5. Money Maths

Questions Pg-90

1. Question

Sandeep deposited 25000 rupees in a bank which pays 8% interest compounded annually. How much would he get back after two years?

Answer

In simple interest, interest charge on investment or principal money.

In Compound Interest, Interest charge on principal + Accumulated Interest.

Balance after completing 1 years=Balance in the starting + interest after 1 years

For calculating Interest $=\text{balance} \times \frac{\text{rate}}{100}$

First Year's balance= 25000Rs

First Year' Interest = $25000 \times \frac{8}{100}$

= 2000

Now, balance after the first year= First Year's balance +First Year's Interest

= 25000+2000

= 27000Rs

Second Year's Balance= 27000Rs

Second Year's Interest= $27000 \times \frac{8}{100}$

= 2160Rs

Balance after the second year = Second Year's Balance + Second Year's Interest

= 27000+2160

= 29160Rs

In this question we were calculating compound interest, as I mention above interest charge on principal or investment. As you can see I am adding interest in principal value to calculate next year interest.

2. Question

Thomas took out a loan of 15000 rupees from a bank which charges 12% interest, compounded annually. After 2 years, he paid back 10000 rupees. To settle the loan, how much should he pay at the end of three years?

Answer

This Problem is quite similar to the previous one, we will use the same Formula as we used in the previous one.

Balance after completing 1 years=Balance in the starting + interest after 1 years

For calculating Interest $=\text{balance} \times \frac{\text{rate}}{100}$

First Year's balance= 15000Rs

First Year' Interest = $15000 \times \frac{12}{100}$

= 1800

Now, balance after the first year = First Year's balance +First Year's Interest

= 15000+1800

= 16800Rs

Second Year's Balance= 16800Rs

Second Year's Interest= $16800 \times \frac{12}{100}$

= 2016Rs

Balance after the second year = Second Year's Balance + Second Year's Interest

= 16800+2016

= 18816Rs After Paying back 10000, Remaining Balance= 18816-10000

= 8816

Interest on remaining balance = $8816 \times \frac{12}{100}$

= 1057.2

Amount Required to settle down the load= 8816+1057.

= 9873.2Rs

3. Question

The simple interest at 5% got for a certain amount after 2 years is 200 rupees. If interest is compounded annually, what would be the interest for same amount at the same rate after 2 years

Answer

Simple Interest=$\text{investment} \times \text{rate} \frac{n}{100}$(n=number of years)

SI= $200 \times 5 \times \frac{2}{100}$

= 20

Amount after 2 years = 200+20

=220

For calculating Interest =$\text{balance} \times \frac{\text{rate}}{100}$

First Year's balance= 200Rs

First Year' Interest = $200 \times \frac{5}{100}$

= 200

Now, balance after the first year= First Year's balance +First Year's Interest

= 200+10

= 210Rs

Second Year's Balance= 210Rs

Second Year's Interest= $210 \times \frac{5}{100}$

= 10.5Rs

Balance after the second year = Second Year's Balance + Second Year's Interest

= 210+10.5

= 220.5Rs

Questions Pg-92

1. Question

Anas deposited 20000 rupees in a bank which pays 6% interest compounded annually. How much would he get back after 3 years?

Answer

Now, we are using the formula to calculate the same.

Amount after n year = investment + CI after n years

= investment $(1+\frac{\text{rate}}{100})^{n}$

Here, investment = 20000Rs,

rate=6%,

n=3years

Amount after n year = $20000(1+\frac{6}{100})^{3}$

= 23820.32Rs

2. Question

Diya deposited 8000 rupees in a bank, which gives 10% interest compounded annually. After 2 years, she withdraws 5000 rupees. After one more year, how much would she have in her account?

Answer

Amount after 2 years = investment(1+$(\frac{\text{rate}}{100})^{n}$

= 8000(1+($^{10}/_{100}$))^{2}

= 10648Rs

She withdraws 5000Rs, Now Remaining Balance= 10648-5000

= 5648Rs

After withdrawing the money, the principal money= 5648

Now, Amount After a year = 5648(1+10/100)^{1}

(to calculate amount after a year, we can use previous formula).

= 6212.8Rs

3. Question

Varun took out a loan of 25000 rupees from a bank, which charges 11% interest compounded annually. He paid back 10000 rupees after 2 years. How much should be pay after one more year to settle the loan?

Answer

Investment = 25000 Rs, rate=11%

Varun Paid Back 10000 Rs after 2 years.

So we need to calculate Amount after 2 years.

Amount after 2 years = 25000(1+11/100)^{2}

= 30802.5 Rs

Varun paid back 10000 Rs

The principal balance will change.

Remaining balance = 30802.5-10000

= 20802.5 Rs

The Amount is 20802.5 Rs.

This amount will change because bank charges 11% interest compounded annually.

After a year amount paid by varun = $20802.5(1+11/100)^1$

= 23090.775

.775paisa is rounded to 1 Rupee. Less than .5 are ignored.

=23091 Rs

Questions Pg-93

1. Question

Arun deposited 5000 rupees in a bank which compounds interest half yearly and Mohan deposited the same amount in another bank which compounds interest quarterly. The annual rate of interest is 6% at both the banks. How much more would Mohan get after one year?

Answer

Investment = 5000 Rs

Arun deposited 5000 Rs in a bank which compound interest half yearly.

Annual rate = 6%

Since Interest is compounded half yearly, Interest has to be calculated twice a year

Half yearly rate = 6/2=3%

We need to figure out the period in which interest compounded.

Amount after a year= $5000(1+3/100)^2$

= 5304.5≈ 5305(.5paisa rounded to 1Rupee)

Mohan deposited 5000Rs in another bank which compounds interest quarterly.

Annual rate = 6%

Since Interest is compounded quarterly yearly, Interest has to be calculated four times a year.

Quarterly rate = 6/4 =1.5%

Amount after a year= $5000(1+1.5/100)^4$

= 5306.81 ≈ 5307(.81rounded to 1rupee)

The more amount Mohan would get = 5307-5305 = 2 Rs

2. Question

A person took out a loan of 16,000 rupees from a bank which charges interest compounded quarterly. The annual rate of interest is 10%. How much should he pay back after 9 months to settle the loan?

Answer

Investment = 16000 Rs

Annual rate = 10%

Since Interest is compounded quarterly yearly, Interest has to be calculated four times a year.

Quarterly rate = 10/4=2.5%

Amount after 9 months = $16000(1+2.5/100)^3$

= 17230.25 Rs

3. Question

Manu deposited 15,000 rupees in a financial establishment which pays interest compounded every 3 months, at 8% annual rate. How much would he get back after one year?

Answer

Investment = 15000Rs

Annual rate = 10%

Interest compounded in every 3 months. Interest compounded quarterly yearly.

Since Interest is compounded quarterly yearly, Interest has to be calculated four times a year.

Quarterly rate = 8/4=2%

Amount after a year= $15000\left(1+\frac{2}{100}\right)^4$

= 16236.4824≈16236

(.48<.5 ignored)

4. Question

John deposited 2500 rupees on the first of January in a bank where interest is compounded half-yearly at 6% annual rate. On the first of July, he deposits 2500 rupees more. How much would he have in his account at the end of the year?

Answer

Investment = 2500Rs

Annual rate = 6%

Since Interest is compounded half yearly, Interest has to be calculated twice a year

Half yearly rate = 3%

Amount after a year= $5000\left(1+\frac{3}{100}\right)^2$

= 2652.25≈ 2652(.25<.5 ignored)

5. Question

Ramlat deposits 30000 rupees in a financial establishment which pay interest at 9% annual rate, compounded every four months. How much would she get back after one year?

Answer

Investment = 30000 Rs

Annual rate = 9%

Since Interest is compounded in every four months, Interest has to be calculated thrice a year

Half yearly rate = 3%

Amount after a year= $30000\left(1+\frac{3}{100}\right)^3$

= 32781.81≈ 32782(.81paisa rounded to 1rupee)

Questions Pg-95

1. Question

A report estimates e-waste increasing by 15% every year and the e-waste in 2014 is about 9 crore tons.

What is the expected amount of e-waste in 2020?

Answer

E-waste in 2014 = 9 crore tons

Initial value = 9 crore to

Rate at which e waste increases every year=15%

It means every year the e waste increases by 15% to its value in that year.

In compound interest, interest charge on the principle and accumulated interest.

This is the same problem as we have solved previously.

E waste in 2020 = 9 crore tons$\left(1+\frac{15}{100}\right)^6$

= 20.8175 crore tons≈21 crore tons

2. Question

A TV manufacturer decreases the price of a particular model by 5% each year. The current price of this model is 8000 rupees. What would be the price after 2 years?

Answer

Initial Price = 8000 Rs

Rate at which price decreases every year = 5%

This is the similar problem as we have solved earlier.

Problem in which decreasing rate is given, actually formula is same that we have used earlier but sign of the rate is negative. Because it is decreasing the principle value will less than the previous year.

Price after two year $= 8000\left(1-\frac{5}{100}\right)^2$

= 7220 Rs

3. Question

Tiger is our National Animal. Their number decreases every year. Figures show 3% annual decrease. According to the census of National Tiger conservation Authority, there were 1700 tigers in India in 2011. If the trend continues, how many tigers would be there in 2016?

Answer

Tigers in 2011 = 1700

Rate at number of tigers decreases = 3%

Number of tigers in 2016 = $1700\left(1-\frac{3}{100}\right)^5$

= 1459.84≈ 1460