount} - \text{Principal} \\ &= 194481 - 160000 \\ &= \text{Rs.} 34481\end{aligned}$$



7).

Roma borrowed a money (P) = Rs. 60000.

Time (T) = $1\frac{1}{2}$ years = 3 half yearsRate (R) = 10% = $\frac{10}{2}\%$ = 5% per half yearPrincipal for the first ^{half year} = Rs. 60000.Simple Interest for first half year = Rs. $\left[\frac{60000 \times 5 \times 1}{100}\right]$

= Rs. 3200

Amount at the end of the first ^{half year}

= 3200 + 60000

= 63200.

Interest for the second ^{half year} = Rs. $\left[\frac{63200 \times 5 \times 1}{100}\right]$

= 3360.

Amount at the end of the second year

= 3360 + 63200

= 70560.

Interest for the third half year = Rs. $\left[\frac{70560 \times 5 \times 1}{100}\right]$

= 3528.

Amount at the end of third half year

= 3528 + 70560

= Rs. 74088

Compound Interest = 74088 - 60000

= 14088.



8) A new car borrowed (P) = Rs. 20000.
rate (R) = 18%, T = 2 years
As per Simple Interest (S.I) = $\frac{PTR}{100}$
$$= \frac{20000 \times 2 \times 18}{100}$$
$$= \text{Rs. } 7200$$

As per compound interest,
Interest for 1st year = Rs. $\left[\frac{20000 \times 1 \times 18}{100} \right]$
$$= \text{Rs. } 3600$$

Amount at the end of the year = $3600 + 20000$
$$= 23600$$

Interest at the second year = Rs. $\left[\frac{23600 \times 1 \times 18}{100} \right]$
$$= \text{Rs. } 4248$$

Sum of the interest in both the years = $4248 + 3600$
$$= \text{Rs. } 7848$$

Gain after 2 years = $7848 - 7100$
$$= \text{Rs. } 648$$

9) Principal (P) = 8000/-
Time = 9 months = 3 quarters
Rate (R) = 20% = $\frac{20}{4}\%$ = 5%.



Simple interest for the first quarter year = $Rs. \left[\frac{8000 \times 1 \times 5}{100} \right]$
= Rs. 400/-

Amount at the end of the first quarter year
= 400 + 8000
= Rs. 8400

Interest for the second quarter year
= $Rs. \left[\frac{8400 \times 1 \times 5}{100} \right]$
= Rs. 420/-

Amount at the end of the 2nd quarter year
= 420 + 8400
= Rs. 8820/-

Interest for the third quarter = $Rs. \left[\frac{8820 \times 1 \times 5}{100} \right]$
= Rs. 441/-

Amount at the end of 3rd quarter year
= Rs. 441 + 8820
= Rs. ~~13261~~ 9261

Compound interest = Amount - principal
= 9261 - 8000
= Rs. 1261



10.

$$\text{rate } (R) = 10\%$$

$$\text{principal } (P) = 200/-$$

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

$$\text{for 2 years } \rightarrow = P \left(1 + \frac{10}{100}\right)^2$$

$$= P \left(1 + \frac{10}{100}\right)^2$$

$$= P \left(\frac{110}{100}\right)$$

$$S.I = 200 = \frac{85P}{100}$$

$$= \frac{8 \times P \times 2}{100}$$

$$P = \frac{200 \times 5}{8}$$

$$= 1250/-$$

$$A = 1250 \left(\frac{110}{100}\right)$$

$$\rightarrow \text{Rs. } 1375$$

$$\begin{aligned} \text{Compound Interest} &= A - P \\ &= 1375 - 1250 \\ &= \text{Rs. } 125 \end{aligned}$$

11.

$$\text{Principal } (P) = 60000/-$$

$$\text{Rate } (R) = 10\% = \frac{10}{4}\%$$

$$\text{Time} = 2 \text{ years} = 8 \text{ quarters}$$

$$\text{Simple Interest for 1st quarter year} = \text{Rs. } \left[\frac{60000 \times \frac{10}{4} \times 1}{100} \right]$$



$$= \text{Rs. } 1600$$

$$\begin{aligned}\text{Amount at the end of first quarter} \\ \text{year} &= 1600 + 64000 \\ &= 65600\end{aligned}$$

$$\begin{aligned}\text{Simple interest for the second quarter} \\ \text{year} &= \text{Rs.} \left[\frac{65600 \times \frac{10}{100} \times 1}{100} \right] \\ &= \text{Rs. } 1640 + 65600 \\ &= \text{Rs. } 67240\end{aligned}$$

$$\begin{aligned}\text{Simple interest for third quarter} \\ \text{year} &= \text{Rs.} \left[\frac{67240 \times \frac{10}{100} \times 1}{100} \right] \\ &= \text{Rs. } 1681\end{aligned}$$

$$\begin{aligned}\text{Amount at the end of the third} \\ \text{quarter} &= 1681 + 67240 \\ &= \text{Rs. } 68921\end{aligned}$$

$$\begin{aligned}\text{Simple interest for the fourth quarter} \\ \text{year} &= \text{Rs.} \left[\frac{68921 \times \frac{10}{100} \times 1}{100} \right] \\ &= \text{Rs. } 1422.025\end{aligned}$$

$$\begin{aligned}\text{Amount for the end of the fourth} \\ \text{quarter year} &= 1422.025 + 68921 \\ &= 70343.025\end{aligned}$$



$$\begin{aligned}\text{Compound Interest} &= \text{Amount} - \text{Principal} \\ &= 70644.025 - 60000 \\ &= 10644.025\end{aligned}$$

12). Ramesh deposited (P) = ₹500/-
Rate (R) = 12% per annum.
 $= \frac{12}{4}\% = 3\%$ per quarter
Time (t) = 9 months
 $= 3$ quarters

Simple Interest for the first quarter
Year = ₹. $\left[\frac{500 \times 1 \times 3}{100} \right]$
 $= ₹. 225$

Amount at the end of the first
quarter year = $500 + 225$
 $= ₹. 725$

Simple Interest for the second quarter
Year = ₹. $\left[\frac{725 \times 1 \times 3}{100} \right]$
 $= ₹. 231.75$

Amount at the end of the 2nd quarter
Year = $231.75 + 725 = ₹. 956.75$



Simple interest for third quarter
year = Rs. $\left[\frac{7956.75 \times 3 \times 1}{100} \right]$

$$= \text{Rs. } 238.7025$$

Amount at the end of the third
quarter = $238.7025 + 7956.75$
 $= 8195.4525$

13)

Principal (P) = 9600 /-

Rate (R) = $5\frac{1}{2}\%$ = $\frac{11}{2}\%$ per annum.

Time = 3 years

Simple interest for the first year

$$= \text{Rs. } \left[\frac{9600 \times \frac{11}{2} \times 1}{100} \right]$$

$$= \text{Rs. } 528$$

Amount at the end of the first year

$$= 9600 + 528$$

$$= \text{Rs. } 10128$$

Simple interest for the second year

$$= \text{Rs. } \left[\frac{10128 \times \frac{11}{2} \times 1}{100} \right]$$



$$= \text{Rs. } 557.04$$

Amount at the end of the second

$$\text{year} = 10128 + 557.04$$

$$= \text{Rs. } 10685.04$$

Simple Interest for the third year

$$= \text{Rs. } \left[\frac{10685.04 \times \frac{11}{2} \times 1}{100} \right]$$

$$= \text{Rs. } 587.6772$$

Amount at the end of the third

$$\text{year} = 10685.04 + 587.6772$$

$$= \text{Rs. } 11272.71$$

$$\text{Compound Interest} = 11272.71 - 9600$$

$$= \text{Rs. } 1672.7172$$

14). Surabhi borrowed money (P) = 12000/-

$$\text{rate (R)} = 5\% \text{ per annum.}$$

$$\text{time} = 3 \text{ years}$$

Simple Interest for first year

$$= \text{Rs. } \left[\frac{12000 \times 5 \times 1}{100} \right]$$

$$= \text{Rs. } 600$$

Amount at the end of the first year

$$= 12000 + 600$$

$$= \text{Rs. } 12600/-$$

Simple Interest for the second year

$$= \text{Rs. } \left[\frac{12600 \times 5 \times 1}{100} \right]$$

$$= \text{Rs. } 630$$

Amount at the end of the second year

$$= \text{Rs. } [12600 + 630] = \text{Rs. } 13230/-$$

Simple Interest for the third year

$$= \text{Rs. } \left[\frac{13230 \times 5 \times 1}{100} \right]$$

$$= \text{Rs. } 661.5$$

Amount at the end of the third year

$$= 661.5 + 13230$$

$$= \text{Rs. } 13891.5/-$$

Compound Interest = Amount - principal

$$= 13891.5 - 12000$$

$$= \text{Rs. } 1891.5$$



15). Dajit received money = Rs. 40000/-

Rate (R) = 7% per annum

Time (T) = 2 years

Simple interest for the first year

$$= \text{Rs.} \left[\frac{40000 \times 7 \times 1}{100} \right]$$

$$= \text{Rs.} 2800$$

Amount at the end of the first year

$$= 40000 + 2800$$

$$= \text{Rs.} 42800/-$$

Simple interest for the second year

$$= \text{Rs.} \left[\frac{42800 \times 7 \times 1}{100} \right]$$

$$= \text{Rs.} 2996/-$$

Amount at the end of the second year

$$= 2996 + 42800$$

$$= \text{Rs.} 45796$$

Compound interest = Amount - principal

$$= 45796 - 40000$$

$$= \text{Rs.} 5796/-$$

Amount after $\frac{9}{4}$ years = $8 \left(1 + \frac{16}{100} \right)^{\frac{9}{4}}$

$$= 15625 \left(1 + \frac{16}{100} \right)^{\frac{9}{4}}$$

$$= 15625 \times 1.3964$$

$$= \text{Rs.} 21819.786$$

18.)

Here $P = \text{Rs.} 125000$

Rate (R) = 6%

Time = $n = 4$ months = $\frac{4}{12}$ years = $\frac{1}{3}$ year

$$= \frac{1}{3} \text{ year}$$

Compound Interest Ex 14.2Exercise 14.2

1. calculate the amount and compound interest in each of the following.

i) Principal = Rs. 3000, Rate 5%, Time = 2 years
when the interest is compound annually is
given by $A = P \left(1 + \frac{R}{100}\right)^n$

Here $P = \text{Rs. } 3000$,
 $R = 5\% \text{ per annum}$, $n = 2$.

$$\begin{aligned}\text{Amount 'A' after 2 years} &= P \left(1 + \frac{R}{100}\right)^n \\ &= 3000 \left(1 + \frac{5}{100}\right)^2 \\ &= 3000 \left(\frac{21}{20}\right)^2 \\ &= 3000 \times 1.1025 \\ &= \text{Rs. } 3307.5\end{aligned}$$

$$\begin{aligned}\text{Compound Interest} &= A - P \\ &= 3307.50 - 3000 \\ \text{C.I.} &= \text{Rs. } 307.50\end{aligned}$$

ii) Principal = Rs. 3000, Rate = 8%, Time = 2 years

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

$$P = 3000, R = 8\%, n = 2.$$



$$\text{Amount 'A' after 't' years} = P \left(1 + \frac{R}{100}\right)^t$$

$$= 3000 \left(1 + \frac{18}{100}\right)^2$$

$$= 3000 \times 1.3924$$

$$A = \text{Rs. } 4177.20$$

$$\text{Compound interest} = A - P$$
$$= 4177.20 - 3000$$

$$\text{C.I.} = \text{Rs. } 1177.20$$

iii) principal = Rs. 5000, rate = 10% per annum
per annum, time = 2 years

Sol. When the interest is compounded annually
is given by $A = P \left(1 + \frac{R}{100}\right)^t$

$$\text{Here } P = \text{Rs. } 5000, R = 10\%$$

$$t = 2$$

$$\text{Amount 'A' after 2 years} = P \left(1 + \frac{R}{100}\right)^t$$

$$= 5000 \times \left(1 + \frac{10}{100}\right)^2$$

$$= 5000 \times \left(\frac{11}{10}\right)^2$$

$$= 5000 \times 1.21$$

$$= \text{Rs. } 6050$$



$$\begin{aligned}\text{Compound Interest} &= A - P \\ &= 6050 - 5000 \\ &= \text{Rs. } 1050/-\end{aligned}$$

iv) Principal = Rs. 2000, Rate = 4% per annum
per annum, time = 3 years

Sol: When the interest is compounded annually
is given by $A = P \left(1 + \frac{R}{100}\right)^n$

Here $P = 2000$, $n = 3$, $R = 4\%$.

Amount after 3 years = $P \left(1 + \frac{R}{100}\right)^n$

$$= 2000 \times \left(1 + \frac{4}{100}\right)^3$$

$$= 2000 \times \left(\frac{26}{25}\right)^3$$

$$= 2000 \times 1.1248$$

$$= \text{Rs. } 2249.68$$

$$A = \text{Rs. } 2249.68$$

$$\begin{aligned}\text{Compound Interest} &= A - P \\ &= 2249.68 - 2000 \\ &= \text{Rs. } 249.68\end{aligned}$$



v) Principal = Rs. 12800, Rate $7\frac{1}{2}\%$ 2,

Sol:- When the interest is compounded annually
is given by $A = P \left(1 + \frac{R}{100}\right)^n$.

Here: $P = 12800$, $n = 3$, $R = 7\frac{1}{2}\%$.

$$\begin{aligned}\text{Amount 'A' after 3 years} &= P \left(1 + \frac{R}{100}\right)^3 \\ &= 12800 \left(1 + \frac{7.5}{100}\right)^3 \\ &= 12800 \times 1.2422\end{aligned}$$

$$= \text{Rs. } 15901.40$$

$$\begin{aligned}\text{Compound Interest} &= A - P \\ &= 15901.40 - 12800 \\ &= \text{Rs. } 3101.40\end{aligned}$$

vi) Principal = Rs. 10000, Rate 20% per annum
Compounded half yearly, time = 2 years

Sol:- Here, Principal $P = \text{Rs. } 10000$,
 $R = 20\%$ per annum
 $n = 2 \text{ years}$

$$\text{Amount after 2 years} = P \left(1 + \frac{R}{200}\right)^{2n}$$

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

$$= 10000 \left(1 + \frac{1}{10}\right)^4$$



$$= 10000 \left(\frac{11}{10} \right)^4$$

$$= 10000 \times 1.4641$$

$$= \text{Rs. } 14641$$

$$\begin{aligned}\text{Compound Interest} &= A - P \\ &= 14641 - 10000 \\ &= \text{Rs. } 4641\end{aligned}$$

vii) Principal = Rs. 160000, Rate = 10% per annum compounded half yearly, Time = 2 years.

Sol:- Here Principal (P) = Rs. 160000
R = 10%
n = 2 years.

$$\begin{aligned}\text{Amount after 2 years} &= P \left(1 + \frac{R}{200} \right)^{2n} \\ &= 160000 \left(1 + \frac{10}{200} \right)^4\end{aligned}$$

$$= 160000 \left(\frac{21}{20} \right)^4$$

$$= 160000 \times 1.2167$$

$$= \text{Rs. } 194672$$

$$\begin{aligned}\text{Compound Interest} &= A - P \\ &= 194672 - 160000 \\ &= \text{Rs. } 34672\end{aligned}$$

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

Sol:- Principal (P) = 2400 $n = 3$
Rate (R) = 20%.

When the interest is computed annually is

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

Amount A after 3 years = $P \left(1 + \frac{R}{100}\right)^3$

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

$$= 2400 \left(\frac{6}{5}\right)^3$$

$$= 24000 \times 1.728$$

$$= \text{Rs } 41472$$

- 3). 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.

Sol:- Principal (P) = Rs 16000
Rate (R) = $12\frac{1}{2}\% = \frac{25}{2}\%$
 $n = 3$



When the interest is computed annually is
given by $A = P \left(1 + \frac{R}{100}\right)^n$.

$$\begin{aligned}\text{Amount } A \text{ after 3 years} &= P \left(1 + \frac{R}{100}\right)^3 \\ &= 16000 \left(1 + \frac{12.5}{100}\right)^3 \\ &= 16000 \times 1.4138 \\ &= \text{Rs. } 22621.25\end{aligned}$$

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

Sol:-
Principal (P) = 1000.
Rate (R) = 10%.
n = 2 years.

When the interest is computed annually is
given by $A = P \left(1 + \frac{R}{100}\right)^n$

$$\begin{aligned}\text{Amount } A \text{ after 2 years} &= P \left(1 + \frac{R}{100}\right)^2 \\ &= 1000 \left(1 + \frac{10}{100}\right)^2 \\ &= 1000 \times \left(\frac{11}{10}\right)^2 \\ &= 1000 \times 1.21 \\ &= \text{Rs. } 1210.\end{aligned}$$



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

Sol:- Principal (P) = 50,000. $n = 2$ years
Rate (R) = 10%.

When the interest is computed annually is given by $A = P \left(1 + \frac{R}{100}\right)^n$

$$\begin{aligned}\text{Amount } A \text{ after 2 years} &= P \left(1 + \frac{R}{100}\right)^2 \\ &= 50,000 \left(1 + \frac{10}{100}\right)^2 \\ &= 50,000 \left(\frac{11}{10}\right)^2 \\ &= 50,000 \times 1.21 \\ &= \text{Rs. } 60500\end{aligned}$$

$$\begin{aligned}\text{Compound interest} &= A - P \\ &= 60500 - 50000 \\ &= \text{Rs. } 10500.\end{aligned}$$

$$\begin{aligned}\text{Simple interest} &= \frac{P \times R}{100} \\ &= \frac{50000 \times 2 \times 10}{100} \\ &= 10000\end{aligned}$$

The difference between Compound interest and

$$\begin{aligned}\text{Simple interest} &= 10500 - 10000 \\ &= \text{Rs. } 500\end{aligned}$$



6). 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?

Sol:

$$\text{Principal (P)} = \text{Rs. } 16000.$$

$$\text{Rate (R)} = 17\frac{1}{2}\% = \frac{35}{2}\%.$$

$$n = 2 \text{ years.}$$

When the interest is compounded annually is given by $A = P \left(1 + \frac{R}{100}\right)^n$.

$$\text{Amount A after 2 years} = P \left(1 + \frac{R}{100}\right)^2$$

$$= 16000 \left(1 + \frac{35}{2 \times 100}\right)^2$$

$$= 16000 \times 1.380$$

$$= \text{Rs. } 22090.$$

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

$$= 22090 - 16000$$

$$= \text{Rs. } 6090$$

$$\text{Simple interest} = \frac{PTR}{100} = \frac{16000 \times 2 \times 17\frac{1}{2}}{100}$$

$$= \text{Rs. } 5600$$

He gains at the end of 2 years is =



6). 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?

Sol:

$$\text{Principal (P)} = \text{Rs. } 16000.$$

$$\text{Rate (R)} = 17\frac{1}{2}\% = \frac{35}{2}\%.$$

$$n = 2 \text{ years.}$$

When the interest is compounded annually is given by $A = P \left(1 + \frac{R}{100}\right)^n$.

$$\text{Amount A after 2 years} = P \left(1 + \frac{R}{100}\right)^2$$

$$= 16000 \left(1 + \frac{35}{2 \times 100}\right)^2$$

$$= 16000 \times 1.380$$

$$= \text{Rs. } 22090.$$

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

$$= 22090 - 16000$$

$$= \text{Rs. } 6090$$

$$\text{Simple interest} = \frac{PTR}{100} = \frac{16000 \times 2 \times 17\frac{1}{2}}{100}$$

$$= \text{Rs. } 5600$$

He gains at the end of 2 years is =



$$\begin{aligned}\text{Amount after 18 months} &= P \left(1 + \frac{R}{200}\right)^n \\ &= 8000 \left(1 + \frac{19}{200}\right)^{1.5} \\ &= 8000 \left(\frac{21}{20}\right)^3 \\ &= 8000 \times 1.1578 \\ &= \text{Rs. } 9261\end{aligned}$$

$$\begin{aligned}\text{Compounded interest} &= A - P \\ &= 9261 - 8000 \\ &= \text{Rs. } 1261\end{aligned}$$

q). 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 $1\frac{1}{2}$ year if the interest is calculated half yearly?

Sol:-

$$\begin{aligned}\text{Principal (P)} &= \text{Rs. } 57600 \\ \text{Rate (R)} &= 12\frac{1}{2}\% \\ &= \frac{25}{2}\% \text{ per annum} \\ \text{Time } n &= 1\frac{1}{2} \text{ year} = \frac{3}{2} \text{ year.}\end{aligned}$$

$$\text{Amount after } \frac{3}{2} \text{ year} = P \left(1 + \frac{R}{200}\right)^n$$



$$\begin{aligned} &= 57600 \left(1 + \frac{25}{2 \times 200}\right)^{2 \times \frac{3}{2}} \\ &= 57600 \times 1.1994 \\ &= \text{Rs. } 69089.06 \end{aligned}$$

10). cost of the house (P) = 60000.

Rate of interest (R) = 5% per annum.

Time = n = $1\frac{1}{2}$ years = $\frac{3}{2}$ years

Amount after one year and half.

$$\begin{aligned} &= P \left(1 + \frac{R}{200}\right)^{2n} \\ &= 60000 \left(1 + \frac{5}{200}\right)^{2 \times \frac{3}{2}} \\ &= 60000 \left(\frac{41}{40}\right)^3 \end{aligned}$$

$$\begin{aligned} &= 60000 \times 1.0976 \\ &= \text{Rs. } 65921. \end{aligned}$$

Compound interest = A - P

$$= 65921 - 60000$$

$$= \text{Rs. } 4921.$$

11.)

Principal (P) = 100000

Rate (R) = 20% per annum

n = 2 years



$$\begin{aligned}\text{Amount after 2 years} &= P \left(1 + \frac{R}{100}\right)^2 \\ &= 245760 \left(1 + \frac{12.5}{100}\right)^2 \\ &= 245760 (1.2656) \\ &= \text{Rs. } 311040\end{aligned}$$

But compounded half yearly, then

$$\begin{aligned}\text{Amount after 2 years} &= P \left(1 + \frac{R}{200}\right)^{2n} \\ &= 245760 \left(1 + \frac{12.5}{200}\right)^4 \\ &= 245760 (1.2744) \\ &= \text{Rs. } 313203.75.\end{aligned}$$

He gains after two years = Amount
in compound ^{half yearly} ~~annually~~ - Amount in ^{annually} ~~half yearly~~

$$\begin{aligned}&= 313203.75 - 311040 \\ &= \text{Rs. } 2163.75\end{aligned}$$

15.

$$\text{Investment (P)} = 8192$$

$$\text{Rate (R)} = 18\frac{1}{2}\% = \frac{37}{2}\% \text{ per annum}$$

$$\begin{aligned}\text{Time} &= 18 \text{ months} = \frac{18}{12} \text{ years.} \\ &= \frac{3}{2} \text{ years}\end{aligned}$$

Compounded half yearly,



$$\begin{aligned}\text{Amount after 2 years} &= P \left(1 + \frac{R}{200}\right)^{n \times \frac{3}{4}} \\ &= 8192 \left(1 + \frac{12.5}{200}\right)^{4 \times \frac{3}{4}} \\ &= 8192 \times 1.1994 \\ &= \text{Rs. } 9826.\end{aligned}$$

147. Here $P = \text{Rs. } 15625$
 $n = 9 \text{ months} = \frac{9}{12} \text{ years}$
 $= \frac{3}{4} \text{ years}$
 $R = 16\% \text{ per annum}$

$$\begin{aligned}\text{Amount after 9 months} &= P \left(1 + \frac{R}{400}\right)^{4n} \\ &= 15625 \left(1 + \frac{16}{400}\right)^{4 \times \frac{3}{4}} \\ &= 15625 \times 1.1248 \\ &= \text{Rs. } 17576.\end{aligned}$$

$$\begin{aligned}\text{Compound Interest} &= A - P \\ &= 17576 - 15625 \\ &= \text{Rs. } 1951\end{aligned}$$



15).

Here

Pekha deposited (P) = 16000.

Rate (R) = 20% per annum

 $n = 1$ year.

Compounded quarterly,

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

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

$$= 16000 \times \left(\frac{21}{20}\right)^4$$

$$= 16000 \times 1.2155$$

$$= 19448.1$$

Compound Interest = $A - P$

$$= 19448.1 - 16000$$

$$= 3448.10$$

16)

Here

$$P = ₹.12500$$

$$n = 1 \text{ year}$$

Rate of Interest is 15% per first year

$$R = 15\%, \quad n = 1 \text{ year}$$



$$\begin{aligned}\text{Amount after 2 year} &= P \left(1 + \frac{R}{100}\right)^n \\ &= 12500 \left(1 + \frac{15}{100}\right)^1 \\ &= 12500 \times 1.15 \\ &= \text{Rs. } 14375.\end{aligned}$$

This amount principal for the second year = 14375,
Rate (R) = 16%.

$$\begin{aligned}\text{Amount after 1 year} &= P \left(1 + \frac{R}{100}\right)^n \\ &= 14375 \left(1 + \frac{16}{100}\right)^1 \\ &= 14375 \times 1.16 \\ &= \text{Rs. } 16675.\end{aligned}$$

17)

Here

$$P = \text{Rs. } 15625$$

Rate of interest (R) = 16% per annum

$$\begin{aligned}\text{Time} = n &= 2\frac{1}{4} \text{ years} \\ &= \frac{9}{4} \text{ years}\end{aligned}$$

Compounded annually,



Compound Interest Ex 14.3

Exercise 14.3

1)

Compound Interest = ₹164

Rate (R) = 5% per annum

n = 2 years

$$\text{Compound Interest} = A - P = 164$$

$$\Rightarrow P \left(1 + \frac{R}{100}\right)^n - P = 164$$

$$\Rightarrow P \left(1 + \frac{5}{100}\right)^2 - P = 164$$

$$\Rightarrow P \left(\frac{21}{20}\right)^2 - P = 164$$

$$P \left[\left(\frac{21}{20}\right)^2 - 1\right] = 164$$

$$P = \frac{164 \times 400}{41}$$

$$\text{Sum } P = \text{Rs. } 1600$$

2)

Here R = 10%, n = 2 years

Compound Interest = Rs. 210

Let the principal be Rs. 100 then

$$\text{Amount after 2 years} = \text{Rs. } \left[100 \times \left(1 + \frac{10}{100}\right)^2\right]$$

$$= 100 \times \left(\frac{11}{10}\right)^2$$

$$= \text{Rs. } 121$$



$$\begin{aligned}\text{Compound Interest} &= A - P \\ &= 121 - 100 \\ &= \text{Rs } 21\end{aligned}$$

Now,

$$\begin{aligned}\text{If compound interest is Rs } 21, \text{ principal} &= 100 \\ \text{If compound interest is Rs } 2, \text{ principal} &= \frac{100}{21} \\ \text{If compound interest is Rs } 210, & \\ \text{principal} &= \text{Rs.} \left[\frac{100}{21} \times 210 \right] \\ &= 1000\end{aligned}$$

3).

Here

$$\text{Amount (A)} = \text{Rs } 756.25$$

$$\text{Rate (R)} = 10\% \text{ per annum.}$$

$$n = 2 \text{ years}$$

Compounded annually,

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

$$\begin{aligned}756.25 &= P \left(1 + \frac{10}{100} \right)^2 \\ &= P \left(\frac{110}{100} \right)^2\end{aligned}$$

$$P = \frac{756.25}{1.21} = \text{Rs } 625$$



4).

$$\text{Amount (A)} = \text{Rs. } 4913.$$

$$n = 18 \text{ months} = \frac{18}{12} \text{ years} = \frac{3}{2} \text{ years}$$

$$R = 12\frac{1}{2}\% = \frac{25}{2}\% \text{ per annum}$$

Computed half yearly.

$$\text{Amount after 18 months} = P \left(1 + \frac{R}{200}\right)^{2n}$$

$$4913 = P \left(1 + \frac{12.5}{200}\right)^{2 \times \frac{3}{2}}$$

$$= P \times 1.1994$$

$$P = \frac{4913}{1.1994} = 4096.2147$$

$$P = \text{Rs. } 4096.21$$

5)

Here Rate (R) = 18% per annum.

$$n = 3 \text{ years}, \quad P = ?$$

$$\text{C.I.} - \text{S.I.} = \text{Rs. } 283.50$$

$$\text{Compound Interest} = P \left(1 + \frac{R}{100}\right)^n - P$$

$$= P \left(1 + \frac{18}{100}\right)^3 - P$$

$$\text{Simple Interest} = \frac{PTR}{100} = \frac{P \times 3 \times 18}{100}$$



$$C.I - S.I = 283.50$$

$$\Rightarrow P \left(1 + \frac{15}{100}\right)^3 - P - P \times 0.45 = 283.50$$

$$\Rightarrow 1.5208P - P - P \times 0.45 = 283.50$$

$$P [0.07] = 283.50$$

$$P = \text{Rs. } 4050.$$

6).

Here

R = 15% per annum

$$\text{Amount (C.I)} = 1290.$$

n = 2 years

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

$$1290 = P \left(1 + \frac{15}{100}\right)^2$$

$$P = \frac{1290}{1.3225} \quad \text{C.I} = A - P$$

$$C.I = P \left(1 + \frac{15}{100}\right)^2 - P$$

$$P = 1290 = P (1.3225) - P$$

$$1290 = P \times 0.3225$$

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

$$P = \text{Rs. } 4000.$$



7)

Here

$$\text{Compound interest} = \text{Rs } 163.20$$

$$\text{Rate (R)} = 4\% \text{ per annum}$$

$$\text{Sum (P)} = \text{Rs } 2000$$

$$\text{period (n)} = ?$$

$$\text{C.I.} = A - P$$

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

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

$$163.20 = 2000 (1.04)^n - 2000$$

$$163.20 = 2000 [(1.04)^n - 1]$$

$$0.0816 = (1.04)^n - 1$$

$$(1.04)^n = 1.0816$$

take log on both sides

$$\log_e (1.04)^n = \log_e (1.0816)$$

$$n \log_e (1.04) = \log_e (1.0816)$$

$$n = \frac{\log_e (1.0816)}{\log_e (1.04)}$$

$$n = \frac{0.0340}{0.0140}$$

$$n = 2 \text{ years}$$



8)

$$\text{Sum (P)} = 5000$$

$$\text{Amount (A)} = 6655$$

$$\text{Rate (R)} = 10\% \text{ per annum}$$

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

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

$$1.331 = \left(\frac{11}{10}\right)^n$$

$$1.331 = (1.1)^n$$

Take loge on both sides

$$\log_e(1.331) = \log_e(1.1)^n$$

$$\log_e(1.331) = n \log_e(1.1)$$

$$n = \frac{\log_e(1.331)}{\log_e(1.1)}$$

$$n = \frac{0.1241}{0.041}$$

$$n = 3 \text{ years}$$

9)

$$\text{Sum (P)} = 10000$$

$$\text{Amount (A)} = \text{Rs. } 1576.$$

$$\text{Rate (R)} = 8\% \text{ per annum}$$

Compounded half yearly



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

$$1576 = 4400 \left(1 + \frac{8}{100}\right)^{2n}$$

$$1.04 = \left(1 + \frac{8}{100}\right)^{2n}$$

$$1.04 = (1.08)^{2n}$$

taking loge on both sides

$$\log_e (1.04) = \log_e (1.08)^{2n}$$

$$\log_e (1.04) = 2n \log_e (1.08)$$

$$2n = \frac{\log_e (1.04)}{\log_e (1.08)}$$

$$n = \frac{1}{2} \text{ year}$$

10)

Here

$$S.I. - C.I. = Rs. 20$$

$$n = 2 \text{ years}$$

$$\text{Rate } (R) = 4\% \text{ per annum}$$

$$P = ?$$

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

$$= P \left[\left(1 + \frac{4}{100}\right)^2 - 1 \right]$$

$$S.I. = \frac{PTR}{100} = \frac{P \times 2 \times 4}{100}$$



$$0.08 \times P - P \times (1.04)^2 + P = 20$$

$$0.08P - 1.0816 \times P + P = 20$$

$$P [0.08 - 1.0816 + 1] = 20$$

$$P = \text{Rs. } 11500$$

11)

$$P = \text{Rs. } 1000$$

$$\text{Amount (A)} = \text{Rs. } 1331$$

$$R = 10\% \text{ per annum}$$

$$n = ?$$

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

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

$$1.331 = (1.1)^n$$

Taking loge on both sides

$$\log_e (1.331) = \log_e (1.1)^n$$

$$\log_e (1.331) = n \log_e (1.1)$$

$$n = \frac{\log_e (1.331)}{\log_e (1.1)}$$

$$n = \frac{0.1241}{0.0413}$$

$$n = 3 \text{ years}$$



12)

Here

$$P = \text{Rs. } 640$$

$$\text{Amount (A)} = \text{Rs. } 774.40/-$$

$$n = 2 \text{ years}$$

$$R = ?$$

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

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

$$1.21 = \left(1 + \frac{R}{100}\right)^2$$

$$1 + \frac{R}{100} = \sqrt{1.21} = 1.1$$

$$\frac{R}{100} = 1.1 - 1 = 0.1$$

$$R = 0.1 \times 100$$

$$R = 10\% \text{ per annum}$$

13)

Here

$$P = \text{Rs. } 2000$$

$$A = \text{Rs. } 2662$$

$$n = 1\frac{1}{2} \text{ year} = \frac{3}{2} \text{ years}$$

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

$$2662 = 2000 \left(1 + \frac{R}{100}\right)^{\frac{3}{2}}$$

$$1.331 = \left(1 + \frac{R}{100}\right)^3$$

$$1.1 = 1 + \frac{R}{100}$$



$$\Rightarrow \frac{R}{200} = 0.1$$

$$R = 0.1 \times 200$$

$$R = 20\% \text{ per annum.}$$

Q2)

$$\text{Simple Interest} = 200$$

$$\text{Compound Interest} = 210$$

$$n = 2 \text{ years}$$

$$S.I = \frac{P \times R}{100} \Rightarrow 200 = \frac{P \times R \times 2}{100}$$

$$P \times R = 10000 \quad \text{--- (1)}$$

$$C.I = P \left(1 + \frac{R}{100}\right)^n - P$$

$$210 = P \left(1 + \frac{R}{100}\right)^2 - P$$

$$210 = P \left(1 + \frac{R}{100} + \frac{R}{100}\right)$$

$$210 = 100 \left(\frac{R}{10} + \frac{1}{5}\right)$$

$$R = 10\%$$

from equation (1)

$$P \times R = 10000$$

$$P = \frac{10000}{10}$$

$$P = \text{Rs. } 1000$$



15)

Here

$$P = ₹2000$$

$$A = ₹5,2315.25 \quad ; \quad n = 1\frac{1}{2} = \frac{3}{2} \text{ years}$$

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

$$5215.25 = 2000 \left(1 + \frac{R}{100}\right)^{3/2}$$

$$1.1576 = \left(1 + \frac{R}{100}\right)^{3/2}$$

$$\left(1 + \frac{R}{100}\right) = 1.1025$$

$$\frac{R}{100} = 0.1025$$

$$R = 10.25\% \text{ per annum}$$

16)

Here

$$A = 2P$$

$$n = 3 \text{ years}$$

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

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

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

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

$$\text{Rate } (R) = 25.99\%$$



17).

Here, Given data is.

$$A = 4P$$

$$n = 2 \text{ years}$$

Interest is compounded half yearly

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

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

$$1.01142 = 1 + \frac{R}{200}$$

$$\frac{R}{200} = 0.01142$$

$$\text{Rate } (R) = 82.84\%$$

18).

Here

$$\text{Amount } (A) = \text{Rs. } 5832.$$

$$n = 2 \text{ years}$$

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

$$R = 8$$

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

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

$$5832 = P \times 1.1664$$

$$P = \frac{5832}{1.1664} = \text{Rs. } 5000.$$



17).

Here, Given data is

$$A = 4P$$

$$n = 2 \text{ years}$$

Interest is compounded half yearly

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

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

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

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

$$\text{Rate (R)} = 82.84\%$$

18).

Here

$$\text{Amount (A)} = \text{Rs. } 5832$$

$$n = 2 \text{ years}$$

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

$$R = 8$$

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

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

$$5832 = P \times 1.1664$$

$$P = \frac{5832}{1.1664} = \text{Rs } 5000$$



19.)

Here

$$C.I - S.I = Rs. 360$$

$$n = 2 \text{ years}$$

$$R = 7.5\% \text{ per annum}$$

$$\text{Sum } (P) = ?$$

$$C.I = P \left(1 + \frac{R}{100}\right)^n - P$$

$$= P \left(1 + \frac{7.5}{100}\right)^2 - P$$

$$C.I = 1.155P - P$$

$$S.I = \frac{PTR}{100} = \frac{P \times 2 \times 7.5}{100} = 0.15P$$

$$C.I - S.I = 360$$

$$1.155P - P - 0.15P = 360$$

$$P [1.155 - 1 - 0.15] = 360$$

$$P (5 \times 10^{-3}) = 360$$

$$P = Rs. 72000$$

20.)

Here

$$S.I - C.I = Rs. 46$$

$$R = 6\frac{2}{3}\% = \frac{20}{3}\% \text{ per annum}$$

$$n = 3 \text{ years}$$



$$C.I = P \left(1 + \frac{R}{100}\right)^n - P$$

$$= P \left(1 + \frac{20}{2 \times 100}\right)^3 - P$$

$$C.I = 1.2136P - P$$

$$S.I = \frac{P \times R}{100} = \frac{P \times 3 \times \frac{20}{2}}{100} = 0.2P$$

$$S.I - C.I = 0.2P - 1.2136P + P$$

$$46 = P(0.23 - 1.2136 + 1)$$

$$P = \text{Rs. } 3382$$

21).

Sum of money (P) = Rs. 12000

R = 5% per annum

Amount (A) = Rs. 13230

n = n years

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

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

$$1.1025 = (1.05)^n$$

taking loge on both sides

$$\log_e(1.1025) = \log_e(1.05)^n$$

$$= n \log_e(1.05)$$

$$n = \frac{\log_e(1.1025)}{\log_e(1.05)} = \frac{0.0413}{0.0211}$$

$$n = 2 \text{ years}$$



21).

Sum of money (P) = Rs. 4000

Compound Interest = Rs. 410.

 $n = 2 \text{ years}$ $R = ?$

$$C.I. = A - P$$

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

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

$$0.1025 = \left(1 + \frac{R}{100}\right)^2 - 1$$

$$\left(1 + \frac{R}{100}\right)^2 = (1.1025)^{1/2}$$
$$= 1.05$$

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

$$R = 5\%$$

Rate of Interest (R) = 5% per annum

22).

 $R = 2\% \text{ per annum}$ $n = 2 \text{ years}$

Amount (A) = Rs 10404

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

$$10404 = P \left(1 + \frac{2}{100}\right)^2$$



$$10000 = P(1.05)^n$$

$$P = 10000$$

24).

Have

$$P = \text{Rs. } 1600$$

$$A = \text{Rs. } 1852.20$$

$$\text{Rate (R)} = 5\% \text{ per annum}$$

$$n = ?$$

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

$$1852.20 = 1600 \left(1 + \frac{5}{100}\right)^n$$

$$1.1576 = (1.05)^n$$

taking log on both sides

$$\log_e(1.1576) = \log_e(1.05)^n$$

$$\log_e(1.1576) = n \log_e(1.05)$$

$$n = \frac{\log_e(1.1576)}{\log_e(1.05)}$$

$$= \frac{0.0635}{0.0211}$$

$$n = 3 \text{ years}$$



26)

Here $P = \text{Rs. } 1000$.

$$\text{Amount (A)} = 1102.50$$

$$n = 2 \text{ years}$$

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

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

$$1.1025 = \left(1 + \frac{R}{100}\right)^2$$

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

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

$$R = 5\% \text{ per annum}$$

26)

Compound interest = Rs. 378.

$$\text{Sum (P)} = \text{Rs. } 1800$$

$$\text{Rate (R)} = 10\% \text{ per annum}$$

$$\text{C.I.} = A - P = P \left(1 + \frac{R}{100}\right)^n - P$$

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

$$0.21 = \left(1 + \frac{10}{100}\right)^n - 1$$

$$1.21 = (1.1)^n$$

taking loge on both sides

then.



$$\log_e(1.21) = \log_e(1.1)^n$$

$$\log_e(1.21) = n \log_e(1.1)$$

$$n = \frac{\log_e(1.21)}{\log_e(1.1)}$$

$$n = \frac{0.0827}{0.041}$$

$$n = 2 \text{ years}$$

27).

$$\text{Amount (A)} = \text{Rs. } 45582.25$$

$$\text{Rate (R)} = 6\frac{3}{4}\% = \frac{27}{4}\% \text{ per annum}$$

$$n = 2 \text{ years}$$

$$P = ?$$

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

$$45582.25 = P \left(1 + \frac{27}{4 \times 100}\right)^2$$

$$= P \times 1.1395$$

$$P = \frac{45582.25}{1.1395}$$

$$P = \text{Rs. } 40,000/-$$



28)

$$\text{Amount (A)} = \text{Rs. } 453690/-$$

$$n = 2 \text{ years}$$

$$\text{rate (R)} = 6.5\% \text{ per annum}$$

$$P = ?$$

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

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

$$= 1.134225 \times P$$

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

$$P = \text{Rs. } 4,00,000/-$$

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