

## 8. mental calculation

Now that you have acquired a certain degree of skill in operating the abacus, let us go into the abacus method of mental calculation.

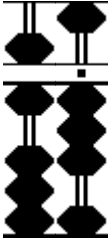
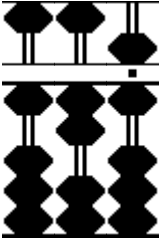
Mental calculation, in fact, is an important feature of abacus, although, it is done without touching the abacus itself. It can be quite useful once the technique is mastered by repetitious practice.

This is done by applying abacus calculation to mental arithmetic, by visualizing abacus manipulation. By proper practice, anyone can learn to work out mental calculations involving figures with many digits.

### ► Method of Practice

Add any number 10 times and subtract 10 times from the total. Practice the addition of two-digit numbers first, then move onto three-digit numbers. For example, add 63 ten times and obtain the total of 630. Then subtract 63 ten times from 630, and if the answer is zero, you know that your mental calculation was correct.

In adding 63 to 63, close your eyes and visualize the beads set

like this:  then add 63 mentally, visualizing this: 

In other words, mental calculation is done by visualizing the movement of the beads at each step of manipulation.

It may be a good idea to do this with your eyes closed so that you can concentrate better.

There are several categories of mental calculation, including the reading-off method, written-number method, page-turning method, division and multiplication.

Of these, the written-number method of mental calculation is included in the first- and second-grade abacus operators' license examinations.

After some practice, it becomes possible for anyone to work out most the arithmetic problems of daily life without clicking the beads. Indeed, this then becomes a strong point of those who have learned to operate the abacus.

Japanese champions of mental arithmetic are able to calculate figures with 9 to 10 digits in their heads without making mistakes.

## **Written-number Method of Mental Calculation**

### **Exercise Problem 1:**

(1)	(2)	(3)	(4)	(5)
56	13	48	35	92
14	47	92	74	18
32	59	65	81	35
88	28	13	16	64
<u>70</u>	<u>62</u>	<u>71</u>	<u>29</u>	<u>71</u>

(6)	(7)	(8)	(9)	(10)
17	93	76	85	20
33	15	24	15	87
52	72	13	43	16
48	23	87	56	43
69	40	25	21	54
35	59	54	70	78
<u>80</u>	<u>88</u>	<u>39</u>	<u>64</u>	<u>92</u>

(Note: Calculate by two digits at a time to avoid ciphering)

### Exercise Problem 2:

No.	1	2	3	4	5
1	3	90	64	40	7
2	91	7	30	31	50
3	20	56	2	5	97
4	7	4	85	69	83
5	74	73	57	8	6
6	53	90	6	10	14
7	6	68	10	74	50
8	20	24	1	2	84
9	89	1	49	35	2
10	18	58	23	62	69
11	73	2	4	18	75
12	1	30	92	3	26
13	62	6	75	7	1
14	5	17	8	26	7
15	34	25	16	90	38
<b>Total</b>					

<b>No.</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
1	40	13	98	58	10
2	56	50	70	90	89
3	91	61	36	16	76
4	79	72	63	70	93
5	60	60	20	26	20
6	28	48	15	70	85
7	90	35	79	38	31
8	36	90	40	54	40
9	74	26	81	69	76
10	85	40	26	40	29
11	72	94	10	73	64
12	13	18	82	40	37
13	60	87	97	92	58
14	58	20	34	82	90
15	40	65	50	15	72
<b>Total</b>					