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Class 9 - ICSE
MATHEMATICS

Compound Interest (Without

Using Formula)

Daily Practice Problems

Solutions

Question 1:

Find the amount and the compound interest on ₹ 10000 at 15% per annum for 2 years. [Level: Easy]

Answer:

For 1st year

P=Rs10000

R=15%

T=1 year

I=$\frac{10000\times15\times1}{100}$=Rs 1500

Amount=Rs10000+Rs 1500

=Rs 11500

For 2nd year

P=Rs11500

R=15%

T=1 year
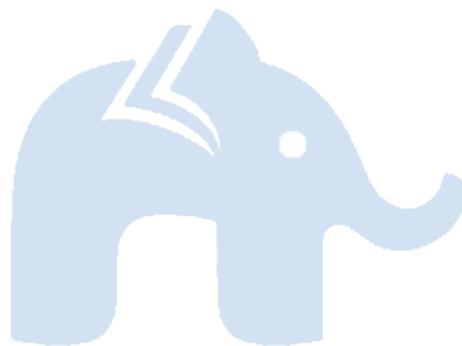
I=$\frac{11500\times15\times1}{100}$=Rs 1725

Amount=Rs11500+Rs 1725

=Rs 13225

Compound Interest = Final amount – Initial Principal

=Rs 13225-Rs 10000

=Rs 3225

Question 2

A certain sum amounts to Rs 4000 in two years and Rs 4800 in 3 years, interest being compounded annually, the rate of interest per annum is: [Level: Moderate]

Answer:

Amount in 2 years =Rs 4000

Amount in 3 years=Rs 4800

Difference = Rs 4800-Rs4000

=Rs 800

Rs 800 is the interest of 1 year on Rs 4000

Rate % = $\frac{800 \times 100}{4000 \times 1}$

=20%

Question 3:

Find the compound interest on Rs 10,000 at 10% per annum and in 1 year;

interest being compounded half-yearly. [Level: Moderate]

Answer:

For first six months

Sum (Principal)=Rs10,000

Rate of interest =10%

Time=$\frac{1}{2}$year

Interest = $\frac{10000 \times 10 \times 1}{100 \times 2}$

=Rs 500

Amount = Rs 10000+Rs 500

=Rs 10500

For second 6 months:

Principal = Rs10500

Rate of interest=10%

Time =$\frac{1}{2}$

Interest = $\frac{10500 \times 10 \times 1}{100 \times 2}$

=Rs 525

Amount=Rs 10500+Rs525

=Rs 11025

Question 4:

What is the difference between the compound interest and simple interest on

Rs 8000 at 16 per cent per annum and in 2 years? [Level: Difficult]

Answer:

For S.I.:

P=Rs 5000

R=10%

T=3years

Simple Interest $= \frac{5000 \times 10 \times 3}{100}$

=Rs 1500

Principal for 1st year=Rs 5000

Interest on it= $\frac{5000 \times 10 \times 1}{100}$

=Rs 500

Amount=Rs 5000+Rs 500

=Rs 5500

Principal for 2nd year=Rs 5500
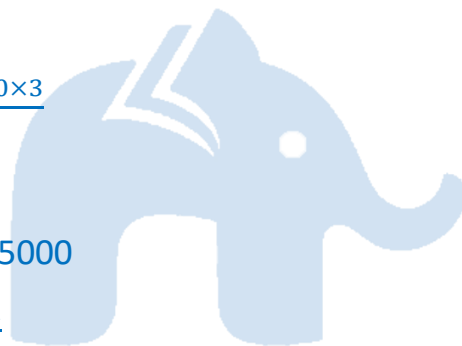
Interest on it = = $\frac{5500 \times 10 \times 1}{100}$

=Rs 550

Amount=Rs 5500+Rs 550

=Rs 6050

Principal for 3rd year=Rs 6050

Interest on it = = $\frac{6050 \times 10 \times 1}{100}$

=Rs 605

C.I for 3 years = Rs 500 +Rs 550+Rs 605

=Rs 1655

Required difference between C.I. and S.I.= Rs 1655 -Rs 1500

=Rs 155

Question 5:

Mrs. Smitha invested ₹ 5000 at a certain rate of interest, compounded annually for two years. At the end of first year, it amounts to ₹ 5500. Calculate

(i) the rate of interest.

(ii) the amount at the end of the second year, to the nearest rupee. [Level: Moderate]

Answer:

Difference between the C.I of two successive years=5500−5000=Rs 500

Time =1 year

Interest = $\frac{P \times T \times R}{100}$

∴Rate of interest= $\frac{I \times 100}{T \times P}$

=$\frac{500 \times 100}{1 \times 5000}$

=10%

Amount at the end of 2nd year = Amount at the end of 1st year +Interest on it for 1year

=5500+10% of 5500

=5500 + $\frac{10 \times 5500}{100}$

=5500+550

=Rs 6050

The amount at the end of second year to the nearest rupee is Rs 6050

Question 6:

Find the compound interest (CI) on Rs. 6,300 for 2 years at 10% per annum compounded annually. [Level: Easy]

Answer:

For 1st year

P=Rs6,300

R=10%

T=1 year

I=$\frac{6300 \times 10 \times 1}{100}$=Rs 630

Amount=Rs 6300+Rs 630

=Rs 6930

For 2nd year

P=Rs 6930

R=10%
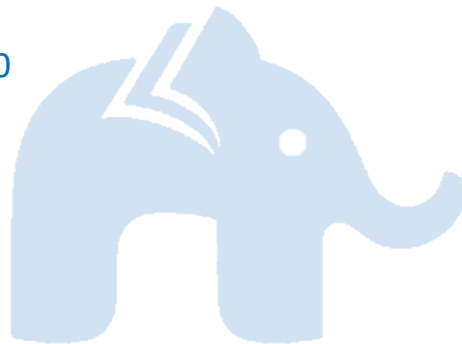
T=1year

I=$\frac{6930 \times 10 \times 1}{100}$

=Rs 693

Amount=Rs 6930+693

=Rs 7623

Compound Interest = Final amount – Initial Principal

=Rs 7623 – Rs 6300

=Rs 1323

Question 7:

Find the compound interest (CI) on Rs. 50,000 for 2 years at 20% per annum compounded half yearly. [Level: Easy]

Answer:

For 1st year

P=Rs 50,000

R=20%

$T=\frac{1}{2}$ years

$I=\frac{50000\times20\times1}{100\times2}$=Rs 5000

Amount=Rs 50000+Rs 5000

=Rs 55000

For 2nd year

P=Rs 55000

R=20%

$T=\frac{1}{2}$ years

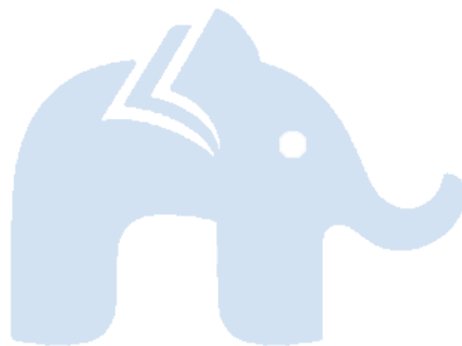$I=\frac{55000\times20\times1}{100\times2}$

=Rs 5500

Amount=Rs 55000+5500

=Rs 60500

Compound Interest = Final amount – Initial Principal

=Rs 60500– Rs 50000

=Rs 10500

Question 8:

Calculate the compound interest for the second year on ₹ 8000 for three years at 10% p.a. Also find the sum due at the end of third year. [Level: Moderate]

Answer:

For 1st year

P=Rs8000

R=10%

T=1 year

I=$\frac{8000 \times 10 \times 1}{100}$=Rs 800

Amount=Rs8000+Rs800

=Rs 8800

For 2nd year

P=Rs 8800

R=10%

T=1year

I=$\frac{8800 \times 10 \times 1}{100}$

=Rs 880

Amount= Rs 8800+Rs 880

=Rs 9680

For 3rd year

P=Rs 9680

R=10%

T=1year

I=$\frac{9680 \times 10 \times 1}{100}$

=Rs 968

Amount= Rs 9680+Rs 968

=Rs 10,648

Compound Interest for the second year = Rs 880

Amount at the end of third year = Rs 10,648
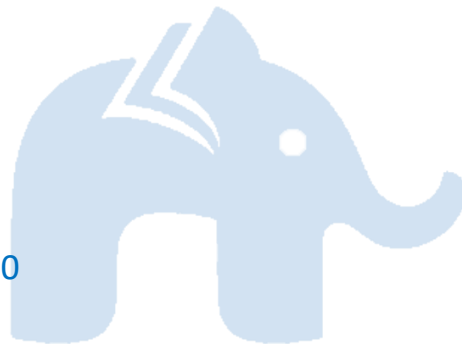
Question 9:

The simple interest on a sum of money for 3 years at 10% per annum is

₹ 3000. Find:

(i) the sum of money.

(ii) the compound interest on this sum for three years payable annually at the

same rate. [Level: Difficult]

Answer:

Given ,

I=Rs 3000

R=10%

T=3years

Simple Interest = $\frac{P \times T \times R}{100}$

I = $\frac{P \times T \times R}{100}$

P = $\frac{I \times 100}{R \times T}$

P = $\frac{3000 \times 100}{10 \times 3}$

=Rs 10,000

The sum of money is Rs 10000

For 1st year:

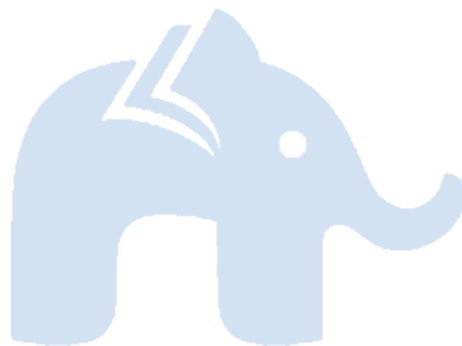Since, money deposited at the beginning of the year=Rs 10,000

Principal for 1st half year =Rs 10000

T=1 year

R = 10%

Interest= $\frac{10000 \times 10 \times 1}{100}$

=Rs 1000

Amount=Rs10000+Rs 1000

=Rs 11000

For 2nd year

Principal=Rs 11000

T=1 year

R = 10%

Interest=$\frac{11000 \times 10 \times 1}{100}$

=Rs 1100

Amount=Rs11000+Rs 1100

=Rs 12100

For 3rd year

Principal=Rs 12100

T=1 year

R = 10%

Interest=$\frac{12100 \times 10 \times 1}{100}$

=Rs 1210

Amount=Rs12100+Rs 1210

=Rs 13,310

Compound Interest = Final amount – Initial Principal

=Rs 13310 – Rs 10000

=Rs 3310
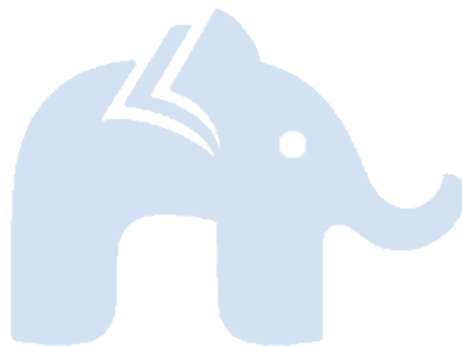
Question 10:

A certain sum of money is put at compound interest, compounded annually. If the interest for two successive years are Rs 1000 and Rs 1200, find the rate of interest. [Level: Easy]

Answer:

Difference between the C.I of two successive years=1200–1000=200

Time =1 year

Interest = $\frac{P \times T \times R}{100}$

∴Rate of interest= $\frac{I \times 100}{T \times P}$

= $\frac{200 \times 100}{1 \times 1000}$

=20%

Question 11:

Find the rate of interest if 10000 amounts to 12100 in 2 years? [Level: Easy]

Answer:

Given

Principal = Rs. 10000

Amount = Rs. 12100

Time = 2 years

Simple interest = Amount - Principal

= Rs. 12100 - Rs. 10000

= Rs. 2100

Now, using Simple interest formula

Simple interest = $\frac{P \times T \times R}{100}$

2100 = $\frac{10000 \times 2 \times R}{100}$

2100 = 100×2×R

2100 = 200R

2100/200 = R

10.5% = R

Therefore, the rate of interest = 10.5%

Question 12:

Find the ratio between simple interest and compound interest earned on sum

Rs 1000 at the rate of interest 20% for 2 years. [Level: Moderate]

Answer:

Principal=Rs1000

R=20%

T=2 years

Simple interest = $\frac{P \times T \times R}{100} = \frac{1000 \times 20 \times 2}{100}$ =Rs 400

For 1st year

P=Rs1000

R=20%

T=1 year

I=$\frac{1000 \times 20 \times 1}{100}$=Rs 200
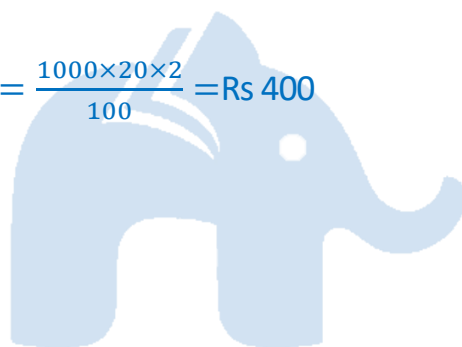
Amount=Rs1000+Rs 200

=Rs1200

For 2nd year

P=Rs1200

R=20%

T=1year

I=$\frac{1200 \times 20 \times 1}{100}$

=Rs 240

Compound Interest for 2 years = Rs 200 +Rs 240

=Rs 440

Required ratio = $\frac{Simple\ Interest}{Compound\ Interest}$

=$\frac{400}{440}$

=$\frac{10}{11}$

=10:11

Question 13:

A sum of money becomes Rs 22050 in 6 months at a rate of 20% per annum if the interest was compounded quarterly. Find the sum. [Level: Difficult]

Answer:

Let the sum (principal)=Rs100

For 1st quarter year

P=Rs100

R=20%

T=$\frac{1}{4}$ year

I=$\frac{100\times20\times1}{100\times4}$=Rs8

Amount=Rs100+Rs5

=Rs105

For 2nd quarter year

P=Rs105
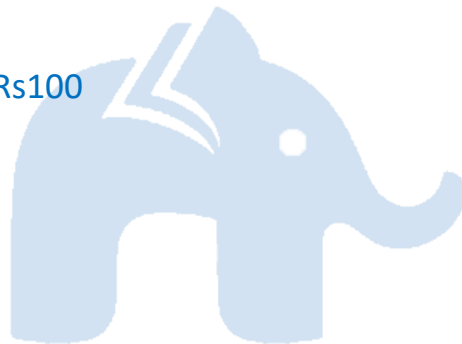
R=20%

T=$\frac{1}{4}$ year

I=$\frac{105\times20\times1}{100\times4}$

=Rs 5.25

Amount = Rs 105+Rs5.25

=Rs 110.25

When amount is Rs110.25, sum = Rs 100

Therefore, when the amount is Rs 22050, sum

$=\frac{100×22050}{110.25}$=Rs 20000

Question 14:

A sum of money becomes 11616 in 1 year at a rate of 16% per annum if the interest was compounded half yearly. Find the sum. [Level: Difficult]

Answer:

Let Principal(P)=Rs 100

For 1st half year

P=Rs100

R=16%

T=$\frac{1}{2}$ year

I=$\frac{100×16×1}{100×2}$=Rs 8

Amount=Rs100+Rs 8

=Rs108

For 2nd half year

P=Rs108

R=16%

T=$\frac{1}{2}$year

I=$\frac{108×16×1}{100×2}$

=Rs 8.16

Amount= Rs108+Rs 8.16

=Rs 116.16
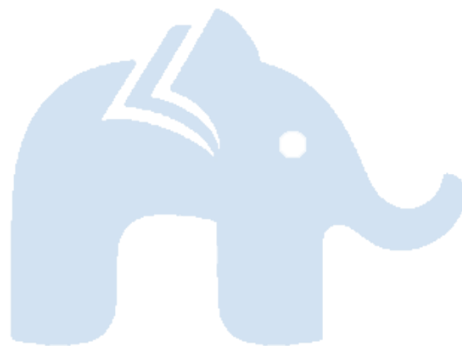
If amount is Rs 116.16 on a sum of Rs 100

Then, if amount is Re1, sum=Rs$\frac{100}{104.04}$

If amount is Rs 20808, sum=$\frac{100}{116.16} \times 11616$=Rs 10000

Question15:

Manu invests Rs 48,000 for 7 years at 10% per annum compound interest. Find the interest for first and second year. [Level: Moderate]

Answer:

For 1st year

P=Rs 48,000

R=10%

T=1 year

I=$\frac{48000 \times 10 \times 1}{100}$=Rs 4800

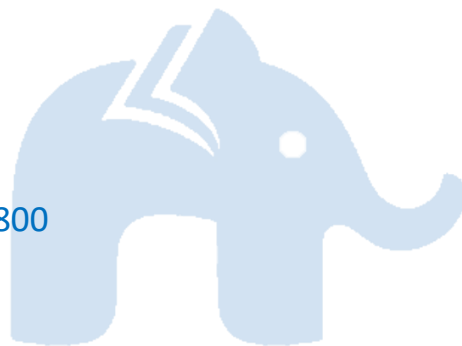Amount=Rs 48000+Rs 4800

=Rs 52800

For 2nd year

P=Rs 52800

R=10%

T=1year

I=$\frac{52800 \times 10 \times 1}{100}$

=Rs 5280

Therefore, interest for first year is Rs 4800 and interest for second year is Rs 5280

Question 16:

Mr. Ashok invested ₹ 10,000 at a certain rate of interest, compounded annually for two years. At the end of first year, it amounts to ₹ 10650. Calculate

(i) the rate of interest.

(ii) the amount at the end of the second year, to the nearest rupee. [Level: Difficult]

Answer:

Difference between the C.I of two successive years=10650−10000=Rs 650

Time =1 year
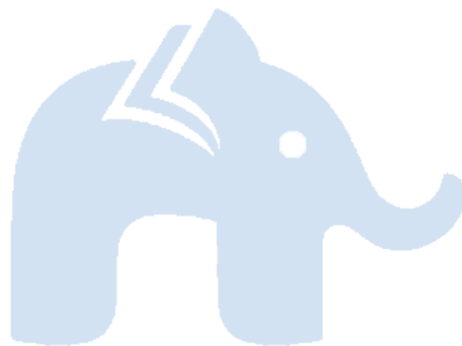
Interest = $\frac{P \times T \times R}{100}$

∴Rate of interest= $\frac{I \times 100}{T \times P}$

= $\frac{650 \times 100}{1 \times 10000}$

=6.5%

Amount at the end of 2nd year = Amount at the end of 1st year +Interest on it for 1year

=10650+6.5% of 10650

=10650 + $\frac{6.5 \times 10650}{100}$

=10650+692.25

=11342.25

The amount at the end of second year to the nearest rupee is Rs 11342

Question 17:

A certain sum of money is put at compound interest, compounded half yearly. If the interest for two successive half-years are Rs 1000 and Rs 1100, find the rate of interest. [Level: Moderate]

Answer:

Difference between the C.I of two successive half -years=Rs 1050−Rs 1000=Rs 50

Time =6 months =$\frac{1}{2}$years

Interest = $\frac{P \times T \times R}{100}$

∴Rate of interest= $\frac{I \times 100}{T \times P}$

=$\frac{50 \times 100}{\frac{1}{2} \times 1000}$

$\frac{50 \times 100 \times 2}{1000 \times 1}$

=10%

Question 18:

If S.I on a certain sum is Rs 2400 in 6 years; the S.I on the sum for 1 year will be _____. [Level: Easy]

Answer:

Simple interest on the sum for 6 years = Rs 2400

Therefore, the simple interest on the sum for 1 year = $\frac{Rs\ 2400}{6}$

=Rs 400

Question 19:

Find the sum on which the difference between the simple interest and the compound interest at the rate of 5% per annum compounded annually be Rs 32 in 2 years? [Level: Difficult]

Answer:

Let the sum (principal)=Rs100

R=5%

T=2 years

Simple interest = $\frac{P \times T \times R}{100} = \frac{100 \times 2 \times 5}{100}$ =Rs 10

For 1st year

P=Rs100

R=5%

T=1 year

I=$\frac{100 \times 5 \times 1}{100}$=Rs 5

Amount=Rs100+Rs5

=Rs105

For 2nd year

P=Rs105

R=5%

T=1year

I=$\frac{105 \times 5 \times 1}{100}$
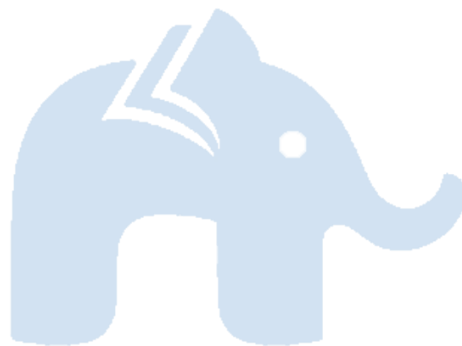
=Rs 5.25

Compound interest = Rs 5.25+Rs 5

=Rs 10.25

Difference of C.I. and S.I. = Rs 10.25-Rs 10

=Rs 0.25

When difference in interests is 0.25, sum = Rs 100

Therefore, when the difference is Rs 32, sum = $\frac{100 \times 32}{0.25}$

=Rs 12,800

Question 20:

A person invests ₹ 10000 for two years at a certain rate of interest, compounded annually. At the end of one year this sum amounts to ₹ 11200. Calculate the rate of interest per annum. [Level: Moderate]

 Answer:

Principal (P) = Rs 10,000

Period (T) = 1 year

Sum amount (A) = Rs 11,200

Rate of interest =?

(i)Interest (I) = 11200 – 10000 = ₹ 1200

Rate of interest

$R = \dfrac{I \times 100}{P \times T}$

Substituting the values

$R = \dfrac{1200 \times 100}{10000 \times 1}$

R = 12%

Therefore, the rate of interest per annum is 12%.

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