

## Chapter 7E

# A/cing for Spl Transactions – 5.Average Due Date

### CHAPTER OVERVIEW

1. Meaning	4. For Bills of Exchange / Promissory Notes
2. Amount lent in various Instalments, Single Repayment	5. Computation of Interest – with Average Due Date
3. Amount lent in Single Transaction, Repayment in Instalments	6. Purchase and Sale Transactions with same person

### 5.1 Meaning of Average Due Date

1. **Meaning:**
  - (a) Average Due Date is the date on which a Debtor can pay all the amounts due to another person **without resulting in gain or loss of interest** for either of the contracting parties.
  - (b) Average Due Date is the **equated date** for several due dates of payments. (It is **not** the Median Average.)
2. **Situations:** There are two situations which necessitate the computation of the Average Due Date (ADD) –
  - (a) When amount is lent in various instalments and repayment is sought to be made in one instalment.
  - (b) When amount is lent in one instalment and repayment is sought to be made in various instalments.

### 5.2 Amount lent in various Instalments, Single Repayment

Step	Procedure
1	Take <b>any</b> Due Date (preferably the first Due Date) as the " <b>Base Date</b> ".
2	Compute the number of days (or months) from the Base Date upto each due date.
3	Multiply the number of days (or months) by the corresponding amounts. This is called "Products".
4	Compute Total of Amounts and Total of Products.
5	Compute <b>Average Due Date</b> = Base Date $\pm \frac{\text{Total of Products}}{\text{Total of Amounts}}$

**Note:** The above procedure is the same as calculating the Arithmetic Mean of a discrete series represented by way of a Frequency Distribution through Step-Deviation Method.

While calculating the Average Due Date, **any** Transaction Date may be taken as the Base Date.

### 5.3 Amount lent in Single Transaction, Repayment in Instalments

Computation of Average Due Date (ADD) in this case is as under –

<b>If Instalment Amounts are EQUAL</b>	<b>If Instalment Amounts are NOT EQUAL</b>
<ol style="list-style-type: none"> <li>1. Compute the number of days / months / years from the date of lending, to the date of each repayment.</li> <li>2. Find the Total of such days / months / years.</li> <li>3. <math>\text{ADD} = \text{Date of Loan} + \frac{\text{Total of Step 2}}{\text{No. of Instalments}}</math></li> <li>4. <b>Interest</b> = Total Principal <math>\times</math> Interest Rate <math>\times</math> Period from Date of Loan to ADD</li> </ol>	<ol style="list-style-type: none"> <li>1. Compute the number of days / months / years from the date of lending to the date of each instalment.</li> <li>2. Multiply the number of days by the corresponding Amounts. This is called "Products".</li> <li>3. Compute Total of Amounts and Products.</li> <li>4. <math>\text{ADD} = \text{Date of Loan} + \frac{\text{Total of Products}}{\text{Total of Amounts}}</math></li> <li>5. <b>Interest</b> = Total Principal <math>\times</math> Interest Rate <math>\times</math> Period from Date of Loan to ADD</li> </ol>

### 5.4 For Bills of Exchange / Promissory Notes

Procedure for computing the Average Due Date in case of Negotiable Instruments like Bills of Exchange / Promissory Notes is same as explained above except, when calculating the due date of transaction the following rule should be considered –

Situation	Rule in computing Due Date	Example
1. Promissory Note or Bill of Exchange payable on demand or at sight or on presentment	Matures on the date on which it falls due – ( <b>No three days of Grace</b> )	A Note dated 1 <sup>st</sup> January is payable at sight after one month. It falls due on 1 <sup>st</sup> February.
2. Promissory Note or Bill of Exchange payable on Other than above terms (e.g. after sight, after date)	Matures on the third day after which it is expressed to be payable. Therefore, three days of grace shall be added to the due date.	A Bill dated 30 <sup>th</sup> September is made payable three months after date. It falls due on 3 <sup>rd</sup> January. (Matures on the 3 <sup>rd</sup> day after due date.)
3. Computation of due date when the Maturity Date is a Public Holiday including Sundays and days notified by Central Government (after including three days of grace)	The Instrument shall be deemed to be due on the <b>preceding</b> business day.	A Bill dated 13 <sup>th</sup> July is made payable 30 days after sight. The due date falls on 14 <sup>th</sup> August (Since 15 <sup>th</sup> August is a Public Holiday)
4. Holiday happens to be an Emergency or Unforeseen holiday (Bandh, Red Alarm holiday) – (after including three days of grace)	The Instrument shall be deemed to be due on the <b>succeeding</b> business day.	If suppose, in Case 2 above, the Central Government announce a sudden holiday on 3 <sup>rd</sup> Jan, the bill matures for payment only on 4 <sup>th</sup> Jan.

## 5.5 Computation of Interest – with Average Due Date

### 1. Computation of Interest using Average Due Date:

Situation	Payment on ADD	Payment after ADD	Payment before ADD
<b>Effect</b>	No Gain or Loss of interest for Debtor as well as Creditor.	Interest Loss to the Creditor (due to delay in receipt), which the Creditor will charge from the Debtor.	Interest Loss to the Debtor (since he makes early payment) which he will claim from Creditor, in the form of Discount.
<b>Interest</b>	Not Applicable	<b>Rate:</b> Agreed Rate <b>Period:</b> From Average Due Date To Date of Payment	<b>Rate:</b> Agreed Rate <b>Period:</b> From Date of Payment To Average Due Date

### 2. Computation of Interest on Drawings:

Particulars	How to Compute Interest?
Drawing made on different dates, and settlement made in the same Financial Year	<ul style="list-style-type: none"> <li>Compute <b>ADD</b> for Dates of Drawings (same as above)</li> <li>Identify Date of Repayment.</li> <li>Compute Interest from <b>ADD</b> to the date of Repayment.</li> </ul>
Drawing made on different dates, and settlement is not made in the same Financial Year	<ul style="list-style-type: none"> <li>Compute <b>ADD</b> for Dates of Drawings (same as above).</li> <li>Compute Interest from <b>ADD</b> to Last day of Financial Year.</li> </ul>

## 5.6 Purchase and Sale Transactions with same person

<b>Situation</b>	In the course of business, a person may be both a Debtor as well as a Creditor to the same person (i.e. he may purchase from and sell goods to the same person).
<b>Settlement</b>	In such case, the Net Amount due by one of the parties (i.e. Amount Lent <b>less</b> Amount Borrowed) can be settled by the appropriate person to the other, on the Average Due Date, without having to pay interest.
<b>By whom?</b>	The Person who is required to <b>make the payment</b> after netting off the Purchase and Sales is required to compute the Average Due Date, for making the payment.
<b>Computation</b>	<ol style="list-style-type: none"> <li>For Purchase and Sales Transactions <b>separately</b> –           <ol style="list-style-type: none"> <li>Take <b>any</b> of the Due Date (preferably the first due date) as the "<b>Base Date</b>".</li> <li>Consider the number of days (or months) from the Base Date upto each due date.</li> <li>Multiply the number of days (or months) by the corresponding amounts. This is called "Products".</li> <li>Compute Total of Amounts and Products.</li> </ol> </li> <li>Compute the difference of the Totals of Products and Amounts of the Sale and Purchase transactions.</li> <li>Compute <b>Average Due Date</b> = Base Date <math>\pm \frac{\text{Difference in Total of Products}}{\text{Difference in Total of Amounts}}</math></li> </ol>

## Practical Questions – Average Due Date

### Points for Consideration: In calculating the number of days –

- Base Date is ignored and Due Date is included. (Alternatively, Base Date can be included & Due Date excluded.)
- Any part of a day is taken as one full day.
- Number of Days in February month shall be taken as 28 or 29 days, depending on leap year concept. If year is not specified, it may be taken as 28 days.
- Same Base Date should be taken in case of Mutual Dealings between parties.

### 1. Amt due on various dates, repayment in single instalment

#### Illustration 1: ADD – Several lendings, single repayment

Harish has various bills due on different dates. It was agreed to settle the total amount due by a Single Cheque payment. Find the date of the Cheque. Details of Bills are – ₹ 5,000 due on 5<sup>th</sup> March, ₹ 7,000 due on 7<sup>th</sup> April, ₹ 6,000 due on 17<sup>th</sup> July, ₹ 8,000 due on 14<sup>th</sup> September.

**Solution:**

**Computation of Average Due Date (Note: Base Date = 5<sup>th</sup> March)**

Due Date	No. of Days from the Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
5 <sup>th</sup> March	0	5,000	0
7 <sup>th</sup> April	26 + 7 = 33	7,000	2,31,000
17 <sup>th</sup> July	26 + 30 + 31 + 30 + 17 = 134	6,000	8,04,000
14 <sup>th</sup> Sep	26 + 30 + 31 + 30 + 31 + 14 = 193	8,000	15,44,000
<b>Total</b>		<b>26,000</b>	<b>25,79,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 5^{\text{th}} \text{ March} + \frac{25,79,000}{26,000}$$

$$= 5^{\text{th}} \text{ March} + 100 \text{ days (approx.)} = 13^{\text{th}} \text{ June}$$

#### Illustration 2: ADD – Several amounts due on various dates, single repayment

Swaminathan owed to Subramanian the following sums. Ascertain the Average Due Date.

(a) ₹ 5,000 on 20<sup>th</sup> January, (b) ₹ 8,000 on 3<sup>rd</sup> March, (c) ₹ 6,000 on 5<sup>th</sup> April, (d) ₹ 11,000 on 30<sup>th</sup> April.

**Solution:**

**Computation of Average Due Date (Note: Base Date = 20<sup>th</sup> January)**

Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
20 <sup>th</sup> January	0	5,000	0
3 <sup>rd</sup> March	11 + 28 + 3 = 42	8,000	3,36,000
5 <sup>th</sup> April	11 + 28 + 31 + 5 = 75	6,000	4,50,000
30 <sup>th</sup> April	11 + 28 + 31 + 30 = 100	11,000	11,00,000
<b>Total</b>		<b>30,000</b>	<b>18,86,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 20^{\text{th}} \text{ Jan} + \frac{18,86,000}{30,000}$$

$$= 20^{\text{th}} \text{ Jan} + 63 \text{ days (approx.)} = 24^{\text{th}} \text{ March}$$

### Illustration 3: ADD – Several amounts due on various dates, single repayment

A accepted the following several bills falling due on different dates, now desires to have these bills cancelled and to accept a new bill for the whole amount payable on the Average Due Date. (Assume February = 28 days)

S. No.	Date of Bill	Amount (₹)	Usance of Bill
1.	1 <sup>st</sup> February	4,00,000	1 month
2.	14 <sup>th</sup> February	6,00,000	3 months
3.	2 <sup>nd</sup> March	7,50,000	2 months
4.	10 <sup>th</sup> March	5,00,000	4 months
5.	18 <sup>th</sup> March	9,00,000	1 month

From above, find the Average Due Date, on which A can pay the whole amount.

#### Solution: Computation of Average Due Date (Note: Base Date = 04<sup>th</sup> March)

Bill Date	Term	Due Date	No. of Days from Base Date	Amt (₹ Lakhs)	Product (₹ Lakhs)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5)	Col. (6) = (4) × (5)
1 <sup>st</sup> February	1 month	4 <sup>th</sup> Mar	0	4.0	0
14 <sup>th</sup> February	3 months	17 <sup>th</sup> May	27 + 30 + 17 = 74	6.0	444
2 <sup>nd</sup> March	2 months	5 <sup>th</sup> May	27 + 30 + 5 = 62	7.5	465
10 <sup>th</sup> March	4 months	13 <sup>th</sup> July	27 + 30+31+30+13 = 131	5.0	655
18 <sup>th</sup> March	1 month	21 <sup>st</sup> Apr	27 + 21 = 48	9.0	432
<b>Total</b>				<b>31.5</b>	<b>1996</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 4^{\text{th}} \text{ March} + \frac{1996}{31.5}$$

$$= 4^{\text{th}} \text{ March} + 64 \text{ days (approx.)} = 7^{\text{th}} \text{ May}$$

### Illustration 4: ADD – Several lendings, single repayment

The following are the amounts due on different dates in between the same parties for a period –

Due Dates	3 <sup>rd</sup> July	2 <sup>nd</sup> August	11 <sup>th</sup> September
Amount (₹)	500	800	1,000

Suggest a date on which all the bills may be paid out without any loss of interest to either party.

**Solution:** Only this illustration has been solved with the last Due Date as the Base Date, to explain the concept of negative days computation. It is generally preferable to take the first due date as Base Date.

#### Computation of Average Due Date (Note: Base Date = 11<sup>th</sup> Sep)

Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
3 <sup>rd</sup> July	-(28 + 31 + 11) = -70	500	- 35,000
2 <sup>nd</sup> August	-(29 + 11) = - 40	800	- 32,000
11 <sup>th</sup> September	0	1,000	0
<b>Total</b>		<b>2,300</b>	<b>- 67,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 11^{\text{th}} \text{ Sep} + \frac{-67,000}{2,300} = 11^{\text{th}} \text{ Sep} - \frac{67,000}{2,300}$$

$$= 11^{\text{th}} \text{ Sep} - 30 \text{ days (approx.)} = 12^{\text{th}} \text{ August}$$

#### Proof of No Interest Loss / Gain:

- Assuming 5% is Interest Rate, the Debtor loses Interest due to early payment of ₹ 1,000 for 30 days (from 12<sup>th</sup> August to 11<sup>th</sup> September) = ₹ 4.
- He however, gains Interest, due to late payment on ₹ 500 for 40 days from 3<sup>rd</sup> July to 12<sup>th</sup> August and on ₹ 800 for 10 days, i.e. ₹ 2.80 + ₹ 1.20 = ₹ 4.
- Thus, the Debtor neither loses nor gains by payment of all the amounts on ADD, i.e. 12<sup>th</sup> August.

**Illustration 5: ADD – Several lendings, single repayment**

Ram purchases goods on credit. His due dates for payments were as under. Compute the Average Due Date.

Transaction Date	Amount (₹)	Due Date
5 <sup>th</sup> March	300	8 <sup>th</sup> April
15 <sup>th</sup> April	200	18 <sup>th</sup> May
10 <sup>th</sup> May	275	13 <sup>th</sup> June
5 <sup>th</sup> June	400	8 <sup>th</sup> July

**Solution:****Computation of Average Due Date (Note: Base Date = 8<sup>th</sup> April)**

Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
8 <sup>th</sup> April	0	300	0
18 <sup>th</sup> May	22 + 18 = 40	200	8,000
13 <sup>th</sup> June	22 + 31 + 13 = 66	275	18,150
8 <sup>th</sup> July	22 + 31 + 30 + 8 = 91	400	36,400
<b>Total</b>		<b>1,175</b>	<b>62,550</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 8^{\text{th}} \text{ April} + \frac{62,550}{1,175}$$

$$= 8^{\text{th}} \text{ April} + 54 \text{ days (approx.)} = \mathbf{1^{\text{st}} \text{ June}}$$

**Illustration 6: ADD – Several amounts due on various dates, single repayment**

Compute the Average Due Date from the following information for a period. Assume 20X2 is a Leap Year.

Date of the Bill	Term	Amount (₹)
10 <sup>th</sup> August 20X1	3 months	6,000
15 <sup>th</sup> October 20X1	60 days	5,000
4 <sup>th</sup> December 20X1	2 months	4,000
14 <sup>th</sup> January 20X2	60 days	2,000
8 <sup>th</sup> March 20X2	2 months	3,000

**Solution: Computation of Average Due Date (Note: Base Date = 13.11.20X1)**

Bill Date	Term	Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5)	Col. (6) = (4) × (5)
10.08.20X1	3 months	13.11.20X1	0	6,000	0
15.10.20X1	60 days	14.12.20X1	17 + 14 = 31	5,000	1,55,000
04.12.20X1	2 months	07.02.20X2	17 + 31 + 31 + 7 = 86	4,000	3,44,000
14.01.20X2	60 days	17.03.20X2	17 + 31 + 31 + 29 + 17 = 125	2,000	2,50,000
08.03.20X2	2 months	11.05.20X2	17 + 31 + 31 + 29 + 31 + 30 + 11 = 180	3,000	5,40,000
<b>Total</b>				<b>20,000</b>	<b>12,89,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 13.11.20X1 + \frac{12,89,000}{20,000}$$

$$= 13.11.20X1 + 65 \text{ days (approx.)} = \mathbf{17.01.20X2}$$

**Illustration 7: ADD – Several amounts due on various dates, single repayment**

Compute the Average Due Date from the following information for a period-

Date of Bill	Term	Amount (₹)
16 <sup>th</sup> August 20X1	3 months	3,000
20 <sup>th</sup> October 20X1	60 days	2,500
14 <sup>th</sup> December 20X1	2 months	2,000
24 <sup>th</sup> January 20X2	60 days	1,000
6 <sup>th</sup> March 20X2	2 months	1,500

**Solution:** Computation of Average Due Date (Note: Base Date = 19.11.20X1) (Assumed 20X2 is a Leap Year)

Bill Date	Term	Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5)	Col. (6) = (4) × (5)
16.08.20X1	3 months	19.11.20X1	0	3,000	0
20.10.20X1	60 days	22.12.20X1	11 + 22 = 33	2,500	82,500
14.12.20X1	2 months	17.02.20X2	11 + 31 + 31 + 17 = 90	2,000	1,80,000
24.01.20X2	60 days	27.03.20X2	11 + 31 + 31 + 29 + 27 = 129	1,000	1,29,000
06.03.20X2	2 months	09.05.20X2	11 + 31 + 31 + 29 + 31 + 30 + 9 = 172	1,500	2,58,000
<b>Total</b>				<b>10,000</b>	<b>6,49,500</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 19.11.20X1 + \frac{6,49,500}{10,000}$$

$$= 19.11.20X1 + 65 \text{ days (approx.)} = \mathbf{23.01.20X2}$$

**Illustration 8: ADD – Several lendings, single repayment**

From the following details find out the Average Due Date –

Date of Bill	Amount(₹)	Usance of Bill
29 <sup>th</sup> January	5,000	1 month
20 <sup>th</sup> March	4,000	2 months
12 <sup>th</sup> July	7,000	1 month
10 <sup>th</sup> August	6,000	2 months

**Solution:** Computation of Average Due Date (Note: Base Date = 3<sup>rd</sup> March)

Bill Date	Term	Due Date	No. of Days from Base Date	Amt (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5)	Col. (6) = (4) × (5)
29 <sup>th</sup> Jan	1 month	3 <sup>rd</sup> Mar	0	5,000	0
20 <sup>th</sup> Mar	2 months	23 <sup>rd</sup> May	28 + 30 + 23 = 81	4,000	3,24,000
12 <sup>th</sup> July	1 month	14 <sup>th</sup> Aug (15 <sup>th</sup> Aug = Public Holiday)	28 + 30 + 31 + 30 + 31 + 14 = 164	7,000	11,48,000
10 <sup>th</sup> Aug	2 months	13 <sup>th</sup> Oct	28+30+31+30+31+31+30+13 = 224	6,000	13,44,000
<b>Total</b>				<b>22,000</b>	<b>28,16,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 3^{\text{rd}} \text{ March} + \frac{28,16,000}{22,000}$$

$$= 3^{\text{rd}} \text{ March} + 128 \text{ days} = \mathbf{9^{\text{th}} \text{ July}}$$

**Illustration 9: ADD – Several lendings, single repayment**

Ram purchased goods from Hari, the due dates for payment is cash, are as follows –

Date of Bill	Amount (₹)	Due Date
15 <sup>th</sup> March	4,000	18 <sup>th</sup> April
21 <sup>st</sup> April	3,000	24 <sup>th</sup> May
27 <sup>th</sup> April	2,000	30 <sup>th</sup> June
15 <sup>th</sup> May	2,500	18 <sup>th</sup> July

Hari agreed to draw a Bill for the total amount due on the Average Due Date. Ascertain that date.

**Solution:** Computation of Average Due Date (Note: Base Date = 18<sup>th</sup> April)

Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
18 <sup>th</sup> April	0	4,000	0
24 <sup>th</sup> May	12 + 24 = 36	3,000	1,08,000
30 <sup>th</sup> June	12 + 31 + 30 = 73	2,000	1,46,000
18 <sup>th</sup> July	12 + 31 + 30 + 18 = 91	2,500	2,27,500
<b>Total</b>		<b>11,500</b>	<b>4,81,500</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 18^{\text{th}} \text{ April} + \frac{4,81,500}{11,500}$$

$$= 18^{\text{th}} \text{ April} + 42 \text{ days (approx.)} = 30^{\text{th}} \text{ May}$$

The B/E should be drawn for 11,500, payable on 27<sup>th</sup> May (since 27<sup>th</sup> May + 3 grace days = 30<sup>th</sup> May)

#### Illustration 10: ADD – Several lendings, single repayment

A Trader having accepted the following several bills falling due on different dates, now desires to have these bills cancelled and to accept a new bill for the whole amount payable on the Average Due Date. Find the said Average Due Date.

Sl. No.	Date of Bill	Amount (₹)	Usance of the Bill
1	1 <sup>st</sup> March	4,000	2 months
2	10 <sup>th</sup> March	3,000	3 months
3	5 <sup>th</sup> April	2,000	2 months
4	20 <sup>th</sup> April	3,750	1 month
5	10 <sup>th</sup> May	5,000	2 months

**Solution:**

**Computation of Average Due Date (Note: Base Date = 4<sup>th</sup> May)**

Bill Date	Term	Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5)	Col. (6) = (4) × (5)
1 <sup>st</sup> March	2 months	4 <sup>th</sup> May	0	4,000	0
10 <sup>th</sup> March	3 months	13 <sup>th</sup> June	27 + 13 = 40	3,000	1,20,000
5 <sup>th</sup> April	2 months	8 <sup>th</sup> June	27 + 8 = 35	2,000	70,000
20 <sup>th</sup> April	1 month	23 <sup>rd</sup> May	19	3,750	71,250
10 <sup>th</sup> May	2 months	13 <sup>th</sup> July	27 + 30 + 13 = 70	5,000	3,50,000
<b>Total</b>				<b>17,750</b>	<b>6,11,250</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 4^{\text{th}} \text{ May} + \frac{6,11,250}{17,750}$$

$$= 4^{\text{th}} \text{ May} + 35 \text{ days (approx.)} = 8^{\text{th}} \text{ June}$$

The New Bill should be for ₹ 17,750 payable on 5<sup>th</sup> June (since 5<sup>th</sup> June + 3 grace days = 8<sup>th</sup> June ADD)

#### Illustration 11: ADD – Several lendings, single repayment

M/s Ram & Co. draw upon Lakshman & Co. several Bills of Exchange due for payment on different dates as under –

Date of Bill	Amount ₹	Tenure of Bill
12 <sup>th</sup> May	44,000	3 months
10 <sup>th</sup> June	45,000	4 months
1 <sup>st</sup> July	14,000	1 month
19 <sup>th</sup> July	17,000	2 months

Find out the Average Due Date on which payment may be made in one single amount by Lakshman & Co. to Ram & Co.

Note: 15<sup>th</sup> August, Independence Day, is a National Holiday and 22<sup>nd</sup> September is a declared Emergency Holiday, due to death of a National Leader.

**Solution:**

**Computation of Average Due Date (Note: Base Date = 04<sup>th</sup> August)**

Bill Date	Term	Due Date	No. of Days from Base Date	Amt (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5)	Col. (6) = (4) × (5)
12 <sup>th</sup> May	3 months	14 <sup>th</sup> Aug	10	44,000	4,40,000
10 <sup>th</sup> Jun	4 months	13 <sup>th</sup> Oct	27 + 30 + 13 = 70	45,000	31,50,000
1 <sup>st</sup> Jul	1 month	4 <sup>th</sup> Aug	0	14,000	–
19 <sup>th</sup> Jul	2 months	23 <sup>rd</sup> Sept	27 + 23 = 50	17,000	8,50,000
<b>Total</b>				<b>1,20,000</b>	<b>44,40,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 4^{\text{th}} \text{ August} + \frac{44,40,000}{1,20,000}$$

$$= 4^{\text{th}} \text{ August} + 37 \text{ days (approx.)} = 10^{\text{th}} \text{ September}$$

**Illustration 12: ADD – Several amounts due on various dates, single repayment – Interest Computation**

Arun owes Bala the following amounts – (a) ₹ 5,000 due on 10<sup>th</sup> March, (b) ₹ 18,000 due on 2<sup>nd</sup> April, (c) ₹ 60,000 due on 30<sup>th</sup> April, and (d) ₹ 2,000 due on 10<sup>th</sup> June.

Arun desires to make full payment on 30<sup>th</sup> June with interest at 10% per annum from the Average Due Date. Find out the Average Due Date and the amount of interest.

**Solution:**

**Computation of Average Due Date (Note: Base Date = 10<sup>th</sup> March)**

Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
10 <sup>th</sup> March	0	5,000	0
2 <sup>nd</sup> April	21 + 2 = 23	18,000	4,14,000
30 <sup>th</sup> April	21 + 30 = 51	60,000	30,60,000
10 <sup>th</sup> June	21 + 30 + 31 + 10 = 92	2,000	1,84,000
<b>Total</b>		<b>85,000</b>	<b>36,58,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 10^{\text{th}} \text{ March} + \frac{36,58,000}{85,000}$$

$$= 10^{\text{th}} \text{ March} + 44 \text{ days (approx.)} = 23^{\text{rd}} \text{ April}$$

Days from ADD to 30<sup>th</sup> June (payment) = 7 + 31 + 30 = 68 days. So, **Interest** = ₹ 85,000 × 10% ×  $\frac{68}{365}$  = ₹ 1,584.

**Illustration 13: ADD – Several amounts due on various dates, single repayment– Interest Computation**

Hari owes Ram ₹ 2,000 on 1<sup>st</sup> April. From 1<sup>st</sup> April to 30<sup>th</sup> June, the following transactions took place between Hari and Ram –

- |                        |   |
|------------------------|---|
| 10 <sup>th</sup> April | – Hari buys goods from Ram for ₹ 5,000.         |
| 16 <sup>th</sup> May   | – Hari receives Cash Loan of ₹ 10,000 from Ram. |
| 9 <sup>th</sup> June   | – Hari buys goods from Ram for ₹ 3,000.         |

Hari pays the whole amount together with interest at 15% p.a. to Ram on 30<sup>th</sup> June. Compute the Interest Payable on 30<sup>th</sup> June by the Average Due Date Method.

**Solution:**

**Computation of Average Due Date (Note: Base Date = 1<sup>st</sup> April)**

Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
1 <sup>st</sup> April	0	2,000	0
10 <sup>th</sup> April	9	5,000	45,000
16 <sup>th</sup> May	29 + 16 = 45	10,000	4,50,000
9 <sup>th</sup> June	29 + 31 + 9 = 69	3,000	2,07,000
<b>Total</b>		<b>20,000</b>	<b>7,02,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 1^{\text{st}} \text{ April} + \frac{7,02,000}{20,000}$$

$$= 1^{\text{st}} \text{ April} + 36 \text{ days (approx.)} = 7^{\text{th}} \text{ May}$$

Days from ADD to 30<sup>th</sup> June (payment) = 24 + 30 = 54 days. So, **Interest** = ₹ 20,000 × 15% ×  $\frac{54}{365}$  = ₹ 444 (approx.)

**Illustration 14: ADD – Several amounts due on various dates, single repayment– Interest Computation**

Anand owes Balu ₹ 8,900 on 1<sup>st</sup> January. From January to March, the following further transactions took place between them.

16 <sup>th</sup> January	Anand buys goods	₹ 9,100
2 <sup>nd</sup> February	Anand receives Cash loan	₹ 7,500
5 <sup>th</sup> March	Anand buys goods	₹ 8,100

Anand pays the whole amount on 31<sup>st</sup> March together with interest at 5% per annum. Compute the interest by the ADD Method.

**Solution:****Computation of Average Due Date (Note: Base Date = 1<sup>st</sup> Jan)**

Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
1 <sup>st</sup> Jan	0	8,900	0
16 <sup>th</sup> Jan	15	9,100	1,36,500
2 <sup>nd</sup> February	30 + 2 = 32	7,500	2,40,000
5 <sup>th</sup> March	30 + 28 + 5 = 63	8,100	5,10,300
<b>Total</b>		<b>33,600</b>	<b>8,86,800</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 1^{\text{st}} \text{ January} + \frac{8,86,800}{33,600}$$

$$= 1^{\text{st}} \text{ January} + 27 \text{ days (approx.)} = 28^{\text{th}} \text{ January}$$

Days from ADD to 31<sup>st</sup> March (payment) = 3 + 28 + 31 = 62 days. So, Interest = ₹ 33,600 × 5% ×  $\frac{62}{365}$  = ₹ 285 (approx.)

**Illustration 15: ADD – Several amounts due on various dates, single repayment– Interest Computation**

A Trader allows his customers credit for one week only beyond which he charges interest at 12% p.a. Anil, a customer buys goods as follows on various dates – (a) 2<sup>nd</sup> Jan – ₹ 6,000, (b) 28<sup>th</sup> Jan – ₹ 5,500, (c) 17<sup>th</sup> Feb – ₹ 7,000, (d) 3<sup>rd</sup> Mar – ₹ 4,700. Anil settles his account on 31<sup>st</sup> March. Compute the amount of interest payable by Anil using ADD Method.

**Solution:****Computation of Average Due Date (Note: Base Date = 9<sup>th</sup> January)**

Transaction Date	Due Date	No. of Days from the Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5) = (3) × (4)
2 <sup>nd</sup> January	9 <sup>th</sup> January	0	6,000	0
28 <sup>th</sup> January	4 <sup>th</sup> February	22 + 4 = 26	5,500	1,43,000
17 <sup>th</sup> February	24 <sup>th</sup> February	22 + 24 = 46	7,000	3,22,000
3 <sup>rd</sup> March	10 <sup>th</sup> March	22 + 28 + 10 = 60	4,700	2,82,000
<b>Total</b>			<b>23,200</b>	<b>7,47,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 9^{\text{th}} \text{ January} + \frac{7,47,000}{23,200}$$

$$= 9^{\text{th}} \text{ January} + 33 \text{ days (approx.)} = 11^{\text{th}} \text{ February}$$

Days from ADD to 31<sup>st</sup> March (payment) = 17 + 31 = 48 days. So, Interest = ₹ 23,200 × 12% ×  $\frac{48}{365}$  = ₹ 366 (approx.)

**Illustration 16: ADD – Several lendings, single repayment – Interest Computation**

The following amounts are due to Govind by Himavan. Himavan wants to pay off – (a) on 18<sup>th</sup> March or (b) on 14<sup>th</sup> July. Interest rate of 8% p.a. is taken into consideration.

Due Date	10 <sup>th</sup> Jan	26 <sup>th</sup> Jan (Republic Day)	23 <sup>rd</sup> Mar	18 <sup>th</sup> Aug (Sunday)
₹	5,000	10,000	30,000	40,000

Determine the amount to be paid in (a) and in (b).

**Solution:****Computation of Average Due Date (Note: Base Date = 10<sup>th</sup> Jan)**

Due Date (Given)	Due Date (Actual)	No. of Days from Base Date	Amount (₹)	Product(₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5) = (3) × (4)
10 <sup>th</sup> Jan	10 <sup>th</sup> Jan	0	5,000	0
26 <sup>th</sup> Jan	25 <sup>th</sup> Jan	15	10,000	1,50,000
23 <sup>rd</sup> Mar	23 <sup>rd</sup> Mar	21 + 28 + 23 = 72	30,000	21,60,000
18 <sup>th</sup> Aug	17 <sup>th</sup> Aug	21 + 28 + 31 + 30 + 31 + 30 + 31 + 17 = 219	40,000	87,60,000
<b>Total</b>			<b>85,000</b>	<b>1,10,70,000</b>

$$\text{Avg Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 10^{\text{th}} \text{ Jan} + \frac{1,10,70,00}{85,000} = 10^{\text{th}} \text{ Jan} + 131 \text{ days (approx.)} = 21^{\text{st}} \text{ May.}$$

**Net Payment to be made:**

(a) If Payment is made on 18<sup>th</sup> March, number of days from date of payment to ADD = 13 + 30 + 21 = 64 days.

$$\text{Discount} = ₹ 85,000 \times 8\% \times \frac{64}{365} = ₹ 1,192 \text{ (approx.)}$$

$$\text{Amount to be paid on } 18^{\text{th}} \text{ March} = ₹ 85,000 - ₹ 1,192 = ₹ 83,808.$$

(b) If Payment is made on 14<sup>th</sup> July, number of days from ADD to date of payment = 10 + 30 + 14 = 54 days.

$$\text{Interest} = ₹ 85,000 \times 8\% \times \frac{54}{365} = ₹ 1,006 \text{ (approx.)}$$

$$\text{Amount to be paid on } 14^{\text{th}} \text{ July} = ₹ 85,000 + ₹ 1006 = ₹ 86,006.$$

**Illustration 17: ADD – Several lendings, single repayment – Desired Interest Savings**

Mitra accepted the following bills drawn by Soma.

Date of Bill	Term	Amount (₹)
9 <sup>th</sup> March	4 months	4,000
16 <sup>th</sup> March	3 months	5,000
7 <sup>th</sup> April	5 months	6,000
18 <sup>th</sup> May	3 months	5,000

Mitra wants to pay all the bills on a single day. Find out this date. Interest is charged at 18% p.a. and Mitra wants to save ₹ 150 by way of interest. Find out the date on which he has to effect the payment to save interest of ₹ 150.

**Solution: Computation of Average Due Date (Note: Base Date = 19<sup>th</sup> June = Earliest Due Date)**

Bill Date	Term	Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5)	Col. (6) = (4) × (5)
9 <sup>th</sup> March	4 months	12 <sup>th</sup> July	11 + 12 = 23	4,000	92,000
16 <sup>th</sup> March	3 months	19 <sup>th</sup> June	0	5,000	0
7 <sup>th</sup> April	5 months	10 <sup>th</sup> Sep	11 + 31 + 31 + 10 = 83	6,000	4,98,000
18 <sup>th</sup> May	3 months	21 <sup>st</sup> Aug	11 + 31 + 21 = 63	5,000	3,15,000
<b>Total</b>				<b>20,000</b>	<b>9,05,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 19^{\text{th}} \text{ Jun} + \frac{9,05,000}{20,000} = 19^{\text{th}} \text{ Jun} + 46 \text{ days (approx.)} = 4^{\text{th}} \text{ Aug}$$

**Pre-Payment for savings in Interest:** Interest p.a. = ₹ 20,000 × 18% = ₹ 3,600 (for 365 days)

Since, Mitra wants to save Interest of ₹ 150, let the number of days corresponding to Interest of ₹ 150 = Y.

$$\text{So, } 3,600 \times \frac{Y}{365} = ₹ 150. \quad \text{On solving, } Y = 150 \times \frac{365}{3600} = 16 \text{ days (approx.)}$$

Hence, if Mitra wants to save Interest ₹ 150, he should make payment 16 days before the Average Due Date. Hence, the payment should be made on 19<sup>th</sup> July (4<sup>th</sup> August less 16 days)

**Illustration 18: Average Due Date**

M 19

Attempt any one of the following two sub-parts i.e. either (i) or (ii)

- (i) Two Traders Yogesh and Yusuf buy goods from one another, each allowing the others, one month's credit. At the end of 3 months the accounts rendered are as follows:

	Goods sold by Yogesh to Yusuf (₹)		Goods sold by Yogesh to Yusuf (₹)
April 18	12,000	April 23	10,600
May 15	14,000	May 24	10,000
June 16	16,000		

Calculate the date upon which the balance should be paid so that no interest is due either to Yogesh or Yusuf.

**Solution:****Computation of Average Due Date (Note: Base Date = May 18)**

Date of Sale	Due Date	No. of Days from Base Date	Amt (₹)	Product (₹ Lakhs)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5) = (3) × (4)
April 18	May 18	0	12,000	0
April 23	May 23	5	14,000	70,000
May 15	June 15	13+15=28	16,000	4,48,000
May 24	June 24	13+24=37	10,600	3,92,200
June 16	July 16	13+30+16=59	10,000	5,90,000
<b>Total</b>			<b>62,600</b>	<b>15,00,200</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = \text{May } 18^{\text{th}} + \frac{15,00,200}{62,600}$$

$$= \text{May } 18^{\text{th}} + 24 \text{ days (approx.)} = \mathbf{11^{\text{th}} \text{ June}}$$

**Illustration 19: ADD – Several lendings, single repayment – Interest Computation****N19**The following amounts are due to X by Y. Y wants to pay on 10<sup>th</sup> July 2019. Interest rate of 9% p.a is taken into consideration.

Due dates	₹
10 <sup>th</sup> January	750
26 <sup>th</sup> January (Republic Day)	1,200
23 <sup>rd</sup> March	3,300
18 <sup>th</sup> August (Sunday)	4,100

Determine average due date and the amount to be paid on 10<sup>th</sup> July 2019. Assume 10<sup>th</sup> January as base date.**Solution:****Same as Illustration 16****Computation of Average Due Date (Note: Base Date = 10<sup>th</sup> Jan)**

Due Date (Given)	Due Date (Actual)	No. of Days from Base Date	Amount (₹)	Product(₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5) = (3) × (4)
10 <sup>th</sup> Jan	10 <sup>th</sup> Jan	0	750	0
26 <sup>th</sup> Jan	25 <sup>th</sup> Jan	15	1,200	18,000
23 <sup>rd</sup> Mar	23 <sup>rd</sup> Mar	21 + 28 + 23 = 72	3,300	2,37,600
18 <sup>th</sup> Aug	17 <sup>th</sup> Aug	21 + 28 + 31 + 30 + 31 + 30 + 31 + 17 = 219	4,100	8,97,900
<b>Total</b>			<b>9,350</b>	<b>11,53,500</b>

$$\text{Avg Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 10^{\text{th}} \text{ Jan} + \frac{11,53,500}{9,350} = 10^{\text{th}} \text{ Jan} + 124 \text{ days (approx.)} = \mathbf{14^{\text{th}} \text{ May}}$$

**Net Payment to be made:**(c) If Payment is made on 10<sup>th</sup> July, number of days from ADD to date of payment = 17 + 30 + 10 = 57 days.

$$\text{Interest} = ₹ 9,350 \times 9\% \times \frac{57}{365} = ₹ 131 \text{ (approx.)}$$

$$\text{Amount to be paid on 10<sup>th</sup> July} = ₹ 9,350 + ₹ 131 = ₹ 9,481.$$

**2. Interest on Drawings****Illustration 20: ADD – Interest on Drawings**Arjun and Balram are Partners in a Firm and share Profits and Losses equally. Arjun has withdrawn the following sums during the half year ending 30<sup>th</sup> June –

Date	15 <sup>th</sup> January	10 <sup>th</sup> February	5 <sup>th</sup> April	20 <sup>th</sup> May	18 <sup>th</sup> June
₹	5,000	4,000	8,000	10,000	9,000

Interest on Drawings is charged at 10% per annum. Find out the Average Due Date and compute the Interest on Drawings to be charged on 30<sup>th</sup> June.

**Solution:****Computation of Average Due Date (Note: Base Date = 15<sup>th</sup> January)**

Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
15 <sup>th</sup> January	0	5,000	0
10 <sup>th</sup> February	16 + 10 = 26	4,000	1,04,000
5 <sup>th</sup> April	16 + 28 + 31 + 5 = 80	8,000	6,40,000
20 <sup>th</sup> May	16 + 28 + 31 + 30 + 20 = 125	10,000	12,50,000
18 <sup>th</sup> June	16 + 28 + 31 + 30 + 31 + 18 = 154	9,000	13,86,000
<b>Total</b>		<b>36,000</b>	<b>33,80,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 15^{\text{th}} \text{ January} + \frac{33,80,000}{36,000}$$

$$= 15^{\text{th}} \text{ January} + 94 \text{ days (approx.)} = 19^{\text{th}} \text{ April}$$

$$\text{Days from ADD to } 30^{\text{th}} \text{ June (period end)} = 11+31+30 = 72 \text{ days. So, Interest} = ₹ 36,000 \times 10\% \times \frac{72}{365} = ₹ 710$$

**Illustration 21: ADD – Interest on Drawings**

Adarsh & Bhanu, two Partners of a Firm, have drawn the following amounts from the Firm in the year ending 31<sup>st</sup> March 20X2. Interest at 6% p.a. is charged on all drawings. Compute Interest Chargeable (assume February of 28 days).

Date	Adarsh	Date	Bhanu
1 <sup>st</sup> July	₹ 1,000	12 <sup>th</sup> June	₹ 2,000
30 <sup>th</sup> September	₹ 1,600	11 <sup>th</sup> August	₹ 1,000
31 <sup>st</sup> October	₹ 2,000	9 <sup>th</sup> February	₹ 800
28 <sup>th</sup> February	₹ 800	7 <sup>th</sup> March	₹ 1,800

**Solution:** Computation of Average Due Date for Adarsh (Note: Base Date = 1<sup>st</sup> July)

Date	No. of Days from Base Date	Amount (₹)	Products (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
1 <sup>st</sup> July	0	1000	0
30 <sup>th</sup> September	30 + 31 + 30 = 91	1,600	1,45,600
31 <sup>st</sup> October	30 + 31 + 30 + 31 = 122	2,000	2,44,000
28 <sup>th</sup> February	30 + 31 + 30 + 31 + 30 + 31 + 28 = 242	800	1,93,600
<b>Total</b>		<b>5,400</b>	<b>5,83,200</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 1^{\text{st}} \text{ July} + \frac{5,83,200}{5,400}$$

$$= 1^{\text{st}} \text{ July} + 108 \text{ days} = 17^{\text{th}} \text{ October}$$

Days from ADD to 31<sup>st</sup> March (year-end) = 14 + 30 + 31 + 31 + 28 + 31 = 165 days.

$$\text{So, Interest on Drawings} = ₹ 5,400 \times 6\% \times \frac{165}{365} = ₹ 146 \text{ (approx.)}$$

**Computation of Average Due Date for Bhanu (Note: Base Date = 12<sup>th</sup> June)**

Date	No. of Days from Base Date	Amount (₹)	Products (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
12 <sup>th</sup> June	0	2,000	0
11 <sup>th</sup> August	18 + 31 + 11 = 60	1,000	60,000
9 <sup>th</sup> February	18 + 31 + 31 + 30 + 31 + 30 + 31 + 31 + 9 = 242	800	1,93,600
7 <sup>th</sup> March	18 + 31 + 31 + 30 + 31 + 30 + 31 + 31 + 28 + 7 = 268	1,800	4,82,400
<b>Total</b>		<b>5,600</b>	<b>7,36,000</b>

$$\text{Avg Due Date} = \text{Base Date} \pm \frac{\text{Total of Products}}{\text{Total of Amounts}} = 12^{\text{th}} \text{ Jun} + \frac{7,36,000}{5,600} = 12^{\text{th}} \text{ Jun} + 132 \text{ days (approx.)} = 22^{\text{nd}} \text{ Oct.}$$

Days from ADD to 31<sup>st</sup> March (year-end) = 9 + 30 + 31 + 31 + 28 + 31 = 160 days.

$$\text{So, Interest on Drawings} = ₹ 5,600 \times 6\% \times \frac{160}{365} = ₹ 147 \text{ (approx.)}$$

### 3. Mutual Dealings

#### Illustration 22: ADD – Mutual Dealings – Purchases and Sales

Ganesh and Rajan had the following mutual dealings and desire to settle their account on the Average Due Date. Find ADD.

Purchases by Ganesh from Rajan	Amount (₹)	Sales by Ganesh to Rajan	Amount (₹)
6 <sup>th</sup> January	6,000	6 <sup>th</sup> January	6,600
2 <sup>nd</sup> February	2,800	9 <sup>th</sup> March	2,400
31 <sup>st</sup> March	2,000	20 <sup>th</sup> March	500

**Solution:**

**Computation of Products for Ganesh's Payments (Note: Base Date = 6<sup>th</sup> January)**

Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
6 <sup>th</sup> January	0	6,000	0
2 <sup>nd</sup> February	25 + 2 = 27	2,800	75,600
31 <sup>st</sup> March	25 + 28 + 31 = 84	2,000	1,68,000
<b>Total</b>		<b>10,800</b>	<b>2,43,600</b>

**Computation of Products for Rajan's Payments (Note: Base Date = 6<sup>th</sup> January)**

Due Date	No. of Days from Base Date	Amount (₹)	Product (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4) = (2) × (3)
6 <sup>th</sup> January	0	6,600	0
9 <sup>th</sup> March	25 + 28 + 9 = 62	2,400	1,48,800
20 <sup>th</sup> March	25 + 28 + 20 = 73	500	36,500
<b>Total</b>		<b>9,500</b>	<b>1,85,300</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Difference in Products}}{\text{Difference in Amounts}} = 6^{\text{th}} \text{ Jan} + \frac{2,43,600 - 1,85,300}{10,800 - 9,500} = 6^{\text{th}} \text{ Jan} + \frac{58,300}{1,300}$$

$$= 6^{\text{th}} \text{ January} + 45 \text{ days (approx.)} = 20^{\text{th}} \text{ February}$$

On 20<sup>th</sup> February, Ganesh has to pay Rajan ₹ 1,300 to settle the account.

#### Illustration 23: ADD – Mutual Dealings – Purchases and Sales

Two traders Abhinav and Krishna buy goods from one another, each allowing the other one month's credit. At the end of 3 months the accounts rendered are as follows:

Goods sold by Abhinav to Krishna		Goods sold by Krishna to Abhinav	
18 <sup>th</sup> April	₹ 6,000	23 <sup>rd</sup> April	₹ 5,200
15 <sup>th</sup> May	₹ 7,000	24 <sup>th</sup> May	₹ 5,000
16 <sup>th</sup> June	₹ 8,000		

Compute the date upon which the balance should be paid, so that no interest is due either to Abhinav or Krishna.

**Solution:**

**Computation of Products for Krishna's payments (Note: Base Date = 18<sup>th</sup> May)**

Transaction Date	Due Date	No. of Days from the Base Date	Amount (₹)	Products (₹)
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5) = (3) × (4)
18 <sup>th</sup> April	18 <sup>th</sup> May	0	6,000	0
15 <sup>th</sup> May	15 <sup>th</sup> June	13 + 15 = 28	7,000	1,96,000
16 <sup>th</sup> June	16 <sup>th</sup> July	13 + 30 + 16 = 59	8,000	4,72,000
<b>Total</b>			<b>21,000</b>	<b>6,68,000</b>

**Computation of Products for Abhinav's payments (Note: Base Date: 18<sup>th</sup> May)**

<b>Transaction Date</b>	<b>Due Date</b>	<b>No. of Days from the Base Date</b>	<b>Amount (₹)</b>	<b>Products (₹)</b>
<b>Col. (1)</b>	<b>Col. (2)</b>	<b>Col. (3)</b>	<b>Col. (4)</b>	<b>Col. (5) = (3) × (4)</b>
23 <sup>rd</sup> April	23 <sup>rd</sup> May	5	5,200	26,000
24 <sup>th</sup> May	24 <sup>th</sup> June	13 + 24 = 37	5,000	1,85,000
<b>Total</b>			<b>10,200</b>	<b>2,11,000</b>

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Difference in Products}}{\text{Difference in Amounts}} = 18^{\text{th}} \text{ May} + \frac{6,68,000 - 2,11,000}{21,000 - 10,200} = 18^{\text{th}} \text{ May} + \frac{4,57,000}{10,800}$$

$$= 18^{\text{th}} \text{ May} + 43 \text{ days (approx.)} = 30^{\text{th}} \text{ June.}$$

On 30<sup>th</sup> June, Krishna has to pay Abhinav ₹ 10,800 to settle the account.

**Illustration 24: ADD – Mutual Dealings – Bills Receivable and Bills Payable**

Ram had the following Bills Receivable and Bills Payable against Shyam. Compute the Average Due Date when the payment can be made or received without any loss or gain of interest to either party.

Bills Receivable			Bills Payable		
Date of the Bill	Amount (₹)	Tenure in Months	Date of bill	Amount (₹)	Tenure in Months
1 <sup>st</sup> June	9,000	3	29 <sup>th</sup> May	6,000	2
5 <sup>th</sup> June	7,500	3	3 <sup>rd</sup> June	9,000	3
9 <sup>th</sup> June	10,000	1	10 <sup>th</sup> June	10,000	2
12 <sup>th</sup> June	8,000	2	13 <sup>th</sup> June	7,000	2
20 <sup>th</sup> June	12,000	3	27 <sup>th</sup> June	11,000	1

Holidays intervening in the period are 15<sup>th</sup> August and 6<sup>th</sup> September.

**Solution:**

**For Bills Receivable (Note: Base Date = 12<sup>th</sup> July)**

<b>Bill Date</b>	<b>Term</b>	<b>Due Date</b>	<b>No. of Days from Base Date</b>	<b>Amount (₹)</b>	<b>Product (₹)</b>
<b>Col. (1)</b>	<b>Col. (2)</b>	<b>Col. (3)</b>	<b>Col. (4)</b>	<b>Col. (5)</b>	<b>Col. (6) = (4) × (5)</b>
1 <sup>st</sup> June	3 months	4 <sup>th</sup> Sep	19 + 31 + 4 = 54	9,000	4,86,000
5 <sup>th</sup> June	3 months	8 <sup>th</sup> Sep	19 + 31 + 8 = 58	7,500	4,35,000
9 <sup>th</sup> June	1 month	12 <sup>th</sup> July	0	10,000	0
12 <sup>th</sup> June	2 months	(Note) 14 <sup>th</sup> Aug	19 + 14 = 33	8,000	2,64,000
20 <sup>th</sup> June	3 months	23 <sup>rd</sup> Sep	19 + 31 + 23 = 73	12,000	8,76,000
<b>Total</b>				<b>46,500</b>	<b>20,61,000</b>

**For Bills Payable (Note: Base Date = 12<sup>th</sup> July)**

<b>Bill Date</b>	<b>Term</b>	<b>Due Date</b>	<b>No. of Days from Base Date</b>	<b>Amount (₹)</b>	<b>Product (₹)</b>
<b>Col. (1)</b>	<b>Col. (2)</b>	<b>Col. (3)</b>	<b>Col. (4)</b>	<b>Col. (5)</b>	<b>Col. (6) = (4) × (5)</b>
29 <sup>th</sup> May	2 months	1 <sup>st</sup> Aug	19 + 1 = 20	6,000	1,20,000
3 <sup>rd</sup> June	3 months	(Note) 5 <sup>th</sup> Sep	19 + 31 + 5 = 55	9,000	4,95,000
10 <sup>th</sup> June	2 months	13 <sup>th</sup> Aug	19 + 13 = 32	10,000	3,20,000
13 <sup>th</sup> June	2 months	16 <sup>th</sup> Aug	19 + 16 = 35	7,000	2,45,000
27 <sup>th</sup> June	1 month	30 <sup>th</sup> July	18	11,000	1,98,000
<b>Total</b>				<b>43,000</b>	<b>13,78,000</b>

**Note:** 15<sup>th</sup> August and 6<sup>th</sup> September are Public Holidays, and hence previous day shall be considered as Due Date.

$$\text{Average Due Date} = \text{Base Date} \pm \frac{\text{Difference in Products}}{\text{Difference in Amounts}} = 12^{\text{th}} \text{ July} + \frac{20,61,000 - 13,78,000}{46,500 - 43,000} = 12^{\text{th}} \text{ Jul} + \frac{6,83,000}{3,500}$$

$$= 12^{\text{th}} \text{ July} + 196 \text{ days (approx.)} = 24^{\text{th}} \text{ January}$$

**Illustration 25: ADD – Mutual Dealings – Bills Receivable and Bills Payable**

The following transactions took place between Thick and Thin. They desire to settle their account on Average Due Date.

Particulars	₹	Particulars	₹
Purchases by Thick from Thin 9 <sup>th</sup> July 14 <sup>th</sup> August	7,200 12,200	Sales by Thick to Thin 15 <sup>th</sup> July 31 <sup>st</sup> August	18,000 16,500

Calculate Average Due Date and the amount to be paid or received by Thick.

**Solution:**

**1. Computation of Products for Thick's payment (Base Date = 9<sup>th</sup> July)**

Due Date	No. of Days from Base Date	Amount (₹)	Product (Rs.)
(1)	(2)	(3)	(4) = (2) × (3)
9 <sup>th</sup> July	0	7,200	0
14 <sup>th</sup> Aug	36 (22+14)	12,200	4,39,200
		19,400	4,39,200

**2. Computation of Products for Thin's payment (Base Date = 9<sup>th</sup> July)**

Due Date	No. of Days from Base Date	Amount (₹)	Product (Rs.)
(1)	(2)	(3)	(4) = (2) × (3)
15 <sup>th</sup> July	6	18,000	1,08,000
31 <sup>st</sup> Aug	53 (22+31)	16,500	8,74,500
		24,500	9,82,500

$$\text{Average Due Date} = \text{Base Date} + \frac{\text{Difference in Products}}{\text{Difference in Amounts}} = 9^{\text{th}} \text{ July} + \frac{9,82,500 - 4,39,200}{34,500 - 19,400} = 9^{\text{th}} \text{ July} + \frac{5,43,300}{15,100}$$

$$= 9^{\text{th}} \text{ July} + 36 \text{ days} = 14^{\text{th}} \text{ Aug.}$$

**Note:** Thick has to receive ₹15,100 from Thin on 14<sup>th</sup> August.

**4. Repayment in multiple Instalments****Illustration 26: ADD – Loan repayable in equal instalments**

Arun advanced ₹ 30,000 to Balu on 1<sup>st</sup> April. The amount is repayable in 6 equal monthly instalments commencing from 1<sup>st</sup> May onwards. Compute the Average Due Date for the Loan.

$$\begin{aligned} \text{Solution: Average Due Date} &= \text{Date of Loan} + \frac{\text{Sum of (Date of Lending to Date of each Repayment)}}{\text{Number of Instalments}} \\ &= 1^{\text{st}} \text{ April} + \frac{(1+2+3+4+5+6)}{6} \text{ (in months)} \\ &= 1^{\text{st}} \text{ April} + 3.5 \text{ months} \quad = 16^{\text{th}} \text{ July} \end{aligned}$$

**Illustration 27: ADD – Loan repayable in equal instalments**

Ambarish lent ₹ 25,000 to Durvasha on 1<sup>st</sup> January 2012. The amount is repayable in 5 half yearly installments commencing from 1<sup>st</sup> January 2013. Compute the Average Due Date and interest at 10% per annum.

**Solution:** **Computation of sum of periods from the date of loan**

Particulars	Date of Repayment	Time from Date of lending to Date of Repayment
1 <sup>st</sup> Payment	01.01.2013	12 months
2 <sup>nd</sup> Payment	01.07.2014	18 months
3 <sup>rd</sup> Payment	01.01.2014	24 months
4 <sup>th</sup> Payment	01.07.2014	30 months
5 <sup>th</sup> Payment	01.01.2015	36 months
<b>Total</b>		<b>120 months</b>

**Average Due Date**

$$= \text{Date of Loan} + \frac{\text{Sum of (Date of Lending to Date of each Repayment)}}{\text{Number of Instalments}}$$

$$= 1^{\text{st}} \text{ Jan 2012} + \frac{120 \text{ months}}{5} = 1^{\text{st}} \text{ Jan 2012} + 24 \text{ months} = 1^{\text{st}} \text{ Jan 2014}.$$

So, **Interest** = ₹ 25,000 × 10% for 24 months (2 years) = ₹ 5,000

#### Illustration 28: ADD– Loan repayable in equal instalments

₹ 1,00,000 lent by Guru to Karna on 1<sup>st</sup> January 20X1 is repayable in 5 equal annual instalments commencing on 1<sup>st</sup> January 20X2. Find the Average Due Date and compute interest at 5% per annum, which Guru will recover from Karna.

**Solution:**      **Average Due Date** = Date of Loan +  $\frac{\text{Sum of (Date of Lending to Date of each Repayment)}}{\text{Number of Instalments}}$

$$= 1^{\text{st}} \text{ Jan 20X1} + \frac{(1+2+3+4+5)}{5} = 1^{\text{st}} \text{ Jan 20X1} + 3 \text{ years} = 1^{\text{st}} \text{ Jan 20X4}.$$

So, **Interest** = ₹ 1,00,000 × 5% for 3 years = ₹ 15,000 to be charged by Guru from Karna.

N 18

#### Illustration 29: Average Due Date

Karan purchased Goods from Arjun, the Average Due Date for payment in Cash is 10.08.2018 and the total amount due is ₹ 1,75,800. How much amount should be paid by Karan to Arjun, if total payment is made on following dates and Interest is to be considered at the rate of 15% p.a.– (a) On Average Due Date, (b) On 28<sup>th</sup> August 2018, and (c) On 29<sup>th</sup> July 2018

**Solution:**

Particulars	Case A	Case B	Case C
Average Due Date (ADD)	10.08.2018	10.08.2018	10.08.2018
Payment Date	10.08.2018	28.08.2018	29.07.2018
Difference between ADD & Pmt Date	Nil	18 Days after ADD	12 Days before ADD
Interest	Nil	$1,75,800 \times 15\% \times \frac{18}{365} = 1,300$	$1,75,800 \times 15\% \times \frac{12}{365} = 867$
Amount to be paid	₹ 1,75,800	$1,75,800 + 1,300 = ₹ 1,77,100$	$1,75,800 - 867 = ₹ 1,74,933$