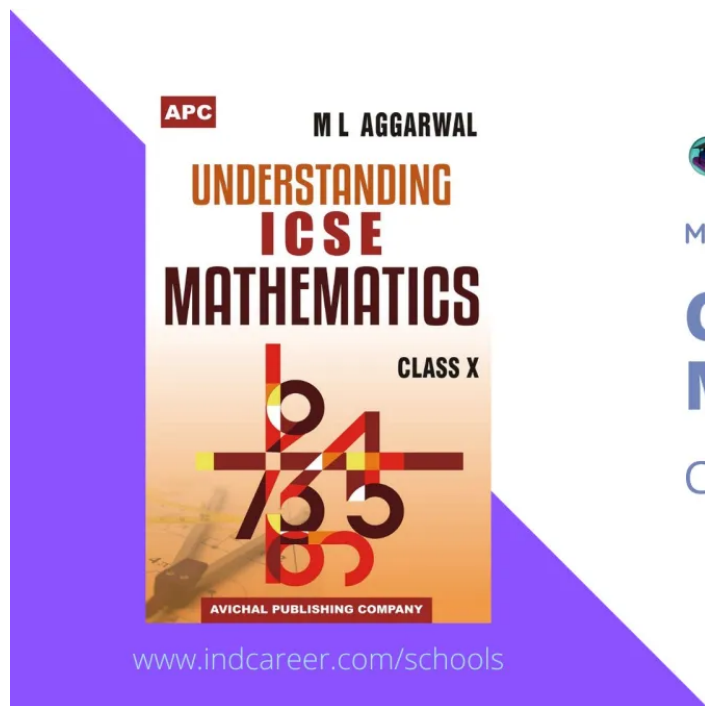


ML Aggarwal Solutions for Class 10 Maths Chapter 2- Banking



ML Agrawal Solutions

CLASS 10 MATHS

Chapter 2: Banking

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Chapter 2- Banking

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Exercise 2

1. Mrs. Goswami deposits ₹ 1000 every month in a recurring deposit account for 3 years at 8% interest per annum. Find the matured value.

Solution:

It is given that

Amount deposited by Mrs. Goswami = ₹ 1000

Rate of interest = 8% p.a.

Period (x) = 3 years = 36 months

We know that

Total principal for one month = $1000 \times [x(x + 1)] / 2$

Substituting the value of x

$$= 1000 \times (36 \times 37) / 2$$

By further calculation

$$= ₹ 666000$$

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$$\text{Interest} = \text{PRT} / 100$$

Substituting the values

$$= (666000 \times 8 \times 1) / (100 \times 12)$$

So we get

$$= ₹ 4440$$

$$\text{So the amount of maturity} = P \times x + \text{SI}$$

$$= 1000 \times 36 + 4440$$

$$= 36000 + 4440$$

$$= ₹ 40440$$

2. Sonia had a recurring deposit account in a bank and deposited ₹ 600 per month for 2 ½ years. If the rate of interest was 10% p.a., find the maturity value of this account.

Solution:

Its given that,

Amount deposited by Sonia per month = ₹ 600

Rate of interest (r) = 10% p.a.

Period (n) = 2 ½ years = 30 months

The interest earned during this period is calculated using the formula:

$$I = P \times [n(n + 1) / (2 \times 12)] \times r/100$$

$$I = 600 \times [30(30 + 1) / (2 \times 12)] \times 10/100$$

$$= 600 \times [(30 \times 31) / (2 \times 12)] \times 1/10$$

$$= 60 \times [(15 \times 31) / 12]$$

$$= 5 \times 15 \times 31$$

$$I = ₹ 2325$$

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$$\text{Maturity value (MV)} = P \times n + I$$

$$\text{MV} = ₹ (600 \times 30 + 2325)$$

$$= ₹ (18000 + 2325)$$

$$= ₹ 20325$$

Hence, the maturity value of Sonia's account will be ₹ 20325.

3. Kiran deposited ₹ 200 per month for 36 months in a bank's recurring deposit account. If the bank pays interest at the rate of 11% per annum, find the amount she gets on maturity?

Solution:

It is given that

Amount deposited by Kiran = ₹ 200

Rate of interest = 11% p.a.

Period (x) = 36 months

So the amount deposited in 36 months = $200 \times 36 = ₹ 7200$

We know that

Total principal for one month = $200 \times [x(x + 1)] / 2$

Substituting the value of x

$$= 200 \times (36 \times 37) / 2$$

By further calculation

$$= ₹ 133200$$

Interest = $PRT / 100$

Substituting the values

$$= (133200 \times 11 \times 1) / (100 \times 12)$$

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So we get

$$= ₹ 1221$$

So the amount of maturity = $P \times x + SI$

$$= 7200 + 1221$$

$$= ₹ 8421$$

4. Haneef has a cumulative bank account and deposits ₹ 600 per month for a period of 4 years. If he gets ₹ 5880 as interest at the time of maturity, find the rate of interest per annum.

Solution:

Interest at the time of maturity = ₹ 5880

Amount deposited by Haneef = ₹ 600

Period (x) = 4 years = 48 months

We know that

Total principal for one month = $600 \times [x(x + 1)] / 2$

Substituting the value of x

$$= 600 \times (48 \times 49) / 2$$

By further calculation

$$= ₹ 705600$$

Consider r% p.a. as the rate of interest

Interest = $PRT / 100$

Substituting the values

$$5880 = (705600 \times r \times 1) / (100 \times 12)$$

So we get

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$$5880 = 588r$$

By further calculation

$$r = 5880/588 = 10$$

Hence, the rate of interest = 10% p.a.

5. David opened a Recurring Deposit Account in a bank and deposited ₹ 300 per month for two years. If he received ₹ 7725 at the time of maturity, find the rate of interest per annum.

Solution:

It is given that

Amount deposited per month = ₹ 300

Period (x) = 2 years = 24 months

Amount received at the time of maturity = ₹ 7725

Consider R as the rate percent

We know that

Total principal for one month = $300 \times [x(x+1)]/2$

Substituting the value of x

$$= 300 \times (24 \times 25)/2$$

By further calculation

$$= ₹ 90000$$

Interest = $PRT/100$

Substituting the values

$$= (90000 \times R \times 1)/(100 \times 12)$$

So we get

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$$= 75R$$

So we get

$$300 \times 24 + 75R = 7725$$

By further calculation

$$7200 + 75R = 7725$$

$$75R = 7725 - 7200 = 525$$

$$R = 525/75 = 7$$

Hence, the rate of interest is 7% p.a.

6. Mr. Gupta opened a recurring deposit account in a bank. He deposited ₹ 2500 per month for two years. At the time of maturity he got ₹ 67500. Find:

(i) the total interest earned by Mr. Gupta.

(ii) the rate of interest per annum.

Solution:

It is given that

Amount deposited by Mr. Gupta per month = ₹ 2500

Period (x) = 2 years = 24 months

Amount got at the time of maturity = ₹ 67500

We know that

Total principal for one month = $2500 \times [x(x+1)]/2$

Substituting the value of x

$$= 2500 \times (24 \times 25)/2$$

By further calculation

$$= ₹ 750000$$

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Interest = Maturity value – $x \times$ deposit per month

Substituting the values

$$= 67500 - 24 \times 2500$$

$$= 67500 - 60000$$

$$= ₹ 7500$$

We know that

$$\text{Period} = 1 \text{ month} = 1/12 \text{ year}$$

$$\text{So the rate of interest} = (\text{SI} \times 100) / (\text{P} \times \text{T})$$

Substituting the values

$$= (7500 \times 100 \times 12) / (750000 \times 1)$$

$$= 12\%$$

7. Shahrukh opened a Recurring Deposit Account in a bank and deposited ₹ 800 per month for $1 \frac{1}{2}$ years. If he received ₹ 15084 at the time of maturity, find the rate of interest per annum.

Solution:

Amount deposited by Shahrukh per month = ₹ 800

We know that

$$\text{No. of months (n)} = 1 \frac{1}{2} = 3/2 \times 12 = 18 \text{ months}$$

We know that

$$\text{Total principal for one month} = 800 \times [x(x + 1)] / 2$$

Substituting the value of x

$$= 800 \times (18 \times 19) / 2$$

By further calculation

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$$= ₹ 136800$$

$$\text{Interest} = \text{PRT} / 100$$

Substituting the values

$$= (136800 \times r \times 1) / (100 \times 12)$$

So we get

$$= 114r$$

$$\text{So the amount of maturity} = P \times x + \text{SI}$$

$$15084 = 800 \times 18 + 114r$$

By further calculation

$$114r = 15084 - 14400$$

$$114r = 684$$

$$r = 684 / 114 = 6\%$$

Hence, the rate of interest per annum is 6%.

8. Rekha opened a recurring deposit account for 20 months. The rate of interest is 9% per annum and Rekha receives ₹ 441 as interest at the time of maturity. Find the amount Rekha deposited each month.

Solution:

Here,

The number of months Rekha deposited (n) = 20

Rate of interest per annum (r) = 9%

Let the amount deposited by Rekha each month be ₹ x, then $P = ₹ x$

Now, we know that

$$I = P \times [n(n + 1) / (2 \times 12)] \times r / 100$$

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$$= x \times [20(20 + 1)/ (2 \times 12)] \times 20/100$$

$$= x \times [20(21)/ (2 \times 12)] \times 1/5$$

$$= x \times [(5 \times 21)/6] \times 1/5$$

According to given,

$$441 = x \times [(5 \times 21)/6] \times 1/5$$

$$2205 = x \times [(5 \times 21)/6]$$

$$x = (2205 \times 6)/ (5 \times 21)$$

$$x = 126$$

Hence, the amount deposited by Rekha each month is ₹ 126.

9. Mohan has a recurring deposit account in a bank for 2 years at 6% p.a. simple interest. If he gets ₹ 1200 as interest at the time of maturity, find

(i) the monthly installment.

(ii) the amount of maturity.

Solution:

Interest at the time of maturity = ₹ 1200

Period (x) = 2 years = 24 months

Rate of interest = 6% p.a.

Consider ₹ P p.m. as the monthly deposit

We know that

$$\text{Interest} = P \times [x (x + 1)]/ (2 \times 12) \times r/100$$

Substituting the value of x

$$1200 = (P \times 24 \times 25)/ 24 \times 6/100$$

By further calculation

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$$1200 = 6/4P$$

By cross multiplication

$$P = (1200 \times 4) / 6 = 800$$

Here monthly deposit = ₹ 800

So the amount of maturity = $P \times x + SI$

$$= 800 \times 24 + 1200$$

$$= 19200 + 1200$$

$$= ₹ 20400$$

10. Mr. R. K. Nair gets ₹ 6455 at the end of one year at the rate of 14% per annum in a recurring deposit account. Find the monthly installment.

Solution:

Consider ₹ P as the monthly installment

Period (x) = 1 year = 12 months

We know that

Total principal for one month = $P \times [x(x+1)]/2$

Substituting the value of x

$$= P \times (12 \times 13) / 2$$

By further calculation

$$= 78P$$

Interest = $PRT / 100$

Substituting the values

$$= (78P \times 14 \times 1) / (100 \times 12)$$

So we get

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$$= 0.91P$$

So the amount of maturity = $P \times x + SI$

$$6455 = P \times 12 + 0.91P$$

$$6455 = 12.91P$$

By further calculation

$$P = 6455/12.91 = ₹ 500$$

11. Samita has a recurring deposit account in a bank of ₹ 2000 per month at the rate of 10% p.a. If she gets ₹ 83100 at the time of maturity, find the total time for which the account was held.

Solution:

Amount deposited in the account per month = ₹ 2000

Rate of interest = 10%

Consider period = n months

We know that

$$\text{Principal for one month} = 2000 \times n(n+1)/2 = 1000n(n+1)$$

$$\text{Interest} = [1000n(n+1) \times 10 \times 1]/[100 \times 12]$$

$$= [100n(n+1)]/12$$

$$\text{So the maturity value} = 2000 \times n + [100n(n+1)]/12$$

Substituting the values

$$2000n + [100n(n+1)]/12 = 83100$$

By further calculation

$$24000n + 100n^2 + 100n = 83100 \times 12$$

Dividing by 100

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$$240n + n^2 + n = 831 \times 12$$

$$n^2 + 241n - 9972 = 0$$

We can write it as

$$n^2 + 277n - 36n - 9972 = 0$$

$$n(n + 277) - 36(n + 277) = 0$$

$$(n + 277)(n - 36) = 0$$

$$\text{Here } n + 277 = 0$$

So we get

$$n = -277 \text{ which is not possible}$$

Similarly

$$n - 36 = 0 \text{ where } x = 36$$

So the period = 36 months or 3 years

Hence, the total time for which the account was held is 3 years.

Chapter Test

1. Mr. Dhruv deposits ₹ 600 per month in a recurring deposit account for 5 years at the rate of 10% per annum (simple interest). Find the amount he will receive at the time of maturity.

Solution:

It is given that

Amount deposited by Mr. Dhruv = ₹ 600

Rate of interest = 10% p.a.

Period (n) = 5 years = 60 months

We know that

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Total principal for one month = $600 \times n (n + 1) / 2$

Substituting the value of n

$$= 600 \times (60 \times 61) / 2$$

So we get

$$= ₹ 1098000$$

Here Interest = $PRT / 100$

Substituting the values

$$= (1098000 \times 10 \times 1) / (100 \times 12)$$

$$= ₹ 9150$$

So the amount of maturity = $600 \times 60 + 9150$

$$= 36000 + 9150$$

$$= ₹ 45150$$

2. Ankita started paying ₹ 400 per month in a 3 years recurring deposit. After six months her brother Anshul started paying ₹ 500 per month in a 2 ½ years recurring deposit. The bank paid 10% p.a. simple interest for both. At maturity who will get more money and by how much?

Solution:

Case 1 – Ankita

Amount deposited per month = ₹ 400

Period (n) = 3 years = 36 months

Rate of interest = 10%

We know that

Total principal for one month = $400 \times n (n + 1) / 2$

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Substituting the value of n

$$= 400 \times (36 \times 37) / 2$$

So we get

$$= ₹ 266400$$

Here Interest = $PRT / 100$

Substituting the values

$$= (266400 \times 10 \times 1) / (100 \times 12)$$

$$= ₹ 2220$$

So the amount of maturity = $400 \times 36 + 2220$

$$= 14400 + 2220$$

$$= ₹ 16620$$

Case 2 – Anshul

Amount deposited per month = ₹ 500

Period (n) = $2 \frac{1}{2}$ years = 30 months

Rate of interest = 10%

We know that

Total principal for one month = $500 \times n (n + 1) / 2$

Substituting the value of n

$$= 500 \times (30 \times 31) / 2$$

So we get

$$= ₹ 232500$$

Here Interest = $PRT / 100$

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Substituting the values

$$= (232500 \times 10 \times 1) / (100 \times 12)$$

$$= ₹ 1937.50$$

$$\text{So the amount of maturity} = 500 \times 30 + 1937.50$$

$$= 15000 + 1937.50$$

$$= ₹ 16937.50$$

We know that at maturity Anshul will get more amount

$$\text{So the difference} = 16937.50 - 16620 = ₹ 317.50$$

3. Shilpa has a 4 year recurring deposit account in Bank of Maharashtra and deposits ₹ 800 per month. If she gets ₹ 48200 at the time of maturity, find

(i) the rate of simple interest,

(ii) the total interest earned by Shilpa

Solution:

It is given that

$$\text{Amount deposited per month (P)} = ₹ 800$$

$$\text{Amount of maturity} = ₹ 48200$$

$$\text{Period (n)} = 4 \text{ years} = 48 \text{ months}$$

Consider R% p.a. as the rate of interest

We know that

$$\text{Total principal for one month} = 800 \times n (n + 1) / 2$$

Substituting the value of n

$$= 800 \times (48 \times 49) / 2$$

So we get

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$$= ₹ 940800$$

$$\text{Here the total deposit} = 800 \times 48 = ₹ 38400$$

$$\text{Amount of maturity} = ₹ 48200$$

$$\text{So the interest earned} = 48200 - 38400 = ₹ 9800$$

$$(i) \text{ Rate of interest} = (SI \times 100) / (P \times T)$$

Substituting the values

$$= (9800 \times 100 \times 12) / (940800 \times 1)$$

$$= 12.5\%$$

$$(ii) \text{ Total interest earned by Shilpa} = ₹ 9800$$

4. Mr. Chaturvedi has a recurring deposit account in Grindlay's Bank for $4\frac{1}{2}$ years at 11% p.a. (simple interest). If he gets Rs 101418.75 at the time of maturity, find the monthly installment.

Solution:

Consider ₹ x as the each monthly installment

$$\text{Rate of interest} = 11\%$$

$$\text{Period (n)} = 4\frac{1}{2} \text{ years} = 54 \text{ months}$$

We know that

$$\text{Total principal for one month} = x \times n (n + 1) / 2$$

Substituting the value of n

$$= x \times (54 \times 55) / 2$$

So we get

$$= 1485x$$

$$\text{Here Interest} = PRT / 100$$

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Substituting the values

$$= (1485x \times 11 \times 1) / (100 \times 12)$$

$$= 13.6125x$$

$$\text{So the amount of maturity} = 54x + 13.6125x$$

$$= 67.6125x$$

By equating the value

$$67.6125x = 101418.75$$

$$x = 101418.75 / 67.6125 = ₹ 1500$$

Hence, the deposit per month is ₹ 1500.

5. Rajiv Bhardwaj has a recurring deposit account in a bank of ₹ 600 per month. If the bank pays simple interest of 7% p.a. and he gets ₹ 15450 as maturity amount, find the total time for which the account was held.

Solution:

It is given that

Amount deposited per month (P) = ₹ 600

Rate of interest = 7% p.a.

Amount of maturity = ₹ 15450

Consider n months as the period

We know that

$$\text{Total principal for one month} = 600 \times n (n + 1) / 2$$

By further calculation

$$= 600 (n^2 + n) / 2$$

$$= 300 (n^2 + n)$$

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Here Interest = $PRT/100$

Substituting the values

$$= (300(n^2 + 1) \times 7 \times 1) / (100 \times 12)$$

$$= 7/4 (n^2 + n)$$

$$\text{Amount of maturity} = 600n + 7/4 (n^2 + n)$$

Substituting the values

$$600n + 7/4 (n^2 + n) = 15450$$

By further calculation

$$2400 + 7n^2 + 7n = 61800$$

$$7n^2 + 2407n - 61800 = 0$$

We can write it as

$$7n^2 - 168n + 2575n - 61800 = 0$$

$$7n(n - 24) + 2575(n - 24) = 0$$

$$(n - 24)(7n + 2575) = 0$$

Here $n - 24 = 0$ where $n = 24$

Similarly

$$7n + 2575 = 0$$

Where $7n = -2575$

$n = -2575/7$ which is not possible as it is negative

Period (n) = 24 months or 2 years

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About ML Aggarwal

M. L. Aggarwal, is an Indian mechanical engineer, educator. His achievements include research in solutions of industrial problems related to fatigue design. Recipient Best Paper award, Manipal Institute of Technology, 2004. Member of TSTE.

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