NATIONAL SCHOOL OF BANKING

ADDITION

The process of addition is very simple and almost all of us can add, getting the correct answer – but not many of us do know the correct way to add, in the shortest possible time, to get the correct answer. A lot many of us have a wrong way of reading numbers and still more have time comsuming ways of adding numbers.

Firstly, while adding numbers, avoid saying 6 plus 8 equal 14 and 18 plus 12 equal 30 etc. Instead as soon as you see 6 and 8 to be added, simply say "14"; similarly for 18 and 12, merely say "30".

Secondly, when you see a number like 216, avoid saying two hundred and sixteen, simply say two sixteen.

Thirdly, as far as possible, perform a double column addition instead of adding the columns one by one. But before we go on to double column addition, let us see how a **single column addition** is performed leaving out all superfluous words.

Sn.1.1

```
 5
 3
 8
 9
 4
 5
 8
42
```

Starting from the bottom, **do not** say 8 and 5 are 13 and 4 are 17 and 9 are 26 and 8 are 34 and 3 are 37 and 5 are 42. Merely say 13, 17, 26, 34, 37, 42.

Another time saving device is to place a dot for each ten to be carried and add only the units.

```
 5.
 3
 8.
 9.
 4
 5.
 8
42
```

Starting from the bottom, instead of 13, 17, 26 etc. say the unit figure only, placing a dot next to the number when you exceed 10. Thus say 3, 7, 6, 4, 7, 2. The four dots indicate 40. 40 plus the last unit figure 2 equal 42.

Sn.1.2 **Double column addition** is absolutely essential for quick work. Always add from the "tens". Thus 32 + 65 will become 32 + 60 i.e. 92 before the unit figure is added. Therefore, 32 + 65 will be called out as 97 immediately.

```
 8 9.
 5 6.
 2 3
 7 8.
 4 5
 1 2
303
```

The addition ***starting from the bottom*** proceeds as 12 + 40 (of 45) and then 5 giving 57, 57 + 70 (of 78) and then 8 giving 135 and so on. (The arrows indicate the direction in which your eyes should see the numbers).

The figure which the eyes see and recognise should be 57, 35, 58, 14, 3. The Hundreds that we get during the process of addition can be placed beside the number where the total comes to a hundred (as shown alongside).

8 9 ***Starting from the top,*** the addition proceeds along the direction of the arrows as 45,
5 6. 68, 46, 91, 3. And the 3 dots mean 300. Hence the total 303.
2 3
7 8.
4 5
1 2.
3 0 3

When tackling additions with more columns, add double columns each time.

	3	6	9	8	7	Starting from the bottom:
	7	4	1	2	3	**First double column** (i.e. right 2 columns) :
	2	8	5	7	9	35, 1̲14, 37, 2̲24 24 written, 2 carried.
	6	5	4	1	2	**Second double column :** 43 (this is the 2 carried plus 41), 97,
	5	4	1	2	3	1̲82, 2̲23, 92. 92 written, 2 carried.
2	5	9	2	2	4	**Last column :** 7 (this is the 2 carried plus 5), 13, 15, 22, 25.

	9	6	3	2	5	8	Starting from the top:
	7	4	1	8	5	2	**1st double column : 1̲10, 38, 55, 2̲11, 32.**
	3	9	6	5	2	8	32 written, 2 carried.
	8	5	2	4	1	7	**2nd double column :** 34, 52, 1̲17, 41, 55, 2̲28.
	3	2	1	4	5	6	28 written, 2 carried.
	9	8	7	3	2	1	**3rd double column :** 98, 1̲72, 2̲11, 96, 3̲28, 4̲26.
4	2	6	2	8	3	2	

Make up sets of figures and add them from the top once and from the bottom again, by the double column method. Check your answer by the single column method.

Sn.1.3 Once double column addition is mastered, it is easy enough to add numbers horizontally, even when the number of digits in each number are different.

$36925 + 4563 + 321659 + 984 = ?$

Adding by the double column method, for the sets of the right 2 figures you would say 88, 147, 231. 31 written, 2 carried. For the next set, 71 (this is 2 carried + 69) 1̲16, 32, 41. Write 41, carry 1. For the last set, 4 (this is 1 carried + 3), 36. Therefore, the answer is 364131.

Make up your own set of horizontal additions, add by the double column method and check the answer by a conventional addition.

Sn.1.4 Checking the answer of an addition by casting out Nines.

This is a method to check the correctness of the answer in a problem on addition. It is based on the fact that the sum of the digits of which any number is composed gives the same remainder when divided by 9 as is obtained when the original number is divided by 9. Thus 56 divided by 9 leaves 2 as the remainder, the same remainder as is obtained by

dividing 5 + 6 by 9. Similarly 332 divided by 9 leaves 8 as the remainder, the same result as 3 + 3 + 2. Similarly 488 divided by 9 leaves 2, which can readily be obtained by deducting9s (i.e. casting out9s) from the sum of 4, 8 and 8.

The method therefore, is to add the digits by column or line and deduct 9 (i.e. cast out 9) whenever the sum of the digits exceeds 9. The final remainder will be the same as is obtained by doing likewise for the answer.

							Nines remainder
3	4	6	8	2	3	…	8
9	3	2	5	1	4	…	6
4	8	3	2	3	3	…	5
1	4	5	6	3	2	…	3
1	9	0	8	2	0	2	22 ÷ 9 leaves 4 as remainder.

1 9 0 8 2 0 2 after casting out nines, leaves 4 as remainder.

If the addition is correct, the two final remainders will tally.

Sn.1.5 For addition of numbers containing decimals, the same procedure of double column addition should be used.

$369.003 + 9.63 + 0.02 + 0.0003 + 948 = ?$

For the decimal part, the 1st double column is totalled as 30, 33 and the 2nd double column as 63, 65, 65. Therefore, the decimal part totals 6533.

For the nondecimal part, the 1st double column would be totalled as 78, 78, 78, 126 (26 written, 1 carried); the last column would be totalled as 4 (this is the carried 1 + 3). 4, 4, 4, 13.

Therefore the total is 1326.6533.

SUBTRACTION

Sn.1.11 The quickest method of subtraction is the method of Equal Additions. The method is one of "borrowing and paying back". It is a statistically proved fact that addition is simpler than subtraction and hence the method.

Suppose you wish to subtract 56 from 92. Mentally increase the number to be subtracted to the nearest multiple of 10 i.e. increase 56 to 60 by adding 4 to it. Mentally increase the other quantity by the same amount i.e. by 4. Therefore, the problem now is 96 minus 60, for which the answer is instantaneously seen to be 36.

Sometimes, it is found useful to increase the number to be subtracted to the nearest multiple of 100, for instance in 342 – 178. Therefore, 178 becomes 200 by adding 22 and 342 becomes 364, and 364 – 200 is immediately seen to be 164.

3326 – 1875 would be tackled by converting 1875 to 2000 (by adding 125) and consequently 3326 to 3451. And 3451 – 2000 = 1451.

Sn.1.12 While the above is useful method, when there are a series of additions and subtractions to be performed in a line, an extension of the double columns addition would be useful – this would of course be a "double column addition and subtraction" method.

(1)

4	8	9	8
- 1	2	0	6
+3	8	0	2
- 4	3	7	8
+1	0	6	2
4	1	7	8

You should keep looking at the sign before the number and keep adding or subtracting (according to the sign) as the case may be. ***Working from the top.***

1st double column : 92, 94, 16, 78.
2nd double column : 36, 74, 31, 41.

(2)

	2	3	6
- 3	6	9	8
+5	6	7	9
- 2	6	2	3
+4	3	8	0
3	9	7	4

1st double column : -62, 17, -6, 74.

2nd double column : -34, 22, -4, 39.

Sn.1.13 Of course, it is not necessary that we will get a positive number, as the answer for each double column, as we did in the above two examples. Consider the following situations where for the 1st or 2nd double column or for both double column, we get a negative answer.

(1)

	2	3	6
- 3	6	7	2
+5	6	1	8
- 2	6	7	4
+4	3	4	6
3	9	$\overline{4}$	6

The 1st double column totals -46 and the 2nd double column totals 39. The answer is written as $39\overline{46}$. (The line above 46 is called a vinculum). The value of the number is obviously 3900 - 46 i.e. 3854.

= 3854

There is a special method of subtracting numbers under a vinculum. Suppose we have a number of the form $87\overline{356}$. Subtract the last digit under the vinculum form 10 and the rest of the digits under the vinculum from 9 and reduce the nonvinculum part by 1. Thus $87\overline{356}$ = 86644. You will realise that what we have done is to consider the value of the number. The

value of the number is 87000 – 356 which equals 86644. Similarly $1\overline{44}$ = 56; $98\overline{4356}$ = 975644; $10\overline{2344}$ = 97656 etc.)

(2)
		5	8	6
	- 4	8	5	8
	+8	8	8	3
	- 5	6	6	9
	- 3	8	0	8
	- 4	9	/3	4
=	- 4	8	6	6

The 1st double column totals + 34 and the 2nd double column totals – 49 i.e. the value of the answer is –4900 + 34 which equals – 4866.

(3)
		2	7	6
	- 8	7	9	9
	+4	0	4	6
	- 3	2	8	3
	+5	2	1	5
	- 2	5	4	5

The **1st double column** totals –45 and the **2nd double column** totals –25. Therefore, the value of the answer is –2500 – 45 which equals – 2545.

(4)
		9	6	3
	- 8	5	2	1
	+7	4	1	0
	- 3	6	9	8
	- 2	5	8	7
	- 6	4	3	3

1st double column : 42, 52, –46, –133. 33 written, –1 carried.

2nd double column : 8(this is 9 – 1 carried) –77, –3, –39, –64.

Sn. 1.14 Subtraction by complementary addition :

This method is to be used when it is required to find out what must be added to a number to make a second number.

(1) $38 + 25 + 89 + ? = 200$

By the single column method say 8, 13, 22, and 8 to make 30; carry 3. 6 (this is the carried 3 + 3), 8, 16, add 4 to make 20. Answer 48.

By the double column method, say 63, 152, add 48 to make 200. Answer 48.

(2) $5748 + 3059 + ? = 9090$

By the double column method, say 107, add 83 to make 190; carry 1. 58 (this is 1 carried + 57), 88, add 2 to make 90. Answer 283.

(3) $6954 + 506 + ? - 78 = 8973$

By the double column method, say 60, -18, add 91 to make 73, 74, add 15 to make 89. Answer 1591.